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THE ACTION OF SOLUTION OF AMMONIA UPON MIXTURES OF SILVER CHLORIDE AND BROMIDE.

BY ALFRED SENIER,

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This paper was written several years ago, since which time no important additional experiments have been made. The author sees no immediate prospect of the work receiving at his hands the further attention which it deserves, and meanwhile the results here described are of sufficient interest to justify their publication.

The action of solution of ammonia upon mixtures of silver chloride and iodide was investigated by Wallace and Lamont,* who proposed a method for their separation based upon the results obtained. The respective solubilities of silver chloride, bromide and iodide have been determined under various circumstances by different observers; but, so far as I have been able to ascertain, the action of solution of ammonia upon mixtures of silver chloride and bromide has not been examined. To obtain, if possible, an approximate method by which chlorides and bromides might be separated, or at all events to give precision to our knowledge of this subject, was the object in view when the experiments here detailed were undertaken.

The solution of ammonia used throughout had a specific gravity of ·959, corresponding to 10 per cent. of NH_3, the "liquor ammoniæ" in fact of the British Pharmacopœia. The silver salts were used in the moist, freshly precipitated state, quantities of dry sodium chloride and potassium bromide being employed to give the desired weight of silver salts. The alkaline salts were dissolved, either together or in some cases separately, in about 50 cubic centimetres of water, and were converted into silver salts by a slight excess of silver nitrate. The precipitate was allowed to subside and was washed with water twice by decantation. The ammonia solution was then added and the mixture thoroughly agitated and set aside to subside if anything remained undissolved.

In the first place the solubility of moist, freshly precipitated silver chloride and silver bromide in ammonia solution by themselves was determined. ·4076 gram of sodium chloride was converted into silver chloride (1 gram) and the ammonia solution added with brisk agitation until all was dissolved. Seventeen cubic centimetres of ammonia solution were employed, and hence the solubility may be stated with sufficient accuracy at 1 in 17. In the same manner the solubility of silver bromide was ascertained. ·1589 gram of potassium bromide converted into silver bromide (·25 gram) required for solution 62·5 cubic centimetres of ammonia solution. The solubility of silver bromide then may be taken to be 1 in 250. Having determined the solubility of the silver salts separately in ammonia solution, I then proceeded to study the action of ammonia solution on the silver salts mixed together, first with equal mixtures of silver salts and different quantities of ammonia, and secondly with the same amount of ammonia solution and varied proportions of the silver salts.

Action of Different Proportions of Ammonia Solution on equal Mixtures of Silver Chloride and Bromide.—An equal mixture of 1 gram each of silver chloride and bromide was prepared by dissolving equivalent quantities of sodium chloride and potassium bromide in water and converting the mixture into silver salts. These were washed and while still fresh were treated with 20 cubic centimetres of ammonia solution, or rather more than would be required to dissolve the silver chloride present if its solubility remained 1 in 17 as when treated with ammonia solution by itself. The result was an insoluble portion, which from its colour was presumedly silver bromide, and which when washed, dried and weighed in the usual manner gave 1·25 gram, or again 1·26 gram (see experiments (1) and (1*a*) in Table I.). Evidently the solubility of the chloride, assuming for the moment the soluble portion to be chloride, was modified by the presence of bromide, otherwise there should have remained insoluble in each of the two experiments only 1 gram at the most—the amount of silver bromide present. In the next four experiments, successively, larger proportions of ammonia solution were employed. They show that in order to dissolve 1 gram of chloride, when mixed with the same weight of bromide, 50 cubic centimetres of ammonia solution are required. In the presence of an equal weight of silver bromide the solubility of silver chloride, for the present amount, is then 1 in 50; but it must be observed that in experiment No. 1 the solubility is 1 in 27, and in No. 2 it is 1 in 33, while the last portion in experiment No. 5 dissolves 1 in about 400. Thus, while, as will be shown presently, too much importance must not be attached to these exact numbers, it is sufficiently evident that the solubility of the mixture decreases by degrees, of which the average solubility only of the silver chloride is 1 in 50. In order to determine whether the insoluble

* *Chemical Gazette*, 1859, 137.

TABLE I.

Number of experiment.	Silver chloride. Gram.	Silver bromide. Gram.	Ammonia solution (10 p. c. NH_3) c.c.	Insoluble. Gram.	Soluble (difference). Gram.	Remarks.
1	1	1	20	1·25	·75	
1*a*	1	1	20	1·26	·74	
2	1	1	30	1·11	·89	
3	1	1	50	1·01	·99	
4	1	1	80	·86	1·14	Insol. portion = bromide with a trace of chloride.
4*a*	1	1	80	·87	1·13	
5	1	1	100	·82	1·18	Insol. portion = bromide only.
6	1	1	50	·98	1·02	Silver salts precipitated separately.
6*a*	1	1	50	1·00	1·00	
7	1 Dissolved in 50 c.c. am. sol.	1		·98	1·02	Sol. AgCl in am. sol. 1 in 50 dissolves no AgBr.
7*a*	1	Enough to saturate 50 c.c. am. sol.		·12		Sol. AgBr. in am. sol. 1 in 250 dissolves AgCl, causing a precipitate of AgBr chiefly.

portions in these experiments contained really all the silver bromide, except, of course, in those cases in which the insoluble matter was less than 1 gram, it was not thought sufficiently promising to undertake any of the ordinary methods of quantitative separation, and, of course, in experiments Nos. 1–3, one would be certain to find some chloride qualitatively. I, therefore, tested the insoluble residues from experiments No. 4, No. 4*a* and No. 5, qualitatively by fusion with sodium carbonate and distillation with potassium dichromate and sulphuric acid. In the case of No. 4 and No. 4*a* much bromide with a trace only of chloride was found, while in the residue from experiment No. 5 no chloride could be detected. It is, therefore, at least approximately true that the chloride dissolves first, then the bromide. The next two experiments (6 and 6*a*) were conducted with silver salts precipitated separately and afterwards mixed together in order to prevent any possible production of double salts when, during the precipitation with silver nitrate, as would happen towards the middle of the operation, the two salts were being precipitated together. They gave insoluble portions weighing ·98 and 1·00 gram, thus showing, when compared with No. 3, that no appreciable difference occurs whether the silver salts are precipitated together or separately. Thus it is gratuitous to suppose either that a double salt or other compound is formed during the precipitation, or that the ammonia is prevented from acting upon the chloride by a physical coating of its particles by the less soluble bromide. All the experiments, so far, point conclusively to the fact that the solubility of silver chloride in ammonia solution is modified by the presence of silver bromide, so that when the latter is present in equal amount the chloride dissolves 1 in 50, and if sufficient ammonia is present the bromide dissolves 1 in 250, its solubility when separate. The next two experiments (7 and 7*a*) seem decidedly to confirm this view. A solution of chloride in ammonia 1 in 50, which is capable of dissolving nearly 2 grams more chloride, dissolves no bromide whatever; and again, a saturated solution of bromide in ammonia dissolves chloride 1 in 50, afterwards slowly precipitating a substance which in the experiment proved to be practically all bromide, and, moreover, a great part of the bromide previously in solution. These experiments show also that if, as is quite possible, new compounds are formed in these reactions, they are not produced by precipitation of the silver salts, but within narrow limits the ammonia solution may itself be the medium of such combination.

Action of Solution of Ammonia upon Unequal Mixtures of Silver Chloride and Bromide.—The following table exhibits the results of a series of experiments, first, silver chloride, and, secondly, when silver bromide is in excess:—

TABLE II.

Number of experiment.	Silver chloride. Gram.	Silver bromide. Gram.	Ammonia solution. Cubic centimetres.	Insoluble (experiment). Gram.	Insoluble (hypothesis). Gram.
8	·1	·9	25	·85	·82
9	·2	·8	25	·76	·74
10	·25	·75	50	·61	·60
11	·3	·7	25	·68	·66
12	·4	·6	25	·59	·58
13	·5	·5	25	·51	·50
14	·6	·4	25	·42	·39
15	·8	·2	25	·22	·18

The hypothetical numbers given in the table were calculated from formulæ depending upon the following hypothesis, a development of that already stated. When the proportion of silver bromide present is equal or in excess of the chloride, and when at least sufficient ammonia solution is present to dissolve the chloride 1 in 50, the chloride dissolves 1 in 50, any excess of ammonia solution dissolving the bromide also, 1 in 250, till saturated. Again, when silver chloride is in excess, and the quantity of ammonia solution is sufficient, the excess of chloride dissolves 1 in 17, the remainder 1 in 50, and the bromide 1 in 250, to the extent of the ammonia solution employed. It is clear from the table that the latter part of the hypothesis is inadequate, and an attempt was made to correct it with the view to a *quantitative analytical method for separation of chlorides and bromides.* But after a long series of experiments it was found to be practically useless. For example, the solubility of the silver salts in ammonia solution is altered by varying the degree of dilution—the solutions from the above experiments were rendered turbid by the addition of water—and under the circumstances of the case the proportion of water could not be kept uniform. Again, doubtless variable physical states of the precipitate which could not be avoided contributed to the results which were afterwards obtained, and which led to the abandonment of the hoped for quantitative analytical method. The exact limits of the solubility of mixtures of silver chloride and bromide in their bearing on *qualitative testing* I have investigated and incorporated in a separate paper.

To sum up, these experiments, taken as a whole, show:—that the solubility of silver chloride is not the same when mixed with silver bromide; that the solubility of moist freshly precipitated silver chloride in ammonia solution (10 per cent. NH_3) is 1 gram in 17 c.c., and of silver bromide is 1 gram in about 250 c.c.; that the solubility of the chloride in presence of bromide is much less, so that when the proportion of bromide is one half or more, it is, on the whole, 1 in 50; that silver bromide is insoluble in a solution of silver chloride in ammonia, 1 in 50; that silver chloride displaces silver bromide from its solution in ammonia, but that the unavoidable errors of experiment preclude the use of these facts in quantitative analytical separation of the two acid radicles. Finally, while the probability of the formation of double salts or other compounds as an explanation of these phenomena has not been disproved, still the prospect of getting at their composition, if such bodies exist, of making sure that they are not products of the processes employed, seems too remote and uncertain to encourage further investigation at present.

THE VALUE OF SILVER NITRATE AND AMMONIA AS A TEST FOR BROMIDES IN PRESENCE OF CHLORIDES.

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It is well known that in cases where chlorides and bromides occur together the solvent action of ammonia upon their silver salts is of little value when applied in the usual manner of qualitative testing. The fact, however, that their silver salts differ so much in solubility in solution of ammonia, as seen in the preceding paper, induced me to find out by experiment exactly what value the method had when applied to definite proportions.

The results in the following table indicate that when mixtures of silver chloride and silver bromide are treated with definite proportions of ammonia solution, the presence of the bromide may be detected when its proportion is not less than about two per cent. of the silver salts or two and a half per cent. of the potassium salts. In these experiments enough sodium chloride and potassium bromide to give the required amount of silver salts was dissolved in a few cubic centimetres of water, the measured volume of ammonia solution (10 per cent. NH_3) was then added, and finally a few drops of solution of silver nitrate and the mixture agitated. No notice is taken of the by-products, sodium and potassium nitrate, etc., which are present.

No. of experiment.	Silver chloride. Grams.	Silver bromide. Grams.	Ammonia solution (10 p. c. NH_3) c.c.	Result.
1	·5	0	10	No precipitate.
2	·5	·025	10	Abundant precipitate.
3	·5	·02	10	Precipitate.
4	·5	·015	10	Precipitate.
5	·5	·01	10	Slight precipitate.
6	·5	·005	10	No precipitate.

These experiments led to the following method of testing. Weigh enough of the salt under examination to give approximately half a gram of silver salt. If it is a potassium salt, weigh 0·25 gram, or 0·2 gram if a sodium salt. Dissolve in about ten cubic centimetres of water and mix with ten cubic centimetres of ammonia solution (10 per cent. NH_3). To the mixture add a few drops of solution of silver nitrate, and agitate. A permanent precipitate indicates presence of bromides equal to at least two per cent. of the silver salts. Working in this way upon mixtures of known proportions I have obtained perfectly reliable results.

ABRUS PRECATORIUS AND ITS THERAPEUTIC USE IN OPHTHALMIC DISEASES.*

Abrus† *precatorius*, Willd, or Indian Liquorice‡ (Jamaica Wild Licorice; Liane de Réglisse, etc.) is a small woody twiner, with a long, woody, tortuous, branched root, ½ inch or more in diameter. It has slender, branched stems and a brown bark. Its leaves are alternate, shortly stalked, spreading, 2 to 6 inches long, abruptly pinnate, leaflets in about eight to fifteen closely-placed pairs, ½ to ¾ inch long, oblong, very blunt at both ends. Flowers are pale rose-tinted, small, in small clusters arranged on large tuberosities along the outer side of a stiff, curved rachis. The fruit is a pod, about 1½ inch long, broadly oblong, shortly beaked, somewhat compressed, two-valved, with imperfect septa between the seeds. Seeds four to six, globular ovoid, about ¼ inch long (of the size of a small pea); testa hard, bright and shining, brilliant scarlet, with a black patch at one end round the hilum; cotyledons plane-convex; no endosperm.

The plant is very common in all parts of India, where

* From *New Remedies*, June, 1883. A portion of the description is after Bentley and Trimen's 'Medicinal Plants,' No. 77, where there is a coloured figure of the plant.

For further information on *Abrus*, the reader is referred to 'Pharmacographia' (2nd ed.), p. 188; 'Bengal Dispensatory,' p. 297; Drury, 'Useful Plants of India,' p. 3; Waring in *Madras Quart. Med. Jour.*, 1860, p. 61; Moodeen Sheriff, 'Supplement to the Pharm. of India,' Madras, 1869, p. 17; 'Pharmacop. of India,' p. 74, 446; Dalzell and Gibson, 'Bombay Flora,' p. 76; Bolton, 'Medicinal Plants of Mauritius,' p. 43; Roxburgh, 'Flora Ind.,' iii., 257.

† *Abrus* is given by Prosper Alpinus (1592) as the name of the plant in Egypt, where the seeds were used for necklaces. Thëis derives it from ἁβρος, delicate.—*Bentley and Trimen.*

‡ Jamaica Wild Licorice; Liane de Réglisse (Fr.); Liane à Reglisse; Faginolo Corallino, or Semi di Corallo (Ital.); Bejuco peronilla, B. peonilla (Peurto Rico); Orozuz abro de cuentas de rosario, or Abro de cuentas (Spain).

it is probably indigenous.* Bentley and Trimen say "that it is doubtlessly indigenous" in India and that it has probably been only introduced in other tropical countries where it is found, namely, South China, the Pacific Islands, tropical Africa, the West Indies, etc. But Dr. Moura Brazil has met with it all through the Brazilian province of Ceará, in the interior plateaus as well as along the sea coast; and, while a member of the Government Commission appointed to regulate the boundary between Brazil and Bolivia, he found it in the large and rich province of Matto-Grosso, between the two river courses of the La Plata and the Amazon, in the midst of virgin forests, where the hand of the husbandman had never penetrated. Yet he adds that it may have been carried there by birds. This appears not unlikely, since the seeds are so very conspicuous by their colour.

The seeds (also known as jumble beads, love peas, crab's eyes, prayer beads, pois d'Amérique, Paternoster-Erbsen, etc.) have been incorrectly stated by some writers to be very deleterious, two or three being, according to Herman, a fatal dose. They are, on the contrary, perfectly innocuous when eaten, and, although hard and indigestible, yet have been used as food in Egypt. In Hindu medical authors, they are recommended, when reduced to a paste, to be applied locally in sciatica, stiffness of the shoulder-joint, paralysis, and other nervous diseases. They have also been used in skin diseases and in fistula. When eaten they are reputed to prevent fecundity.

The root is employed in all hot climates (except China) for the same purposes as licorice. It was introduced into the Bengal Pharmacopœia of 1844 and into the Indian Pharmacopœia of 1868. Berzelius also noticed (in 1827) a sweet principle in the leaves.

The seeds have been used, according to Dr. Moura Brazil, for many years, in chronic granular conjunctivitis, in the Brazilian provinces of Ceará and Piauhy. In some portions of the former, the disease often assumes a very violent character, and the proportion of blind persons if very large. Whenever purulent ophthalmia is not carefully attended to, granulations are often formed, which are often followed by serious consequences. It is precisely in these chronic, granular cases, which have long resisted all other treatment, that the *Abrus* (or *jequirity*, as it is called in Brazil) is used with advantage. Yet, since the dose or the remedy is not always properly adjusted, and as the intensity of the artificial conjunctivitis produced by it is in proportion to the concentration of the solution, it may happen that an eye, otherwise capable of being saved, may be entirely ruined by a careless application.

Dr. Castro e Silva (of Ceará) published a small memoir, in 1867, on the use *jequirity*, in which he draws attention to the dangers connected with its use. He himself employed it in the proportion of 1 part in 700 parts of water, in form of lotion, applied several times a day.

In the interior of Ceará and Piauhy, where the remedy is much abused, cases have been reported in which, after two or three applications, there appeared a very intense inflammation of the eyelids and conjunctiva, extending over the whole face, the neck, the upper part of the thorax, and sometimes even affecting the sub-maxillary glands.

The remedy is usually prepared in the following manner:—The seeds are soaked during a few hours in boiling water, or during three or four days in cold water. When they are more or less softened, they are blanched, and the kernel reduced to a fine powder, which is macerated for twenty-four hours,* after which the liquid is filtered. The patient applies the liquid by bathing his eyes three times daily, in such a manner that it passes under the eyelids, or (if more concentrated) it may be dropped in the eye, during several consecutive days.

Immediately after the first application the patient's eyes begin to run, and he begins to feel a burning heat and a sort of heaviness of the eyelids. On the next day, the inflammation is so intense that he can no longer open his eyes, the skin of the lids becomes shining, of a violet colour, the conjunctival ecchymosis becomes more pronounced, accompanied with a more or less abundant muco-purulent discharge, and the patient complains of great pain.

Mr. Mello e Oliveira found that if the seeds are treated with boiling water slightly acidulated with hydrochloric acid, a bright, rose-coloured substance separates, which on the addition of some 45 per cent. alcohol, changes to red, a greyish-white substance of a gummy nature being deposited. The liquid, which has a red colour (after the addition of alcohol), when exposed for some time to diffused daylight, acquires, after a short time, a greenish colour persisting for several days. Ether separates from it an oil, and alcohol a gummy substance which is partly soluble in water and partly in alcohol.

After some hours, the portion soluble in alcohol changes its white colour to bluish-green. No alkaloidal substance could be detected in it because—as the author says—the appointments of the laboratory did not permit the execution of certain methods of extraction.† The seeds were subjected to processes employed for the detection of organic acids, and the liquid, after being filtered and concentrated *in vacuo*, had an acid reaction to litmus. This liquid was at first golden yellow, turning to dirty yellow when exposed to light and air. The acidity, which at first was feeble but distinct, after a while became very faint. While freshly prepared, it possessed the characteristic odour of the freshly powdered seeds, but whether the acid is of a volatile nature has not been ascertained.

Dr. Moura Brazil made experiments with all the substances isolated by Mr. Mello e Oliveira. The essential oil was found inert when applied to the conjunctiva; so also the grey and the white resinous principles. The green principle, the odour of which recalls that of the coffee-green seeds, was employed in quantities of 0·2 gram (ab. 3 grains) in 10 grams (ab. 160 min.) of water (see below).

Dr. Moura Brazil tried various preparations of jequirity upon rabbits, and thus ascertained the portion and quantity which produces the most severe inflammation. At first he used the seed and each one of its parts separately in fine powder and subjected to maceration, the cotyledons having been separated from the skin and likewise the embryonic radicle and gemmule. The results differed completely. With a solution of *jequirity* containing all these parts, and being of a strength of 1 in 20, the most intense inflammation was produced in the eyes of a rabbit. This inflammation yielded to no remedy and progressed to suppuration of the eye-ball, gangrene of the lids, and inflammation of the sub-maxillary glands. On using the cotyledons alone, without embryo (radicle and gemmule), in the same dose, the inflammation was much less intense. This is analogous to what has been observed in the case of the seeds of *Jatropha Curcas*, Linn., which, when employed with radicle and gemmule,

* In Sanskrit the plant (and its seed) is known by the name of *gunjá*, and various authorities give a large number of synonyms (over fifty) for it, which are partly taken from dialects or modern Indian languages. The seeds are also called *ratî* in Hindustani (=*raktiká*, Sanskrit), which is at the same time a name for a small weight (two and three-sixteenth grains) used by Hindu apothecaries and jewellers. The Burmese also use the seeds as weights. The plant (and its seed) is mentioned in Hindu medical works; compare U. Ch. Dutt, 'Hindu Materia Medica,' p. 151.—Ed. N. R.

* The original does not state in how much water, and adds "exposed to the night dew."—Ed. N. R.

† The analytical results here detailed are confusing, and certainly of no value whatever.—Ed. N. R.

produce violent emesis, while without them they produce scarcely any vomiting at all.

The dose has gradually been reduced to *four seeds* (without the testa and the radicle). In this way a mild inflammation is produced, permitting one application per day and sufficient to heal granulations in a few days. The cotyledons were reduced to fine powder, then macerated, the liquid filtered, and finally applied to the conjunctiva with a brush.

The results obtained with the green principle (see above, were so surprising that the author thinks the *jequirity* will form an important agent in ophthalmic therapeutics, inasmuch as granulations which had for years resisted all other treatment, were cured by *jequirity* in from twenty to thirty days.

This is of the greatest consequence for science and humanity, particularly for countries in the north of Europe, where ophthalmic inflammations are very common.

To repeat, the form in which Dr. Moura Brazil uses the *Abrus* is either a solution of 0·2 gram (or ab. 3 grains) of the "greenish extractive" (above mentioned) in 10 grams (160 min.) of water, or an infusion or cold macerate of the seeds (deprived of their testa, radicle and gemmule), made in the proportion of 0·5 grams (ab. 8 grains) to 10 grams (160 min.) of water.

The microscopic examination made by Dr. Silva e Chanjo of a recently prepared solution and of one which was two months old, as well as an examination of the false membranes it produces, has furnished remarkable results.

In all fresh infusions of *jequirity*, Dr. Silva found large polyhedric cells filled with a granular protoplasm. He considers them to be the cells of the seed itself, separated by the bruising and the maceration. Besides these cells there were found granulations, which, under a higher power, presented themselves as round, spherical, very brilliant bodies, capable of movement either around their axis or in a forward direction. With a lower power, they looked liked a fine powder. Dr. Silva considers them to be *gonidia*, or organs of non-sexual propagation.

On examining an infusion of older date, the aspect is different. Besides the powder—the *gonidia*—there are now noticed the true cells and tubes of a microscopic plant, with spores and mycelium. The spores are large, ovoid, sometimes solitary, or in groups of two, three, or more. The tubes either bear spores, or are bare and are branched. Between the spores and the tubes the above mentioned powder (the gonidia) is noticed. The older the infusion the better are these elements developed.

On the other hand, the microscopic examination of a false membrane (the conjunctival surface of the upper eye-lid, for instance), treated with or produced by *jequirity*, has shown this to be of a true diphtheritic character. It was found to consist of an agglomeration of particles of pus, held together by a fibrous substance and covered with gonidia exactly like those noticed in the infusion of *jequirity*. On macerating the membrane in distilled water for forty-eight hours, the elements previously described were noticed to be much more developed. (For further details of the microscopic examination we must refer to the original.)*

Dr. L. de Wecker, of Paris, who appears to have made similar observations on *jequirity* at about the same time as Dr. Moura Brazil, confirms the latter's statements, and sums up his observations as follows:

1. There is no doubt that an infusion of *jequirity* produces a purulent ophthalmia of a croupous nature, the intensity of which can be regulated by the strength and number of applications.

2. The cornea runs no risk during the development of the "jequiritic" ophthalmia.

* *Annales d'Oculistique*, Bruxelles, December, 1822.

3. The "jequiritic" ophthalmia cures granulations *rapidly*.

Dr. Wecker also states that he has vainly tried, by a careful study of Dr. Moura Brazil's memoir, to ascertain how the "active principle of a greenish colour" should be prepared. Two eminent chemists were also consulted, who declared, as might have been expected, that it was impossible to say exactly what was meant by that principle. Mr. Rabinet, at Dr. Wecker's request, prepared an extract of the seeds, and obtained a product of a deep green colour, which dissolved without difficulty in water, but the solution of it produced no action whatever upon the conjunctiva. Hence Dr. Wecker fell back upon the seeds, making an infusion in the usual manner.

Dr. Wecker also remarks that the preparation which has answered best in his hands, and which he is in the habit of using, is weaker than that used by Dr. Moura Brazil, being prepared from 10 grams (155 grains) of the decorticated and powdered seeds macerated for twenty-four hours in 500 grams (17 fluid ounces) of *cold* water and filtered.

From the April number of *La Farmacia Moderna* (Naples), we learn that Dr. G. Moyne, of Naples, has also used the infusion prepared as follows:—Thirty-two of the seeds were thoroughly triturated and pulverized; the powder was macerated for twenty-four hours in 500 grams of cold water, and then 500 grams of hot water added. After the infusion was cold, it was filtered and preserved in well-stopped, dark-coloured vials. When freshly prepared, the infusion is transparent and clear; after a few days, however, it becomes opalescent. At the same time it becomes less irritating. According to Dr. Moyne, it is useless to increase the amount of *jequirity*, since the effects will not be so satisfactory. The best proportion is 3·20 grams of the seeds (equally on an average thirty-two in number).

Finally, the Editor of the *Restaurador Farmaceutico*, of Barcelona, D. Juan Texidor, states in his journal (1883, 74) that Dr. D. José Maria Alcon has used the drug in thirty-nine cases, and found that effects were only produced with an infusion made from 4 grams of the seeds in 500 grams of boiling water. These discrepant statements are not calculated to create a great reliance upon the drug.

TEST FOR ARSENIC IN DOMESTIC FABRICS.*

REPORT OF A COMMITTEE APPOINTED BY THE NATIONAL HEALTH SOCIETY.

Chemical Report on the Test to be employed for the Detection of Arsenic.—It was found that, on the Continent, Acts or decrees exist, forbidding the sale of wall-papers, curtains, carpets and textile fabrics generally, if they contain arsenic. We had before us the decrees in force in Germany and Sweden. In the former, the prohibition of the sale of goods containing arsenic is absolute; in Sweden, a concession is made to manufacturers to this extent, that a paper or textile fabric shall be considered practically free from arsenic if an opaque black or brown arsenical mirror cannot be obtained from 68 square inches of paper, or 34 inches of a textile fabric, in a tube of 2 mm. (·078 inch) internal diameter. In the printed certificates issued by the Government, to be filled up by the chemist making the analysis, it is stated that the method known as the Von Babo and Fresenius test should be employed. The process is then minutely described, so as to insure uniformity of results. We ascertained from the Government analyst, in Stockholm, that the fact of the mirror being opaque is determined by observing whether or not a black line on a white ground could be seen through it. The fact that the presence of arsenic in domestic fabrics is injurious to health having been already ascertained by the Committee, the question for our consideration is simply that of the mode of testing. The first point for consideration is whether the

* From the *British Medical Journal*, June 23, 1883.

prohibition of arsenic must be absolute, extending to the most minute trace, or whether such minute quantities may be allowed as arise from accidental and unavoidable contamination. A very large proportion of fabrics of all kinds are found absolutely free from arsenic, no known test discovering the slightest trace; but, again, with regard to many fabrics, some traces are unavoidable in consequence of the very wide diffusion of small quantities of arsenic in natural products. The consideration consequently arises: first, as to what amount of arsenic it is requisite to allow as unavoidable and accidental contamination, in order that trade may not be hampered or interfered with to any undue extent; and next, whether that allowance may be permitted with due consideration to health. There are manufacturers of wall-papers (the principal articles in question) who have, on principle, abjured the use of all arsenical colours; the result of their work affords, therefore, an excellent guide for what may be demanded without unreasonable interference with the freedom of trade. An examination of a very large number of papers, supplied by these manufacturers, leads to the conclusion that an allowance of half a grain of arsenic per "piece of paper"—a piece being 12 yards in length and 21 inches wide—would be ample for accidental and unavoidable contamination; and this quantity, it is considered, would not be injurious to health. It is found that a suitable size for a sample to be tested is 16 square inches, to be cut from one part; or, if thought well, from several parts of the pattern, so as to include all the colours. The proposed limit of half a grain per piece gives ·001 grain per sample of 16 square inches. For ordinary uniform materials, a square of 4 inches by 4 inches may, therefore, be taken as the portion to be tested. We may remark, that the quantity of arsenic which we allow to pass by these tests is more than four times as much as would be permitted by the Swedish decree. We were at first of opinion that Reinsch's process, carefully conducted so as to insure uniformity of results, might be employed; but several wall-papers and many textile fabrics having been found which gave no arsenical reaction with Reinsch's test, however carefully conducted, but which, nevertheless, were subsequently proved to contain notable quantities of arsenic, this method was proved not to be an absolutely reliable test. A modification of Marsh's test is recommended as the most reliable, and as most suitable for a standard test to be inserted in an Act of Parliament. Detailed instructions are subjoined for both tests, in order that those who still desire to use Reinsch's method may get results comparable with the prescribed test by the modification of Marsh's process where arsenic is found.

Standard Test.

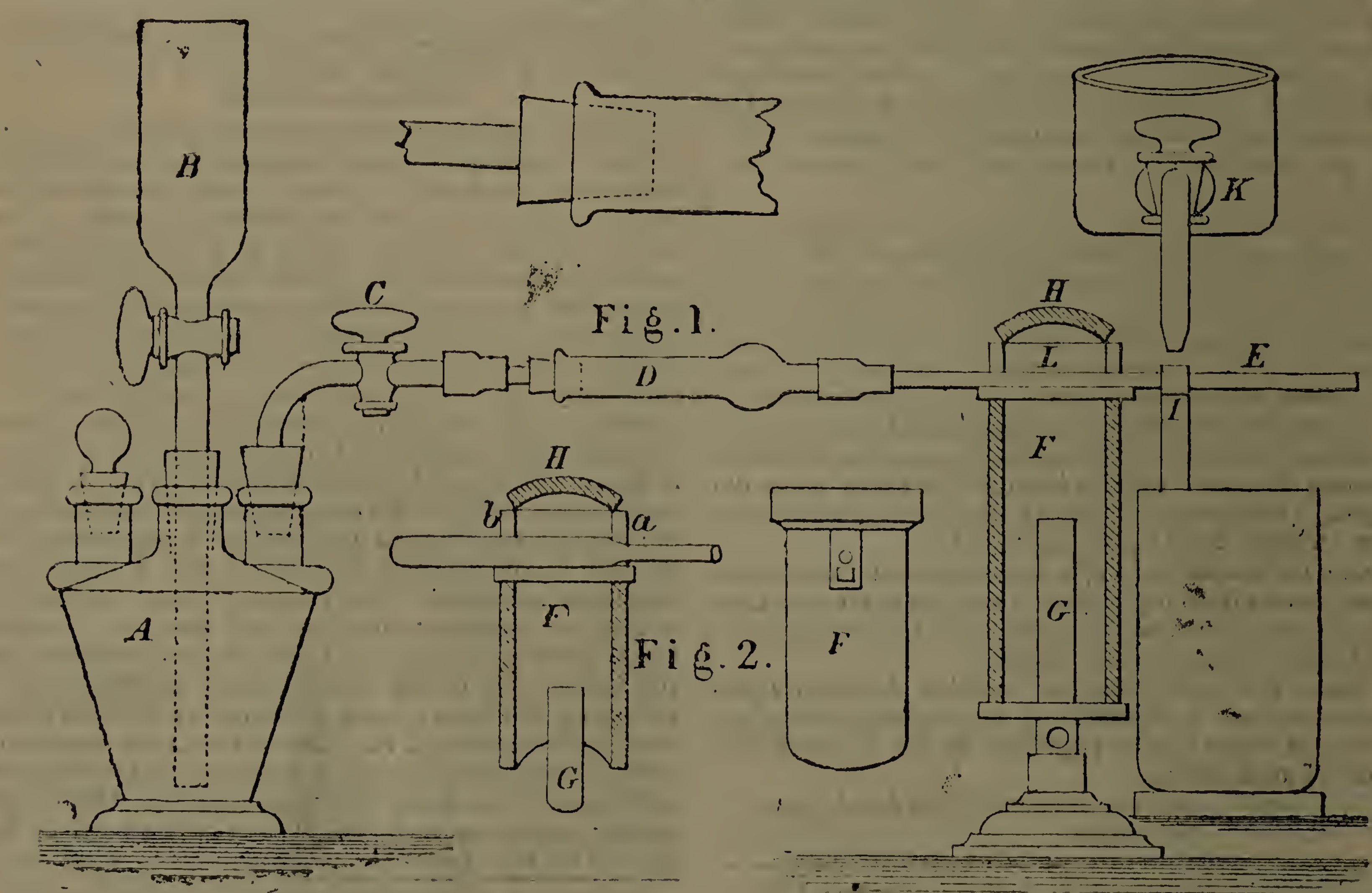
No paper should be passed as "non-arsenical," unless, when treated as hereafter described, it fails to yield a mirror in a tube $\frac{1}{8}$ inch internal diameter, sufficient to cut off at any point a black line on a white ground, technically known as thick rule (eight to pica).

Specimen Line.

In a three-necked bottle* of the form A, Fig. 1, of about 10 ounces capacity, place 200 grains of pure zinc.† To the centre neck, fit a tube funnel and stop-cock, B, and to one of the side necks a right-angled tube, and stop-cock, C. The third neck should be closed with a ground stopper. Connect with C a chloride of calcium tube, D, and with this a tube of hard glass, E, $\frac{1}{8}$-inch internal diameter, and about ·04 inch thick in the glass, if the paper or other material to be tested does not contain sulphur; but if, on being treated with hydrochloric acid, it yields sulphuretted hydrogen, the modification of this tube E, hereafter mentioned, must be adopted. Let this tube traverse a clay chimney, F, $1\frac{3}{4}$-inch diameter, and 6 inches high, in the top edges of which two slots have been filed to admit E, to the depth of 1 inch, and let E be supported on a thin bridge of the same material as the chimney, $\frac{1}{4}$-inch wide and $\frac{1}{8}$-inch thick slightly

* This form is recommended, as, in case of frothing, which frequently occurs, the froth is not driven into the tubes.

† Zinc sufficiently pure for this purpose can only be prepared by dissolving the purest commercial zinc in pure acid, so as to expel any arsenic as arsenuretted hydrogen; precipitating the zinc with pure carbonate of soda, washing the precipitate, and, when dry, reducing it. Messrs. Johnson and Matthey, of Hatton Garden, prepare zinc exactly in this manner, and supply it in bars, guaranteed free from arsenic. This zinc gives off hydrogen so freely that it is desirable to have the requisite quantity in one piece in the bottle so as not to expose too great a surface to the action of the acid.



notched, to rest on the sides of the chimney. This chimney surrounds a Bunsen's burner, *G*, of $\frac{1}{2}$ inch diameter. Over the top of the chimney, place an arched cover, *H*. Round *E*, at $\frac{3}{8}$-inch from the chimney,* roll a strip of thick blotting-paper or calico, $\frac{1}{4}$-inch wide, secured by a thread as at *I*. This should go at least twice round the tube, and hang down, as shown in Fig. 1; on to this, water is dropped from the bottle, *K*, at the rate of about 120 drops per minute (in very hot weather even faster). When the apparatus is thus arranged, pour through *B* 2 ounces of dilute hydrochloric acid, 1 part acid to 8 water. If any sample of zinc do not yield hydrogen with sufficient rapidity with this acid, slightly stronger must be employed. The hydrogen should be evolved with sufficient rapidity to keep alight at the end of the tube when fired. Close stop-cock on *B*, and let hydrogen escape through *C, D, E*, till all air is expelled. Now light *G*, and when *E* is quite red hot, close *C*, and introduce through the stoppered neck the 16 square inches of paper, cut into strips of 1 inch by 2 inches, and rolled up, so as to pass readily through the neck. This must include within the 16 square inches of paper portions of every part of the pattern, so that all the colours may be tested. Replace the stopper, open stop-cock *C*, and let the action continue for one hour. Now, extinguish *G*, and observe if a brown or black mirror be formed in *E*, between *I* and the chimney. If no mirror be formed, the paper is absolutely free from arsenic; if a mirror be formed, which, if the operation be properly conducted, will occupy about $\frac{3}{16}$ inch in the tube, lay *E* along the black line before spoken of, in front of and pointing towards a window, and observe, with one eye exactly over the tube, whether at any point the mirror be thick enough to obscure the line. Should this not be the case the paper may be passed as containing no more arsenic than may have got into it from unavoidable causes; should the line be at any point obscured it only remains to make sure that the mirror is arsenical. If, when sublimed with access of air, the mirror yield octahedral crystals it is arsenical. This operation is best performed as follows: The portion of the $\frac{1}{8}$-inch tube containing the mirror being cut out, take a thin hard glass tube, $\frac{1}{4}$-inch internal diameter and $1\frac{3}{8}$-inch long, sealed at one end, and lipped like a test tube at the other. Suspend this by dropping it through a hole cut in a piece of stout sheet-brass or copper, not less than four by two inches, so that the lip just supports the tube, and place the brass or copper plate on the ring of a retort stand. Heat the tube nearly to redness to expel the last trace of moisture; when cold insert the portion of the $\frac{1}{8}$-inch tube containing the mirror, and place, over the mouth of the tube and resting on it, a microscopic slide, warmed in a spirit lamp till all the moisture at first deposited has disappeared. Now heat the tube with the spirit-lamp, letting the flame play on the under side of the brass plate. In a few seconds a sublimate will appear on the slide. Watch this till it begins to shrink from the edges, and form a patch just the size of the bore of the tube. Remove the lamp, allow the slide to cool, and examine the sublimate with a magnifying power of not less than 220 diameters. If the sublimate is found to consist of octahedal crystals, it is arsenical. Such crystals are well shown on the photographs taken by Mr. J. H. Jennings, of 14, Beach Avenue, Nottingham.

If, on being treated with hydrochloric acid, a paper or other substance yield sulphuretted hydrogen, as before mentioned, or if, on being treated as above described, a yellow or whitish-yellow sublimate be found instead of a mirror the following modification must be adopted.

Substitute for the tube *E* a tube of $\frac{1}{4}$-inch diameter, having the $\frac{1}{8}$ tube sealed on to its end (Fig. 2); at *a*, the junction of the two, place a small plug of asbestos; fill the portion which traverses the chimney with a mixture of dry carbonate of soda and charcoal; and behind this, at *b*, place another plug of asbestos. The rest of the arrangement is the same as in Fig. 1. The red-hot carbonate of soda and charcoal retain any sulphur, etc., but permit the arsenic to pass. In this case, a little water is formed, and carried forward with the arsenic, which prevents the mirror having such well-defined limits as when it is perfectly dry; but a few experiments, made with known quantities of arsenic, will enable the operator to say with accuracy if a paper contain more than the permitted maximum of arsenic. It is remarkable how small a quantity of sulphur will completely mask a considerable amount of arsenic. Thus, sufficient ultramarine, mixed with a white pigment to give it a greyish tint, will quite prevent the formation of an arsenical mirror with four times the maximum quantity of arsenic permitted.

In the case of textile fabrics to be worn next the skin (as gloves, socks, or vests), experience has shown us that no trace of arsenic, however small, should be permitted. Curtains, carpets, etc., come under the same rule as wallpapers. In the case of carpets, it is better to remove the hempen backing on which they are frequently made up, and only to put the wool into the bottle. Some textile fabrics will not yield up their arsenic without previous maceration in strong acid. It is, therefore, desirable in all cases to submit the material to the action of pure hydrochloric acid, sufficient thoroughly to saturate it for a period of at least twelve hours previous to testing. When commencing to test, water should be added to dilute the acid. Textile fabrics should also be submitted to the action of zinc and acid for a longer time than papers; and it is safer, when the first portion of acid has nearly ceased to act, to add a quarter of an ounce strong acid through *B*, and let the action proceed for a second hour.

The only novelties that are claimed in this process are, first, the chimney of a non-conducting material, which confines the intense heat to $1\frac{3}{4}$ inches of the tube; and, secondly, the sharp condensing action of the water passing over the strip of blotting paper or calico. By these means, the arsenical mirror is concentrated, and not permitted to be carried off as arsenuretted hydrogen, as we have found to be the case when these precautions are not insisted on.

We recommend the Society to adopt and publish the proposed test, as a standard test according to which wall papers and other materials described in Appendix A, may be classed as "arsenical" or "non-arsenical," and their manufacture or importation be regulated accordingly.—H. C. Bartlett; Chas. Heisch; F. de Chaumont.

Appendix A.

Articles in which Arsenical Pigments, Dyes, or Mordants are used within the Knowledge of the Sub-Committee.—Paper, fancy and surface coloured; in sheets; for covering cardboard boxes; for labels of all kinds; for advertisement cards; for playing cards; for wrappers and cases for sweetmeats, cosaques, etc.; for the ornamentation of children's toys; for covering children's and other books; for lamp shades; paperhangings, for wall and other purposes; artificial leaves and flowers; wax ornaments for Christmas trees and other purposes; printed or woven fabrics intended for use as curtains or coverings for furniture; children's toys, particularly inflated indiarubber balls with dry colour inside, painted indiarubber dolls, stands and rockers of rocking-horses and the like, glass balls (hollow); distemper colour for decorative purposes; oil paint for the same; lithographic colour printing; decorated tin plates, including painted labels used by butchers and others to advertise the prices of provisions; japanned goods generally; Venetian and other blinds; American or leather cloth; printed table baizes; carpets; floorcloth; linoleum; book cloth and fancy bindings.

* The chimney is conveniently made by cutting the bottom off a Daniell's porous cell, and the cover by cutting a piece $1\frac{3}{4}$ inch off a similar cell and splitting it into three. The bridge also is best made of the same material.

Popular Test.

Although the Committee are of opinion that Marsh's test alone gives results of sufficient delicacy and accuracy to justify the taking of legal proceedings thereon, and have therefore adopted it in a modified form as the standard test to be appended to the proposed Bill, they are fully aware of the insuperable difficulties that stand in the way of its general employment in ordinary business transactions. It can only be practised by experts, and the fee which they would very properly require would, in the great majority of cases, deter the public from availing themselves of their assistance, although when a prosecution was contemplated it would be otherwise. Reinsch's test, though less delicate and, indeed, not absolutely free from the possibility of error, has been proved in hundreds of comparative trials to be, when carried out as they direct, accurate enough for all ordinary practical purposes, *i.e.*, for indicating the presence of a dangerous amount of arsenic, and when no graver consequences are involved than the acceptance or rejection of a particular paper.

Its advantages are that it could be undertaken by any professed chemist at a fee within the means of everyone, no small consideration when a large number of papers have to be examined; indeed, with the apparatus provided at the suggestion of the Society by Messrs. Griffin, of 22, Garrick Street, London, manufacturers, tradesmen, and intelligent householders might use it for themselves.

They thus hope that the end they have in view, the discouragement of the employment of arsenical colours, would be more speedily attained by the education of the public generally than by a few isolated cases of prosecution.

They, therefore, give directions for the performance of Reinsch's test.

Testing by Reinsch's Process.—The following is the mode in which this test should be used:—Sixteen square inches of the paper, either in one piece or several so as to include all parts of the pattern, to be cut up and put in a test-tube or flask with two ounces of dilute hydrochloric acid (4 distilled water to 1 of acid), and brought to the boiling point, a vertical condenser being used, if convenient; it is, however, not essential. A piece of copper foil, 1 inch by ½ inch, clean and bright, is now placed in the flask suspended by a thin platinum wire, by means of which it can be withdrawn, from time to time, for examination. After boiling gently for half an hour the copper must be rinsed repeatedly in water, and finally held under a tap, in a pair of forceps, to remove all traces of acid, etc. On no account is the copper to be touched with the fingers, as, even when wet, the grease of the finger interferes with the subsequent operations. No great stress can be laid on the amount of discoloration, as it varies very much, even with the same amount of arsenic, in the presence of other substances, such as sulphur, mercury, etc. The copper must then be treated as follows:—Dry it between two pieces of clean blotting-paper, and, holding it in the forceps, warm it very gently over a spirit-lamp; then, still holding it in the forceps, cut it into strips. Take a thin glass tube, ¼-inch internal diameter and 1⅝-inch long, sealed at one end and lipped like a test tube at the other. Suspend this by dropping it through a hole cut in a piece of stout sheet-brass or copper, not less than 4 by 1 inches, so that the lip just supports the tube, and place the brass or copper plate on the ring of a retort-stand. Heat the tube nearly to redness to expel the last trace of moisture; and, when cold, put the copper strips within, and place over it, resting on the mouth of the tube, a microscopic slide, warmed in a spirit-lamp till all the moisture at first deposited has disappeared. Now heat the tube with the spirit-lamp, letting the flame play on the under side of the brass plate. In a few seconds a sublimate will appear on the slide. Watch this until it begins to shrink from the edges and form a patch just the size of the bore of the tube. Remove the lamp, allow the slide to cool, and examine the sublimate with a magnifying power of 220 diameters. If the sublimate consist of octahedral crystals the discoloration of the copper is due to arsenic.

It is of course essential that the copper and hydrochloric acid used for this test be free from arsenic.

PHYSICAL CHARACTERS OF NITRO-GLYCERINE.*

BY MATTHEW HAY, M.D.

In view of the continued, and perhaps extended, use of nitro-glycerine in therapeutics, it may be desirable to add a few observations which I have made on its physical characters, more precise than those to be met with in previous publications.

Nitro-glycerine is perfectly colourless, and not of a clear yellow colour as is stated in most of the papers on the chemistry of this body. The colour is due to the imperfect removal of the acid, or to the use of soda which is commonly used for washing it, and which decomposes it with the production of a reddish-brown colour. It has no odour when cold, but has a sharp pungent odour when heated. Its taste is sweet, and not unlike that of glycerine, but is more pungent. As regards its solubility:—1 gram dissolves in about 800 cubic centimetres of water; with difficulty in 3 c.c. of absolute alcohol, easily in 4 c.c.; in 10·5 c.c. of rectified spirit (sp. gr. 0·846); in 1 c.c. of methylic alcohol (sp. gr. 0·814); in 4 c.c. of methylated spirit (sp. gr. 0·830); in 18 c.c. of amylic alcohol; in every proportion in ether; so also in chloroform, in glacial acetic acid, and in carbolic acid; in less than 1 c.c. of benzol; in 120 c.c. of carbon bisulphide; and to a very limited extent, if at all, in glycerine. Its solutions in water and alcohol I have kept for nearly four months without their exhibiting the slighest evidence of decomposition; and I have no reason for believing that they will not remain undecomposed for a much longer time.

NOTE ON GALANGAL.†

Galangal, which is the Rhizoma of *Alpina Galanga*, is brought over from Haian on the peninsula of Lei-chou, and from How Sui and Tam-chou on the west coast of this island. The article from the peninsula is far superior to that grown on Hainan. The former is cultivated on the slopes of hills about thirty miles distant from Haian, while the latter grows in a state bordering upon wildness, and is quite unsuited for the home market. The quality of galangal depends upon the age of the plant and the care which has been taken in drying the roots. Roots of ten years' growth are considered the best, but of late years, owing to a good demand for the article both at home and in the Hankow market, such qualities are rarely obtainable. The galangal now placed on the market is seldom of more than four or five years' growth, and prices have consequently declined. When taken out of the ground the root measures from 3 to 4 feet in length, and 2 to 3 inches in thickness; it is cut at once into small pieces and dried by exposure to the air. To give it a good appearance for the market, the Chinese use red earth for colouring purposes. Even the best roots lose considerably in weight in course of transport. A deduction of 10 per cent. for conveyance to Hong Kong, and of 20 per cent. for Europe is generally allowed on this account. In former years the crop was nearly all shipped in junks to Macao, but since the opening of Kiungchow the trade has been diverted to this port. The total annual production does not average more than 8000 piculs, the bulk of which goes to Europe, where, besides finding favour as a spice, it is used for medicinal and tanning purposes.

* Extract from a paper on the "Chemical Nature and Physiological Action of Nitro-Glycerine" in the *Practitioner* for June.

† From a Report by Mr. Acting Consul Jordan on the Trade of Kiungchow.

The Pharmaceutical Journal.

SATURDAY, JULY 7, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

THE BRITISH PHARMACEUTICAL CONFERENCE.

THE hospitable invitation issued this week to the members of the British Pharmaceutical Conference by the Local Committee at Southport will bring home to many pharmacists the welcome fact that sessions and seasons have an end, and that the time is once more approaching when they may hope to shake off the cares of business for a few days at least and join their brethren of the pestle and mortar in one of the most pleasant *réunions* of the year. Naturally there will be those who are looking with some curiosity for any information as to the nature of the local intentions in respect to the entertainment of the Conference, and therefore, although the programme is at present necessarily one of possibilities rather than certainties, we are glad to be able at so early a date to mention some arrangements that have been completed as well as others that are contemplated, purposing to revert to the subject when more positive statements can be made.

As is generally known, the meeting of the British Pharmaceutical Conference is to be held this year at Southport, in Lancashire, on Tuesday and Wednesday, the 18th and 19th of September. Unlike most of the places in which the Conference has met in recent years, Southport is neither an ancient city nor the seat of a manufacturing industry, neither does it boast of docks or arsenal. If the truth must be told it is somewhat of the butterfly order, and to find its nearest similitude amongst the entertainers of the Conference it would be necessary to turn back eleven years to the meeting in Brighton. Indeed, if Brighton be esteemed a London-super-Mare, Southport may be described as a place by the side of the Irish Sea where hard-headed north countrymen resort to find respite from the moil of money-making in the busy towns of Lancashire and Yorkshire. "It is essentially a health resort and seaside watering place;" but that in this respect it must be very attractive in its character is shown by its unusually rapid development, the number of inhabitants having increased from just over five thousand in the year 1851 to more than thirty-two thousand at the time of the last census in 1881. It may be added for the benefit of those who are weak in topography, that Southport is situated on the south shore at the mouth of the estuary of the Ribble, where a large expanse of sand stretches for some miles along the coast, forming a foreshore, which, it is needless to say, is not unknown to Her Majesty's Government. It is distant about eighteen miles from Liverpool, thirty-six miles from Manchester and sixteen miles from Preston, and is in connection with the railway systems of the London and North Western, Lancashire and Yorkshire and West Lancashire Railway Companies. Of course, like all watering places of any pretension now-a-day, it possesses an aquarium, a pier (built of iron and nearly a mile in length), a promenade and baths, besides which it boasts of the only real glaciarium in the world, a park, and winter and botanic gardens.

The business meetings of the Conference are to be held in the Assembly Rooms of the Prince of Wales Hotel, beginning and ending each day at the usual time; as usual, also, there is to be an interval for luncheon, which we understand will be provided by the Local Committee in one of the rooms of the Hotel. On Tuesday, at any time during the day, members will be able to visit the Winter Gardens and Aquarium, for which tickets will be provided. Immediately after the close of the meeting on this day those who feel disposed will be invited to adjourn to the Baths for a short time, where a special entertainment will be provided. On Wednesday, the Committee intend to invite the members to visit the Glaciarium, where some of them may feel disposed to disport themselves on skates; but it is hoped that it will be possible to provide other recreation as well, more in keeping with the scientific instincts of the company, and to make arrangements for a demonstration of the process followed in making the ice for the Glaciarium by GAMGEE'S method. On Thursday it is proposed that the company shall leave by an early train for St. Helen's, in order to visit one or more of the large manufactories in that town, but at present the negotiations are not sufficiently advanced to allow of any definite statement being made as to which. At any rate, it is intended that the company shall leave St. Helen's and return to Southport in time for a Garden Party, to which they will be invited by the Local Committee; this is to be held in the Botanical Gardens, which are to be specially reserved for the purpose on Thursday afternoon.

The "head-quarters" of the Conference during its visit to Southport will be at the Prince of Wales Hotel, which is pleasantly situated, and in which the Local Committee has secured a number of beds; we are glad to learn, further, that it has been stipulated that the ordinary tariff shall be adhered to. We hope, therefore, that under these circumstances, intending visitors who may wish to have accommodation secured for them will communicate their wishes at the earliest possible date to the Local Secretary of the Conference, Mr. WILLIAM ASHTON, 77, Lord Street, Southport

CINCHONA CULTIVATION IN CEYLON.

The report on the Royal Botanic Gardens in Ceylon for the year 1882, a copy of which we have received through the courtesy of the Director, Dr. Trimen, contains much interesting information respecting the cultivation of cinchona, which has now undergone such an enormous development that the bark has become the foremost product of the island. Some idea of the rate of increase may be gathered from the fact that during the year ending September, 1882, the exports of bark from Ceylon amounted to 3,099,895 lbs., or considerably more than double the quantity exported in the previous year. A large proportion of this was, however, unfortunately, of inferior quality, and Dr. Trimen thinks that at present there is little danger of an over-production of bark of the best quality in the island. Indeed, it is rather surprising to find that, notwithstanding the advice put forward time after time by Mr. J. E. Howard, it is the *Cinchona succirubra* which is rapidly displacing the coffee plant, though this is perhaps explained by the fact that this species is more easily cultivated. Dr. Trimen appears to think that the most promising future for the large yield of "succirubra" bark lies in its possible utilization for the manufacture of a cheap febrifuge such as is now made in India. On the other hand, there seems to be some evidence in favour of the assertion that the bark of the "succirubra" plant improves with increased age. Some fine trees are mentioned, about twenty years old, one of which girthed 37 inches near the ground and 25 inches at a height of 5 feet, and yielded 25 lbs. of dry bark. A sample of this bark, analysed by Mr. Howard, gave 6·8 per cent. of total alkaloids, 2·06 per cent. of which was quinine (equal to 2·75 per cent. of quinine sulphate) and 3·47 per cent. of cinchonidine.

The method of harvesting the bark introduced by Mr. Moens, which consists in shaving off the rich outer portions down to a plane as near the cambium zone as possible without touching it, proves to be so simple, expeditious and cheap, as well as convenient for drying, packing, and bailing for shipment, that it is now generally adopted, and it is probable that soon only renewed bark will be sent into the market from Ceylon. The trees do not appear to suffer much if the operation be carefully performed. The scraped surface is usually covered with "mana" grass (*Andropogon Martini*, Thw.), under which new bark is rapidly formed, the proportion of quinine being much increased in the renewed tissues. It appears, however, that there is a disposition to carry this process to excess, by operating at too short intervals and on immature plants. Experiments are greatly needed to determine several points in connection with this subject, such as the ratio of the increase of alkaloid in renewed bark to the age of the tree, and the length of the interval that should be allowed to elapse between successive shavings.

Among cinchona plants that are specially mentioned as having been received is a kind, from Kew, said to yield "hard Carthagena" bark, which is thought to be an undescribed variety or species occupying an intermediate position between *C. cordifolia* and *C. Calisaya*, with points of resemblance to *C. purpurea*. Some seed of the plant yielding "cuprea" bark has also been received from Bogota, but only one seedling survived at the date of closing the report.

We also learn from the report that an attempt is being made in the Botanic Gardens at Hakgala to cultivate some of the plants used in medical practice which are at present imported. Fair success has already been attained with the jalap plant, and among other medicinal plants that promise well are both the official species of rhubarb, belladonna, hyoscyamus, digitalis, and camomile. After a partial failure with taraxacum, which is largely used in the island, more than a quarter of a million plants were established and growing well at the end of last year.

In order to avoid misunderstanding, it may be as well to mention that the Medical Act (1858) Amendment Bill, which was read a third time and passed in the House of Commons, on Thursday, is not the Bill dealing with the general subject of medical regulations into which the Council is desirous of introducing an amendment, but a small Bill having for its object to vest in the Royal University of Ireland the right of sending a representative to the Medical Council, formerly possessed under the existing Act by the dissolved Queen's University, Ireland. The larger "Medical Acts Amendment Bill" has made no progress during the week and is now set down for second reading on Monday next.

* * *

It will be seen from the official notice on the front page that the examination for the Pereira and other medals and gifts of books, known as the Council Prizes, is to be held in London and Edinburgh on the 26th inst., and that persons desiring to compete must give notice of their wish to the Registrar on or before Saturday, the 21st inst. Any person who has passed the Major examination during the present session, and who was an Associate of the Pharmaceutical Society at the time of passing, is entitled to compete.

* * *

The excitement caused by the discovery that sophisticated quinine had been supplied for use in the Paris hospitals has now had its legitimate sequence in the arraignment of the offender before one of the correctional police courts in Paris on the two charges of adulterating a certain medicinal substance for the purpose of sale and for selling it after adulteration. We learn from the *Gazette des Tribunaux* that the right of supplying quinine sulphate for use in the Paris hospitals during 1882 was held by a person named Pressac, who proved, however, to be only a agent for a "druggist" named Lacombe. Suspicion having been excited as to the quality of the quinine sulphate supplied, an investigation was made, which showed that up to October the quality had been satisfactory, but that after that time it had not been so. One case received at the end of October is said to have contained a mixture of quinine sulphate and cinchonidine; another received in November contained a superficial layer of quinine, about 5 or 6 inches thick, the underlying portion being a mixture of alkaloids; whilst a third, received in November and not opened prior to the investigation, also contained only a superficial layer of quinine sulphate. The explanation offered by M. Lacombe was that he was an agent of the Lombardy Chemical Manufactory at Milan and that up to October he had supplied that brand of quinine, but that then having to dispose of two cases bearing another brand (Taillandier), and these having been different in size and form, in order not to raise any objection he decided to mix two boxes each of the "Milan" and "Taillandier" brands and fill the whole into Milan boxes. Whilst doing this he noticed that the appearance of the Taillandier quinine was very fine and gave orders that some of it should be reserved to spread over the Milan quinine; but the person entrusted with this work, deceived by the similarity of the Italian labels, used two cases of Milan "solfato di conchinino" as the substratum instead of "solfato di chinino." The defence was ingenious, but failed to satisfy the Court, for the sufficient reason, among others, that the substituted alkaloid was not conchinine (quinidine) at all, but the lower-priced cinchonidine. Lacombe was therefore sentenced to one year's imprisonment and to pay a fine of fifty francs. Moreover, as the fraud has been the occasion of a great deal of misrepresentation in respect to the Lombardy Company, it was ordered that a copy of the judgment should be affixed to the door of Lacombe's warehouse and retained there during twenty-four hours, and that it should also be advertised at his expense in twelve Paris journals, including the principal medical and pharmaceutical ones. Probably the *fons et origo* of the fraud is to be found in the existence of a contract to supply quinine sulphate for 374 francs per kilogram at a time when the market price of the salt was 400 francs per kilogram.

* * *

The Pharmacy Act of New Zealand, passed in 1880, appears to have been a somewhat crude specimen of legislation, it having already been found to be defective in several points, so that an effort is now being made by the Pharmacy Board to effect its amendment. In the first place there appears to have been no provision made for carrying out the election of Pharmacy Boards after the first, which goes out of office next year. Then all regulations made by the Board have to be approved and confirmed by a general special meeting of pharmaceutical chemists under the Act, which practically places the control in the hands of a few who are able to attend, as no provision is made for the reception of voting papers from the absent, an inconvenience which apparently it is proposed to meet by repealing the words requiring such approval and confirmation. Another proposed modification of the Act is in the same direction as an amendment now being sought of the British Pharmacy Act, namely to require that managers of branch shops shall be registered men. It has also been found that the simple prohibition of the assumption of the title of "pharmaceutical chemist" leaves room for a large amount of evasion, and it is, therefore, proposed to make it an offence for any unregistered person to keep an open shop for the compounding and dispensing of the prescriptions of legally qualified medical practitioners. Dealing in poisons in New Zealand is at present regulated under a Sale of Poisons Act, according to which any person, examined or unexamined, may sell poisons in the colony, if he is only registered and adopts certain precautions; but even these mild provisions are continually ignored, the police denying that it is their duty to see to their enforcement. It is, therefore, proposed to entrust the Pharmacy Board with the supervision of the sale of poisons, and impose a small licence fee upon registered sellers to cover the expenses. We understand that these propositions have been almost unanimously endorsed by the pharmaceutical chemists of the colony.

* * *

In December an International Exhibition is to be opened at Nice, one of the sections of which is to be devoted to sanitary and medical objects. The great interest which any movement likely to promote the sanitary improvement of the Riviera presents to the large number of British subjects who visit this district yearly has led to the issue of a circular, signed by a number of eminent medical men and others, asking that the active co-operation of British engineers, architects, manufacturers of sanitary apparatus, pharmacists and instrument makers may be extended to this exhibition. Pharmaceutical Preparations will form Class 8, and Mineral Waters Class 9, of Section II. Further information may be obtained from the official agents, Messrs. Johnson and Sons, Limited, Castle Street, Holborn.

* * *

At a meeting of the Council of the Royal Society, held on Thursday, Professor Huxley was elected to the office of President, rendered vacant by the death of the late Mr. William Spottiswoode.

* * *

The new number of the *Journal of Botany* contains the opening instalment of a biography of Samuel Dale, physician and apothecary, the neighbour, co-worker and executor of Ray, accompanied by an excellently executed portrait, apparently transferred from copper. Dale's *magnum opus* was his 'Pharmacologia,' one of the earliest systematic treatises on materia medica published in this country. The first edition appeared in 1693; it was dedicated to the "celeberrimo collegio Regali medicorum Londinensium," and its full title was: "Samuelis Dale Pharmacologia, seu manductio ad materiam medicam: in qua Medicamenta Officinalia Simplicia, hoc est Mineralia, Vegetabilia, Animalia, eorumque partes in Medicinæ officinis usitata, in methodum naturalem digesta succincte et accurate describuntur. Cum notis generum Characteristicis, Specierum Synonymis, differentiis et viribus. Opus Medicis, Philosophis, Pharmacopœis, Chirurgis, etc., utilissimum."

* * *

The annual meeting of the American Pharmaceutical Association is to be held this year in Washington, commencing on Tuesday, the 11th of September, and concluding with excursions on Saturday, the 15th. It will, therefore, precede the meeting of the British Pharmaceutical Conference, in Southport, by a week.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, July 4, 1883.

Present,—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Messrs. Borland, Bottle, Butt, Gostling, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Symes, Williams, Woolley and Young.

The minutes of the previous meeting were read and confirmed.

George Deller Wedge, being duly registered as Pharmaceutical Chemist, was granted a diploma, stamped with the seal of the Society.

ELECTIONS.

MEMBERS.

PHARMACEUTICAL CHEMIST.

George Deller Wedge, of Whitchurch, Hants, having passed the Major examination and tendered his subscription for the current year, was elected a "Member" of the Society.

CHEMISTS AND DRUGGISTS.

The following registered chemists and druggists, who were in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Flanders, Henry ....Cambridge.
Gibb, Ebenezer......................New Blyth.

ASSOCIATES IN BUSINESS.

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

Bradbury, Thomas ....Glossop.
Humphries, Jacob ....Low Moor.
Shapcott, Wm. Henry Pyne ...London.

ASSOCIATES.

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

Minor.

Ashton, Frederick William......Market Harborough.
Atkins, Alfred Edward ....Newport.
Blain, William Rushton..........Bolton.
Hamilton, Henry.....................Finchley.
Handford, Thomas Edward ...Torrington.
Joye, Joseph............................Southport
Kitchin, John ....Ulverston.
Marsden, Charles Edwin.........Huddersfield.
Martin, John............................Redruth.
Nicholls, Reginald Edward......Lee.
Silk, Edward............................Macclesfield.
Thacker, Henry Ransley.........Nottingham.

Modified.

Castell, George Gower............London.
Heathcote, Henry...................Liverpool.

APPRENTICES OR STUDENTS.

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

Bolas, Samuel Brittain ....Rock Ferry.
Coope, Thomas ....Farnworth.
Ellison, George Reed ....Whitby.
Hoyles, Henry Richardson ......Sheffield.
James, Tom ....London.
Jolly, John ....Cromer.
Lamb, Thomas ....Sleaford.
McCurrie, John ....Port Bannantyre.
Miller, Edwin Frederick..........Ipswich.
Patey, William James.............Banbury.
Smith, Arthur ....Watford.
Taylor, Walter ....London.

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

RESTORATIONS TO THE REGISTER.

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

Charles Cook, 36, Market Place, Wednesbury.
Charles William Hayward, Holbeach, Lincolnshire.
Frank Whitworth, 45, Etnam Street, Leominster.

ADDITION TO THE REGISTER.

The Registrar reported that—

Isaac Wilson, 74, Saltaire Road, Shipley, Yorks.,

having made a statutory declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been supported by a duly qualified medical practitioner, his name had been placed on the Register.

APPOINTMENT OF PROFESSORS.

The following appointments were unanimously made:—

Professor Redwood was reappointed Professor of Chemistry and Pharmacy.

Professor Bentley was reappointed Professor of Botany and Materia Medica.

Professor Attfield was reappointed Professor of Practical Chemistry.

LOCAL SECRETARIES.

The Council went into committee to consider whether it was desirable to appoint a Local Secretary in Edinburgh, having in view the fact that there was an official of the Society there in the person of Mr. MacEwan, the Secretary to the North British Branch. On resuming, the following gentlemen were appointed Local Secretaries for the ensuing year, no one being appointed to the office in Edinburgh, in accordance to what was understood to be the wish of members in that city:—

List of Local Secretaries, 1883-84.*

Towns eligible.	Names of persons appointed.
Aberdeen	Kay, James Petrie.
Abergele	Hannah, John.
Aberystwith	Wynne, Edwin Price.
Abingdon	Smith, William.
Altrincham	Hughes, Edward.
Andover	Gould, Robert George.
Arbroath	Robertson, John.
Ashbourne	Reckless, Arthur Henry.
Ashton-under-Lyne	Arnfield, John Cash.
Aylesbury	Turner, John.
Ayr	
Banbury	Ball, George Vincent.
Banff	Ellis, Bartlett.
Bangor	Roberts, Meshach.
Barnsley	Badger, Alfred.

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

Towns eligible.	Names of persons appointed.
Barnstaple	Goss, Samuel.
Barrow-in-Furness	Steel, Thomas.
Bath	Commans, Robert Dyer.
Beaumaris	
Bedford	Taylor, James Bennett.
Belper	Calvert, James.
Berwick	Carr, Walter Paterson.
Beverley	Hobson, Charles.
Bewdley	
Bilston	Gray, Charles.
Birkenhead	Nicholson, Henry.
Birmingham	Southall, William.
Bishop Auckland	Dobinson, Thomas.
Blackburn	Farnworth, William.
Blandford	Griffith, Samuel.
Bodmin	Williams, Joel Drew.
Bolton	Dutton, Francis.
Boston	Pilley, Henry Thomas.
Bournemouth	Duncan, Alexander.
Bradford (Yorkshire)	Rimmington, Felix M.
Brecon	Meredith, John.
Bridgnorth	Deighton, Thomas Milner.
Bridgwater	Basker, John Anthony.
Bridlington	Jackson, Henry John.
Bridport	Beach, James.
Brighton	Gwatkin, James Ross.
Bristol	Stroud, John.
Buckingham	
Burnley	Cowgill, Bryan H.
Burslem	Blackshaw, Thomas.
Bury	Bowker, Ellis.
Bury St. Edmunds	Summers, Frank.
Buxton	Thresh, John Clough.
Calne	
Cambridge	Deck, Arthur.
Canterbury	Bing, Edwin.
Cardiff	Munday, John.
Cardigan	Jones, John Edward.
Carlisle	Thompson, Andrew.
Carmarthen	Davies, Richard Morgan.
Carnarvon	Lloyd, William.
Chatham	Crofts, Holmes C.
Chelmsford	Baker, Garrard.
Cheltenham	Smith, Nathaniel.
Chester	Baxter, George.
Chesterfield	Windle, John T.
Chichester	Long, William Elliott.
Chippenham	Coles, John Coles.
Christchurch	Green, John.
Cirencester	Smith, Charles Septimus.
Clitheroe	
Cockermouth	Bowerbank, Joseph.
Colchester	Cordley, William Bains.
Congleton	Goode, Charles.
Coventry	Hinds, James.
Cricklade	
Croydon	Barritt, George.
Darlington	Robinson, James.
Deal	Green, John.
Denbigh	Edwards, William.
Derby	Goodall, Henry.
Devizes	Edwards, Thos. Roberts.
Devonport	Codd, Francis.
Dewsbury	Gloyne, C. G.
Diss	Gostling, Thomas Preston.
Doncaster	Howorth, James.
Dorchester	Evans, Alfred John.
Dorking	Clift, Joseph.
Douglas	Brearey, William A.
Dover	Bottle, Alexander.
Droitwich	Taylor, Edmund.
Dudley	Gare, Charles Hazard.
Dumfries	Allan, William.
Dundee	Hardie, James.
Dunfermline	Seath, Alexander.

Towns eligible.	Names of persons appointed.
Durham	Sarsfield, William.
Eastbourne	Crook, Herbert.
Elgin	Robertson, William.
Ely	Pate, Henry Thomas.
Evesham	Dingley, Richard Loxley.
Exeter	Broom, William W.
Exmouth	Laugher, William.
Eye	Bishop, Robert.
Falkirk	Murdoch, David.
Falmouth	Newman, Walter Francis.
Fareham	Batchelor, Charles.
Faversham	Lenfestey, William G.
Flint	Jones, Michael.
Folkestone	Goodliffe, George.
Forfar	Ranken, James A.
Frome	
Gainsborough	Spouncer, Henry Thomas.
Gateshead	Elliott, Robert.
Glasgow	Kinninmont, Alexander.
Gloucester	Ward, Joseph.
Gosport	Hunter, John.
Grantham	Cox, John.
Gravesend	Bulgin, William.
Greenock	McNaught, Archibald.
Grimsby, Great	Cook, Robert, junior.
Guernsey	Arnold, Adolphus.
Guildford	Martin, Edward W
Haddington	Watt, James.
Halifax	Dyer, William.
Hanley	Eardley, James F.
Harrogate	Davis, R. Hayton.
Hartlepool	Jackson, William G.
Harwich	Bevan, Charles F.
Hastings and St. Leonards	Bell, James Alfred.
Haverfordwest	Saunders, David Price.
Hawick	Craig, John.
Helston	Wakeham, Charles.
Hereford	Williams, Walter.
Hertford	Lines, George.
Hexham	Gibson, John Pattison.
Hitchin	Ransom, William.
Horsham	Williams, Philip.
Huddersfield	King, William.
Hull	Bell, Charles Bains.
Huntingdon	Provost, John Pullen
Huntly	Chalmers, George.
Hyde	Wild, Joseph.
Hythe	Lemmon, Robert Alce.
Ilfracombe	Wheeler, James.
Inverness	Galloway, George Ross.
Ipswich	Anness, Samuel Richard.
Jersey	Ereaut, John, jun.
Kendal	Severs, Joseph.
Kidderminster	Gascoigne, Charles.
Kilmarnock	Borland, John.
King's Lynn	Palmer, William Joseph.
Kingston-on-Thames	Walmsley, Samuel.
Kirkcaldy	Storrar, David.
Knaresborough	Potter, Charles.
Lancaster	Bagnall, Wm. Henry.
Launceston	White, Thomas.
Leamington	Davis, Henry.
Leeds	Reynolds, Richard.
Leek	Johnson, William.
Leicester	Clark, Walter Beales.
Leighton Buzzard	Readman, William.
Leith	Finlayson, Thomas.
Leominster	Davis, David Frederick.
Lewes	Martin, Thomas.
Lichfield	Perkins, John Jaquest.
Lincoln	Maltby, Joseph.
Liskeard	Young, Richard.
Liverpool	Symes, Charles.
Longton	Prince, Arthur G.
Loughborough	Paget, John.

Towns eligible.	Names of persons appointed.
Louth	Hurst, John.
Lowestoft	Sale, Thomas J.
Ludlow	Woodhouse, George.
Lymington	Allen, Adam U.
Macclesfield	Bates, William Isaac.
Maidstone	Rowcroft, Albert E.
Maldon	Wallworth, David.
Malmesbury	Brown, Francis James.
Malton	Buckle, James.
Malvern	Metcalfe, Edmund Henry.
Manchester, etc.	Wilkinson, William.
March	Davies, Peter Hughes.
Margate	Candler, Joseph Thomas.
Marlborough	
Marlow	
Merthyr Tydvil	Smyth, Walter.
Middlesborough	Buck, Thomas.
Midhurst	Cowap, Samuel Evan.
Monmouth	Key, Hobson.
Montgomery	
Montrose	Burrell, George.
Morpeth	Marshall, George T.
Neath	Hibbert, Walter.
Newark	March, William.
Newbury	Hickman, Francis.
Newcastle-on-Tyne	Martin, Nicholas H.
Newcastle-under-Lyme	Cartwright, William.
Newport (I. of Wight)	Orchard, Herbert Joseph.
Newport (Mon.)	Phillips, John.
New Radnor	
Newtown	Owen, Edward.
Northallerton	Warrior, William.
Northampton	Bingley, John.
Norwich	Sutton, Francis.
Nottingham	Bolton, Charles A.
Nuneaton	Iliffe, George.
Oldham	Hargraves, H. Lister.
Oswestry	Evans, John.
Over Darwen	Shorrock, Ralph.
Oxford	Prior, George Thomas.
Paisley	Waddell, Andrew M.
Pembroke	Treweeks, Rich. Harwood.
Penrith	Kirkbride, William.
Penzance	Cornish, Henry Robert.
Perth	Donald, David.
Peterborough	Heanley, Marshall.
Petersfield	Edgeler, William B.
Plymouth	Hearder, Henry P.
Pontefract	Bratley, William.
Poole	Penney, William.
Portsmouth, etc.	Childs, James L.
Preston	Barnes, Lawrence R.
Ramsgate	Morton, Henry.
Reading	Bradley, Charles.
Redditch	Mousley, William.
Retford	Clater, Francis.
Rhyl	Foulkes, William H.
Richmond (Yorks)	Thompson, John Thomas.
Ripon	Judson, Thomas.
Rochdale	Taylor, Edward.
Rochester	Barnaby, Henry.
Rugby	Chamberlain, Arthur G.
Ryde (Isle of Wight)	Pollard, Henry Hindes.
Rye	Waters, William Allen.
St. Albans	Ekins, Arthur Edward.
St. Andrews	Govan, Alexander.
St. Austell	Hern, William Henry.
St. Ives (Cornwall)	Young, Tonkin.
Salisbury	Atkins, William Ralph.
Sandwich	Baker, Frank.
Scarborough	Whitfield, John.
Seacombe	Walker, John Henry.
Selby	Cutting, Thomas John.
Shaftesbury	Barry, Frederic.
Sheerness	Bray, John.
Sheffield	Ward, William.
Shields, South	Mays, Robert J. J.
Shoreham	Fenner, Edwin.
Shrewsbury	Cross, William Gowen.
Slough	Griffith, Richard.
Southampton	Dawson, Oliver R.
Southport	Ashton, William.
Spalding	Shadford, Major.
Stafford	Averill, John.
Stalybridge	Brierley, Richard.
Stamford	
Stirling	Moore, William J.
Stockport	Kay, Samuel.
Stockton-on-Tees	Brayshay, Thomas.
Stoke-on-Trent	Adams, Frank.
Stourbridge	Bland, Thomas Frederick.
Stratford-on-Avon	Hawkes, Richard.
Stroud	Blake, William F.
Sunderland	Harrison, John.
Swansea	Grose, Nicholas M.
Tamworth	Allkins, Thomas Boulton.
Taunton	Gregory, George Henry.
Tavistock	Gill, William.
Teignmouth	Cornelius, Joseph.
Tenby	Davies, Moses Prosser.
Tewkesbury	Allis, Francis.
Thirsk	Foggitt, John B.
Tiverton	Havill, Paul.
Torquay	Smith, Edward.
Totnes	Michelmore, Philip W.
Truro	Percy, Thomas Bickle.
Tunbridge Wells	Howard, Richard.
Tynemouth	Stobbs, Robert.
Uttoxeter	Johnson, John Borwell.
Ventnor	Weston, Charles.
Wakefield	Wice, Jonathan E.
Wallingford	Payne, Sidney.
Walsall	Bate, Joseph William.
Wareham	Randall, Thomas.
Warrington	Greenough, Hugh F.
Warwick	Pratt, Henry.
Watford	Chater, Edward Mitchell.
Wednesbury	Gittoes, Samuel James.
Westbury	Taylor, Stephen.
West Bromwich	Stamps, Frederic.
Weston-super-Mare	Gibbons, George.
Weymouth	Groves, Thomas Bennett.
Whitby	Stevenson, John.
Whitehaven	Kitchin, Archibald.
Wick	Miller, Kenneth.
Wigan	Phillips, Jonathan.
Wigton	
Wilton	
Winchester	Hunt, Richard.
Windsor	Russell, Charles J. L.
Wolverhampton	Brevitt, William Yates.
Woodbridge	Betts, John.
Woodstock	Griffits, J. A.
Worcester	Virgo, Charles.
Worthing	Cortis, Arthur Brownhill.
Wrexham	Edisbury, James Fisher.
Wycombe	Furmston, Samuel C.
Yarmouth, Great	Poll, William S.
Yeovil	Maggs, Thomas Charles.
York	Sowray, Joseph.

Examiners for Council Prizes.

Mr. Plowman and Mr. Southall were unanimously appointed to conduct the next examination for the Council Prizes.

Written Examinations.

The Registrar presented the following table, showing the attendance of candidates at the various centres for the last eleven Preliminary examinations, and it was resolved that Superintendents be appointed at the same centres as last year, the appointments to be offered in the first instance to the Local Secretary in each of those places, with the exception of London and Edinburgh.

PRELIMINARY EXAMINATION.

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

	1881. Jan., Apl., July, Oct.	1882. Jan., Apr., July, Oct.	1883. Jan.	1883. Apr.	1883. July.	Total number of attendances at each centre at 11 examinations.
ENGLAND AND WALES						
Birmingham	62	56	19	18	15	170
Brighton	11	16	2	5	7	41
Bristol	38	34	7	11	9	99
Cambridge	18	22	5	5	4	54
Canterbury	19	12	2	2	5	40
Cardiff	29	32	14	7	12	94
Carlisle	27	25	4	8	9	73
Carmarthen	33	41	8	10	16	108
Carnarvon	15	24	6	6	7	58
Cheltenham	6	8	1	6	2	23
Darlington	23	13	6	5	6	53
Exeter	25	32	11	12	13	93
Hull	23	29	8	9	9	78
Lancaster	14	26	2	9	6	57
Leeds	57	64	22	20	23	186
Lincoln	29	30	6	9	13	87
Liverpool	44	34	16	18	21	133
London	147	176	40	49	63	475
Manchester	76	102	25	22	33	258
Newcastle	31	38	7	6	7	89
Northampton	17	12	3	7	3	42
Norwich	23	28	6	9	9	75
Nottingham	37	33	16	8	13	107
Oxford	7	7	1	1	1	17
Peterborough	15	22	9	3	4	53
Sheffield	24	25	8	10	10	77
Shrewsbury	25	16	5	6	11	63
Southampton	27	29	5	5	10	76
Truro	20	23	2	4	7	56
Worcester	11	12	3	7	7	40
York	34	33	8	7	9	91
SCOTLAND.						
Aberdeen	43	52	10	8	16	129
Dundee	33	33	3	4	6	79
Edinburgh	88	74	19	28	29	238
Glasgow	39	36	14	17	22	128
Inverness	12	11	2	2	7	34
Douglas, I. of Man	—	3	3	—	3	9
Guernsey	3	6	3	3	3	18
Jersey	1	—	—	—	1	2

Reports of Committees.

FINANCE.

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

BENEVOLENT FUND.

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

£10 to the widow of a pharmaceutical chemist and member for many years, Applicant has had five previous grants.

£10 to the widow of an associate who has had five previous grants.

£10 to a registered chemist and druggist, aged 69, suffering from heart disease.

£10 towards the support of two of Isherwood's orphans.

One application had been deferred for further consideration.

The report and recommendations were received and adopted.

LIBRARY, MUSEUM, LABORATORY, AND HOUSE.

Librarian's Report.

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

	Attendance.	Total.	Highest.	Lowest.	Average.
May	Day	692	37	16	26
	Evening	161	14	2	7

	No. of Entries.		
Circulation of books.	Town.	Country.	Total.
May	186	116	302

Carriage paid, £1 13*s.* 6½*d.*

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

Hogg (W. D.), La Médecine publique en Angleterre, 1883. From the Author.

Ince (J.), Latin Grammar of Pharmacy, 2nd ed., 1883. 2 *copies.* From the Author.

Poehl (A.), Über das Vorkommen und die Bildung des Peptons ausserhalb des Verdauungsapparates und über die Rückverwandlung des Peptons in Eiweiss, 1882.

— Mittheilungen über neue Arzneimittel.

— Three pamphlets in Russian. From the Author.

United States, Medical and Surgical History of the War of the Rebellion, part 3, vol. 2, 1883. From the Surgeon-General, U.S. Army.

The Committee also recommended the purchase of the undermentioned works:—

Armstrong (H. E.), Organic Chemistry, 3rd ed., 1882.

Bloxam (C. L.), Chemistry Inorganic and Organic, 5th ed., 1883.

Ralfe (C. H.), Demonstrations in Physiological and Pathological Chemistry, 1880.

Neubauer and Vogel, Analysis of Urine, latest edition.

Owen (I.), Materia Medica, 1883.

Proctor (B. S.), Practical Pharmacy, 2nd ed., 1883. 2 *copies.*

Pharmaceutical Times, 1847-8, vol. 3.

Illustrations of the British Flora, companion to Bentham's Handbook, 1880.

Bentley (R.), Student's Guide to Botany, 1883.

Tolhausen (A.), Technological Dictionary in English, French and German, 3rd ed., 1883.

The Committee also recommended for purchase, a cabinet containing, on separate slips, over 10,000 titles of books, etc., prepared with a view to the formation of a bibliography of pharmacy.

The Committee also recommended that the Library and Museum be closed in the evening during the months of August and September, and that they be closed entirely on Monday, August 6.

Curator's Report.

The Curator had reported that the attendance in the Museum during the month of May had been:—

	Total.	Highest.	Lowest.	Average.
Morning	484	32	0	19
Evening	112	12	0	5

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

Specimens of English rhubarb prepared from the root of *Rheum officinale.* From Mr. R. Usher, Banbury

Specimens of crystals of Glycocoll.
From Mr. T. S. DYMOND.
Specimens of the root of *Chondodendron tomentosum*, and of the bark of the Balsam of Peru tree.
From Messrs. HEARON, SQUIRE and FRANCIS.
Specimen of the juice of the Natal Aloe plant.
From Mr. T. W. TURNER, Pietermaritzburg.
Specimen of the leaves of *Angræcum fragrans*.
From Messrs. WRIGHT, LAYMAN and UMNEY.
Specimen of Boldu leaves (*Cryptocarya Peumus*).
From Messrs. T. CHRISTY and Co.

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

New cases for Museum specimens were recommended to be placed in the front examination room, and it was also recommended that the examination rooms be cleaned and painted in accordance with an estimate that had been obtained.

The list of Local Secretaries had been considered and settled, subject to the approval of the Council.

The President had been requested to ask Professor Michael Foster, F.R.S., to deliver the Inaugural Address in October next.

The report and recommendations were received and adopted.

The Inaugural Sessional Address.

The PRESIDENT announced that he had seen Professor Michael Foster, who had consented to deliver the address.

FREEHOLD INVESTMENTS.

The report of this Committee was read, giving particulars of ground rents which had been considered by the Committee, who recommended the purchase of properties yielding £407 per annum; one property, yielding £37 per annum, had already been purchased in pursuance of a resolution formerly passed.

The Council went into committee to consider the subject, when the President read the report of a firm of surveyors who had inspected the property.

A long discussion ensued.

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

THE NEW PATENTS BILL: THE USE OF THE ROYAL ARMS.

Mr. SYMES drew attention to the fact that by section 94 of the new Patents Bill, now before the Grand Committee of the House of Commons, it is provided that anyone who without due authority used, in connection with any trade or business, the royal arms or any colourable resemblance thereto, shall be liable to a fine not exceeding £20. If the Act were passed this session, as was expected, it would come into operation in January next. It had occurred to him that many chemists and druggists were in the habit of using the royal arms on their labels, and that their stock might not be exhausted by January next. He would ask whether it would not be as well for the Council to make a suggestion to the Committee that the operation of the clause should be deferred to a later period.

Mr. BUTT said he had the royal arms painted on a specie jar, which he presumed would be illegal under such an Act.

Mr. YOUNG said he believed there were many labels used bearing the royal arms, and it might be as well to see if anything could be done.

Mr. SCHACHT said the utmost the Council could do would be to ask for an extension of the time; the clause itself seemed to be a very proper one.

The PRESIDENT said he would bring the subject before the Library, Museum, Laboratory and House Committee at its next meeting.

GENERAL PURPOSES.

The report of this Committee, which was read in committee, included the usual letter from the Solicitor stating the progress of cases which had been placed in his hands. The result in the cases of Everard Arthur Brown and J. C. Copley, both of Nottingham, was reported in the Journal of the 23rd ult. A penalty had also been paid by

Owen Stafford, of Hyde, Cheshire.

Several cases of alleged infringement of the Pharmacy Act had been reported, and in some instances legal action was recommended. In one case the Secretary had received information of a proposed sale of drugs by auction in which some poisons were to be included, but on making representations to the auctioneers, these poisons were withdrawn from the sale.

The report and recommendations were received and adopted.

REPORT OF EXAMINATIONS.

June, 1883.

ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.
Major (20th)	6	1	5
Minor (20th)	19	7	12
„ (21st)	22	12	10
	—41	—19	—22
Modified (21st) . . .	2	2	0
	49	22	27

Preliminary Examination.

Twenty-three certificates had been received in lieu of the Society's examination:—

7 College of Preceptors.
2 Faculty of Physicians and Surgeons of Glasgow.
1 Royal College of Surgeons of England.
1 Royal University of Ireland.
1 Society of Apothecaries.
7 University of Cambridge.
1 „ Glasgow.
1 „ London.
2 „ Oxford.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, June 28, 1883, Mr. H. G. Greenish, Vice-President in the chair.

Mr. H. Hamilton read a paper upon "The Characteristics of the Principal Natural Orders," in which the leading characters of the chief natural orders were explained. The paper was profusely illustrated by fresh specimens of typical plants.

A discussion followed the reading of the paper, in which the Chairman, Messrs. Baily, Corder, Crow, Fowler, Granger, Ranken and Short took part.

A vote of thanks was passed to Mr. H. Hamilton.

The Reporter upon Analytical Chemistry, Mr. C. Thompson, then made a report upon "The Estimation of Carbolic Acid," in which he gave an account of the principal processes, both gravimetric and volumetric, which have been proposed for the determination of carbolic acid, as well as a description of experiments made by the author to determine the relative accuracy of the respective processes.

In the discussion that followed, the Chairman, Secretary, Messrs. Crow, Dymond, Ranken and Short took part.

The meeting then adjourned.

Parliamentary and Law Proceedings.

Improper Use of Arsenic.

LAYING POISON ON A FARM.—HEAVY PENALTY ON A RATCATCHER.

At the Broxton (Cheshire) Petty Sessions, Joseph Turner, a ratcatcher, was charged with having illegally exposed poison on land.

Mr. Cartwright, who appeared for the police, said the defendant for some time before May 28 had been in the neighbourhood of Newton-by-Tattenhall killing rats, and about that period dogs, cats and game were found dead in the district. The first idea was that the animals had been killed by some fanatic who had a design on them; ultimately, however, Sergeant Morgan discovered, by a hedge on a farm, a substance which he suspected contained poison. He also noticed it in several other places, and there were traces of it beside a pool of water. He took up a quantity, and it was forwarded to the county analyst, Dr. Carter Bell, who stated that it contained 10 per cent. of arsenic, 3 grains of which would be sufficient to kill a man. Traces of this deadly poison had been discovered in the bodies of foxes which had been found dead in the district, and it was impossible to imagine what might be the result of laying such poison on a farm recklessly. It might be picked up by domestic animals, and in that way many deaths might ensue. It was well known that when rats took the poison they usually made for the water, and pools of water might be thus poisoned. The police had not been able to discover who had sold the arsenic to the defendant, but undoubtedly the vendor was even a greater offender than the defendant, for the analyst found that the arsenic was unmixed, whereas the law prescribed that it should be mixed with soot or indigo before it was sold.

Walter Sadler, a farmer, having proved that he had seen the defendant lay the poison, a fine of £13, including costs, was imposed.

[*** The inference drawn respecting the vendor of the arsenic is not necessarily correct, since the sale of uncoloured arsenic in quantities of not less than ten pounds at a time is provided for in section 4 of the Arsenic Act.—Ed. Ph. Journ.]

Poisoning by Vermin Killer.

Last week an inquest was held in Lincoln, by Mr. S. Lowe, City Coroner, concerning the death of a girl, named Pepper, aged 16 years, who had committed suicide. It appeared from the evidence that the deceased, having been reproved by her father for her unsatisfactory conduct, had been observed, after she had gone to bed, to be taking something from a paper, which was thought to be sweetstuff, but very early the next morning she was found in dreadful contortions, and died shortly after in fearful agony. It was subsequently ascertained that on the previous evening she had purchased a packet of "Battle's Vermin Killer," and the wrapper round the packet was found under her pillow.

Lucy Hodson was called, but, being only 13 years of age, she was not sworn. She, however, made the following statement: Last night, a little before six o'clock, I went with Mildred Pepper to Messrs. Battle and Maltby's shop for a threepenny packet of "Vermin Killer." She said to the assistant "If any of the children eat it, will it poison them?" and the answer was, "Yes, it is rank poison." She told the person in the shop she wanted it to put in the cupboard to kill the mice.

The medical evidence showed that death had resulted from strychnine poisoning, and the Jury returned a verdict that deceased had committed suicide by taking poison whilst in a temporary state of insanity.—From the *Lincolnshire Chronicle*.

Poisoning by Carbolic Acid.

On June 27, at Liverpool, Mr. Clarke Aspinall inquired into the circumstances attending the death of James McBroom, a commercial traveller. It appeared from the evidence that deceased was a very intemperate man, and had not been sober within the last three weeks. His head had become affected, and on Friday last he attempted to take poison, but was prevented. On Monday he returned to the house helplessly drunk about six o'clock, and half an hour afterwards his landlady found him dead in bed. A carbolic acid bottle lay on the table, and it transpired that he had purchased some of that poison on Monday morning, telling the chemist that he wanted it to dissolve horn pith. Dr. Sheppard, who was called in to see the deceased, stated that the cause of death was carbolic acid poisoning.

The Coroner remarked that every care had been taken in the sale of the carbolic acid; in fact, he found chemists generally were very careful in the conduct of their business, and that during the sixteen years he had been Coroner for Liverpool no case of poisoning had come before him in which a chemist had sold the article carelessly."

The Jury returned a verdict of "Suicide during temporary insanity."

Curious Action against a Chemist.

C. WEIGHT *v.* WALTER R. HADWEN.

This was an action heard last week at the Weston County Court, by Mr. W. J. Metcalfe, judge, in which the plaintiff, a travelling theatrical proprietor, claimed £5 of the defendant, a chemist, of Highbridge, for the loss of a dog, from taking poison on the defendant's premises. According to the statement of the case for the plaintiff, he had occasion to go to the defendant's shop. The dog followed its master into the shop, and the door of the counter being open at the time, the dog got into a place behind it, where Mr. Hadwen or his assistant had placed poisoned bread and butter on the floor with a view of killing mice or vermin, and the dog getting hold of it was killed in a very few minutes. It was contended that the defendant had been guilty of carelessness, in allowing particles of poisoned bread to be about his shop, within the reach of any child or dog that might come in. The dog was a retriever and performed in some of the pieces in the theatre.

Mr. Hadwen, in defence, having explained the position of the counter and the opening in the same, which was nearly at one end of the shop, said a piece of poisoned bread had been placed on the day in question on the top of a hamper at the extreme corner of the shop, about five minutes before the dog took it up. The greatest care had been exercised in placing the bread on the hamper, as the assistant who placed it there intended to take it away and burn it. Whilst his assistant was attending to the plaintiff, the dog, which did not appear to be under full control, got behind the counter and seized the piece of bread which was on the hamper either by stretching its neck or standing on its hind legs. Witness said he had to dispense and manufacture poison constantly for agricultural purposes, and as the rear of a chemist's counter was a sacred spot, the public had no right there. Chemists were bound as qualified men to keep such counters, and as every intelligent person knew that he had no right behind such counter, he ought to take care that an unintelligent brute should not go there. If the plaintiff's dog was a valuable creature, that was the greater reason why more care should have been taken of it. He denied the charge of carelessness which had been preferred by the plaintiff. Supposing that dog had come into his shop and knocked down some valuable bottles, would not its master be responsible? If the owner of the dog was responsible in that instance, why surely it was in the present action. Witness added that when the dog took the poisoned bread the assistant at once took the bread out of its mouth, and the plaintiff took the dog away from the shop apparently none the worse for what had happened.

In cross-examination Mr. Hadwen said he was in the room behind his shop when the plaintiff and his dog entered, and he heard the whole of the conversation between the plaintiff and his assistant. There was no need to put the poisoned bread on a higher elevation, as the dog had no right whatever behind his counter. The poisoned bread had been in a seed drawer the whole of the night before, and had only been placed about five minutes on the hamper, prior to its being burned. His assistant had just taken the bread from the drawer in order to put a fresh piece in its place, when a customer entered the shop. They were obliged to put a fresh piece of poisoned bread every night to destroy mice, as mice would not touch stale bread. The dogs which came to his shop were a great nuisance, as they had spoiled a lot of his goods from time to time, and he hoped that the accident which had happened to the plaintiff's dog would be a lesson to all his customers. As the plaintiff knew that he was a dispenser and manufacturer of poisons he ought to have taken proper care of his dog.

Mr. Hadwen's assistant corroborated his employer's statement.

His Honour, in summing up, pointed out that it had been held that the proprietor of a theatre was not at all liable when a person, who had no business on the stage, fell through a trap door, whereby he sustained bodily injuries. And so, if a person brought a dog with him into a chemist's shop, where there are all sorts of things necessarily exposed, he did so at his own risk. Mr. Hadwen had not invited the dog into his shop. Dogs are no doubt great nuisances to shopkeepers, and if people would take their dogs about into chemists' and other shops they would do so at their own risk. Even if the dog had picked up the poison outside the counter, he would have been loath to hold Mr. Hadwen responsible. Mr. Brice could take the case into a higher court if he liked, but it was his opinion that the defendant was not responsible in the present instance.

Judgment for the defendant, with costs.—*Weston Mercury and Somersetshire Herald.*

The Limitations under which a Man may use his own Name as a Trade Mark.

An important decision, bearing upon the law as to trade marks, was given last week by Mr. Justice North, in the case of Freeman *v.* Freeman. The action was to restrain the defendant from selling, offering for sale, passing or attempting to pass off, or enabling or inducing others to pass off baking powder not of the manufacture of the plaintiffs as or for the goods of the plaintiffs, by using the word "Freeman" or in any other way. The facts will be sufficiently understood from the judgment, which was as follows:—

Mr. Justice North said the plaintiffs (Freeman and Hildyard) had for many years carried on the sale of Freeman's baking powder, and in 1876 they registered as a trade mark the front of the label now used upon the 1*d.* packages. From the evidence it appeared clear that the sale of this baking powder became very large, one witness putting the number of packets sold at ten or eleven millions in the course of a year. To obtain this trade they had advertised very largely, and issued a considerable number of show-cards, and the article sold by them had become recognized in the trade, and was invariably asked for by customers as "Freeman's." On the label appeared the following words:—"Freeman's Digestive Baking Powder," the word "Freeman" being printed large, and then the words "Try it," which were said to be registered, and below that two medals and the signature "W. G. Freeman." The defendant's position was this. He seemed to have carried on business for some time as a china and glass merchant, and then he took up the ironmongery business. In September, 1880, he added to that the business of an oil and colourman, provision dealer, and other matters of that kind, and he had his name painted up in three or four places on his premises in the Harrow Road. He then for the first time commenced to deal in baking powder, and with the exception of three small fancy boxes which he had from Messrs. Pearce Duff and Co., the baking powder was supplied by the plaintiffs. The defendant himself proved that he knew the plaintiffs' article, for he had produced his invoices in which the baking powder was described as "Freeman's." In February or April the defendant commenced to make baking powder; at first he sold it in 1*d.* packets, afterwards adopted the 2*d.* packets, and the 1*d.* packets were very like the plaintiffs'. By "very like" he meant the packet was of the same size, the paper was of the same colour, the inscription on the back was in the same coloured ink, and at first sight no one could say which was the plaintiffs' and which was the defendant's. Upon examining the packet closely it would be seen that the words were different. On the top were the words "Royal Baking Powder" "Is the Best," then the royal coat of arms, and "Prepared only by H. Freeman, manufactory, College Park, Harrow Road, London, W." No doubt a person comparing the two packets would be able to distinguish between them, and would not be misled; but it must not be forgotten that very often persons had not the two labels side by side. Therefore, the mere fact that the distinction could be seen when the two were examined together was not all important. Of course, the defendant had a right to place his name and address upon his goods, so that persons might know where to apply to; but it was important to notice that the address was in very different type and appearance to the name. The name, "H. Freeman," was printed in enormously large letters, considering the size of the packets, and the address was printed in small letters. His lordship having referred to the evidence as to the sale of the defendant's baking powder to the plaintiffs when "Freeman's" was asked for, said he believed the defendant had sold this packet with the intention of passing it off as the plaintiffs' manufacture. It was clear that the plaintiffs' baking powder was known by the name of "Freeman's"; it was clear that the defendant had a right to sell baking powder, and to use his own name and address, but it was incumbent upon him to use his own name in such a way as not to represent that the goods made by him were really the goods of somebody else. He thought that the name of "H. Freeman" had been placed in a conspicuous manner upon the packages by the defendant in order to identify his baking powder with the name of Freeman. In addition to that there was the fact of the packets being of the same size, the boxes of the same shape and size, and the advertising that the powder was sold in 6*d.* and 1*s.* tins, when upon the defendant's own evidence he had never sold any tins. He also thought that the use by the defendant of the plaintiffs' show cards had not been sufficiently explained, and, therefore, he should grant an injunction restraining the defendant from selling, or offering for sale, or attempting to pass off any baking powder not manufactured by the plaintiffs as and for the goods of the plaintiffs. The defendant would also be restrained from using the label which had been put in evidence, and must pay the costs of the action. Upon the application of counsel for the plaintiffs his lordship directed the usual account as to profits, if the plaintiffs elected to proceed with it.

Reviews.

THE STUDENT'S GUIDE TO STRUCTURAL, MORPHOLOGICAL AND PHYSIOLOGICAL BOTANY. By ROBERT BENTLEY, F.L.S., M.R.C.S. Eng., etc.*

In consequence of the rapid strides made in all branches of botanical science during the last twenty years, the size of manuals of botany has, almost of necessity, increased in proportion, until they have become both too condensed in matter and too voluminous in size to be suitable either for regular reading, or for carrying with comfort in the pocket or hand. They have, therefore, in many cases become simply works of reference. Probably for this reason, many old pupils and others have expressed a desire, for some years past, to Professor Bentley, "to have a guide which should serve as an introduction to his Manual and other larger and more comprehensive works." In accordance with this expressed wish, Professor Bentley has prepared the volume under notice, in which he has "endeavoured to condense within a moderate compass all that is essential for a foundation for future study, with the view of its forming a convenient and trustworthy, but not too elementary, guide to structural and physiological botany, for medical and pharmaceutical students, and also for use in colleges and schools, where botany is now largely taught."

The book is of convenient size for the pocket, being rather smaller than Thomé's 'Text-book.' Systematic botany is entirely excluded, for the present volume is to be followed as early as possible by another, entitled 'The Student's Guide to Systematic Botany,' uniform with it in design and execution. This separation of the manual into two parts, each brought up to date by careful revision, will prove a great boon to students, since the two parts are rarely used at the same time. On opening the pages of the present volume it will be observed that, with the exception of one or two figures after Sachs, Luerssen, and others, the illustrations are those of the Manual. A perusal of the text, however, will show that many new terms are added and that nearly every page bears evidence of careful revision; this is particularly the case with regard to the style and language, which is much more simple and perspicuous than it was possible to make it in so condensed a work as the Manual. For instance, the summary of the discoveries of Darwin and others on the movements of plants is presented in a manner that renders it quite a bird's-eye view of the subject.

The great improvements made in the 'Student's Guide' over the first part of the Manual lead to the hope that the highly esteemed author may proceed still further in the next edition, which we trust may soon follow. From very few botanical works, if, indeed, from any, does the student gain an idea of the relative frequency with which the immense number of terms are used by systematic botanists, or of the looseness with which certain words, such as achene, thorn, berry, etc., are used, while there are many words met with in Latin descriptions of plants of which he has a difficulty in finding out the meaning in a Latin dictionary. A little more information in this direction would lighten to a considerable extent the difficulties of the students in the practical study of the science.

The 'Student's Guide' well deserves its name, for it serves as an intermediate stage between the cheap elementary primers and the perusal of such a complete text-book of the science as Sachs' classical work. The student who has carefully gone through the little volume now under notice will find himself familiar with the numerous new terms to be met with in the most advanced works on the subject, and will be thus fully equipped for further research which, in such subjects as chlorophyll, the reproduction of the Florideæ, and the colouring matters of plants, must be carried on in more advanced and compendious treatises. To the student we can strongly recommend the 'Student's Guide,' and also to those whose who from pressure of business have not time to read all that is written in botanical science, but who find an acquaintance with the meaning of new terms, which come into use almost every year, necessary to prevent their being left behind in the march of scientific knowledge.

* London: J. and A. Churchill, Fcap. 8vo., pp. i.–xiv., 1–482. 7*s.* 6*d.*

DIE CHINARINDEN. In Pharmakognostischer hinsicht dargestellt von F. A. FLUCKIGER.*

This is a concise handbook on the cinchona bark, and supplies a want which has long existed of an accurate condensation of the literature of the cinchonas suitable for pharmaceutical readers. Originally appearing in the author's 'Pharmakognosie des Pflanzenreiches,' Professor Flückiger has supplemented his article with such matter as the work required in its present form and was of interest to a wider circle of readers.

Commencing with a botanical description of the genus *Cinchona* and of the most important species, then of the genus *Remijia*, next come chapters on the habitat and the cultivation of the cinchona and on the collection of the bark and the effect of mossing, coppicing and uprooting. Then follow accounts of the appearance and structure of the bark, of the contents of its tissues and the seat of the alkaloids; also of the various kinds of cinchona barks. Chapter XI. contains an interesting description of the now important cuprea bark, the name first applied by the author in 1871 to the bark of a species of *Remijia*. Since its introduction in about June, 1879,—although according to a foot note on page 43, Mr. J. E. Howard has shown to the author a specimen of cuprea bark which he obtained on the London market in 1859,—the importation of cuprea bark has increased to such an extent that the greater part of the cinchona bark which is now imported from South America consists of cuprea, and its value as a quinine bark cannot be too highly estimated as it yields on an average one and a half per cent. of quinine alkaloid with a very small proportion of quinidine and cinchonine and no cinchonidine. There is a well-written account of the chemical constituents of cinchona bark, with the list of the alkaloids brought down to the latest date, including the new alkaloid of cuprea bark, discovered in 1881 and first published in this Journal in December of that year; we refer to homoquinine, ultraquinine, or cupreine, whichever may be the name finally adopted for it. We notice Professor Flückiger adopts Skraup's new formula for cinchonine and cinchonidine, viz., $C_{19}H_{22}N_2O$.

The chapter on the quantitative determination of the alkaloids contains several ready pharmaceutical methods for the estimation of the amount of alkaloids in cinchona bark without regard to the separation of the mixed alkaloids, the amount of quinine in which would hardly be very accurately ascertained by dissolving the mixed alkaloids in ether (or chloroform) and relying on "the weight of the residue left after the evaporation of the ether approximating to the quantity of quinine" ("das Gewicht des nach Verdunsten des äthers bleibenden Rückstandes entspricht annähernd der Menge des Chinins," p. 60), or by neutralizing the alkaloids with sulphuric or tartaric acid and depending on "the corresponding salts of quinine being, on account of their difficult solubility, easy to separate from those of the accompanying alkaloids" ("die entsprechenden Salze des Chinins sind ihrer Schwerlöslichkeit wegen leicht von denjenigen der Nebenalkaloïde zu trennen," p. 61).

The book has some excellent plates illustrating the plants of *C. succirubra*, *C. Calisaya*, var. *Ledgeriana* (2), *C. lanci-*

* Berlin: R. Gaertner, 1883. Super Royal 8vo. Pp. 1–79. Plates I.–VIII. 10*s.* 6*d.*

folia, *C. officinalis*, *Remijia pedunculata*, sections of the bark of *C. Calisaya* and *C. lancifolia* and a section of the "cuprea" bark, and is written with the care that usually characterizes the works of Professor Flückiger.

Obituary.

Notice has been received of the death of the following:—

On the 19th of April, Mr. James Garrett, Chemist and Druggist, Commercial Street, Newport, Mon. Aged 77 years.

On the 4th of May, Mr. John Dodwell, Chemist and Druggist, Camberwell New Road, S.E. Aged 79 years.

On the 11th of May, Mr. William Duncanson, Pharmaceutical Chemist, Port Street, Stirling. Aged 52 years. Mr. Duncanson had been a Member of the Pharmaceutical Society since 1869, and for several years filled the office of Local Secretary.

On the 30th of May, Mr. Edward Dingle, Chemist and Druggist, Bideford. Aged 82 years.

On the 4th of June, Mr. Richard Graves, Chemist and Druggist, Broad Street, Golden Square, W. Aged 26 years. Mr. Graves had been an Associate of the Society since 1880.

On the 6th of June, Mr. Webster Cox, Chemist and Druggist, Havelock Place, Stoke-on-Trent. Aged 21 years.

On the 11th of June, Mr. Frederick George Baldwin, Greenwich Road. Aged 36 years.

On the 16th of June, Mr. George Smith F. Skoulding, Chemist and Druggist, Church Plain, Great Yarmouth. Aged 48 years.

On the 19th of June, at Ilkley, Mr. Samuel Hague Stanley, late of Bradford. Aged 73 years.

On the 21st of June, Mr. Joseph William Winter, Chemist and Druggist, Boxford, Suffolk. Aged 56 years.

On the 22nd of June, Mr. William David Williams, Chemist and Druggist, High Street, Hampstead. Aged 41 years.

On the 22nd of June, Mr. John Nelson, Chemist and Druggist, Bridge Street, Blyth. Aged 85 years.

On the 22nd of June, Mr. William John Mortlock, Pharmaceutical Chemist, Huntingdon. Aged 27 years.

On the 27th of June, Mr. John Sharp, Chemist and Druggist, Sedgefield Terrace, Bradford. Aged 76 years.

On the 28th of June, Mr. Horatio Pass, Chemist and Druggist, Wandsworth Road, S.W. Aged 69 years. Mr. Pass had been a Member of the Pharmaceutical Society since 1869.

On the 30th of June, Mr. Robert Stephen, Chemist and Druggist, George Street, Aberdeen. Aged 39 years.

On the 2nd of July, Mr. Frederick Kendall, Stratford-on-Avon. Aged 75 years. Mr. Kendall was one of the Founders of the Pharmaceutical Society, having joined it in 1841.

BOOKS RECEIVED.

REPORT ON THE PHARMACOPŒIAS OF ALL NATIONS. By Dr. JAMES N. FLINT, U.S.N. Washington: Government Printing Office. 1883.

BABIES: HOW TO REAR THEM. By F. C. FAWKES, F.R.H.S. London: W. Swan Sonnenschein and Co. 1883. From the Author.

A FEW WORDS UPON ANÆSTHETICS. By R. T. FREEMAN, L.R.C.P., etc. London: J. and A. Churchill. 1883. From the Publishers.

Correspondence.

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

EASTON'S SYRUP.

Sir,—In the Journal for April 26, 1879, Mr. Edward Smith, in a remark on Mr. Gilmour's note on the loss of quinine in making Easton's syrup, suggested the direct use of the sulphate instead of the phosphate prepared from it.

Would you kindly allow me to ask Mr. Smith, or any one who may have acted upon his suggestion, whether or not they have succeeded in turning out a satisfactory syrup. I find that Easton's syrup, prepared strictly from the sulphate or from crystallized phosphate, soon becomes unsaleable from the presence of minute crystals which give the syrup a "milky" appearance.

Information from any who may have met with similar difficulties would be very acceptable.

JOHN.

REJECTED BARK OF "TR. QUILLAYA SAPONARIA" AS A CLEANSING AGENT.

Sir,—To those who are in the habit of making their own tincture of the above it may be interesting to know that the "bark," having done its duty in forming the tincture, comes very useful for cleansing greasy bottles, etc. I always find it answer capitally; just a small piece and a little water do wonders.

J. D. M.

SYRUP OF SQUILLS.

Sir,—This preparation, if made with sugar, invariably crystallizes, and consequently is never uniform.

I have for some years made a syrup which never alters; it is perfectly transparent, and I hope the formula will find a place in the New Pharmacopœia. It is as follows:—Mix, by stirring, 15 ozs. by weight of syrup of glucose with 2 fluid ounces of glycerine. Now add 10 fluid ounces of acetum scillæ, and stir until thoroughly incorporated, no heat being used.

PERCY WELLS.

Lac.—A recipe for essence of rennet will be found in the *Pharm. Journ.* for August 19 last, p. 150.

Spicelia.—There would be no difficulty in obtaining a copy of the second edition of Mr. Ince's book if you were to apply directly to the publishers, Messrs. Baillière, Tindall and Cox, 20, King William Street, Strand, W.C.

H. C. H.—The plant has been named correctly.

"*Cornkure.*" — Such a preparation has been held by the Inland Revenue Authorities to be liable to the payment of stamp duty.

American.—There are almost as many rival recipes for Florida Water as for Eau de Cologne. The following is one of them:—Ol. lavand., ol. bergamot., ol. limonis, of each 2 drachms; tinct. curcumæ, ol. neroli, of each 1 drachm; ol. melissæ, 30 drops; ol. rosæ, 10 drops; alcohol, 2 pints.

R. A. Hoyle.—No. 5 is *Scirpus acicularis*; the others are correctly named.

Ephemera.—(1) *Euphorbia Peplus.* (2) *Carex pseudo-cyperus.* (3) *Vicia sepium.* (4) *Scrophularia aquatica*, probably: leaf and stem should be sent.

"*Herbalist.*"—(1) *Verbascum Thapsus.* (2) *Rhinanthus Crista-Galli.* (3) *Polygala vulgaris.* (4) *Prunella vulgaris.* (5) *Galium Aparine.* (6) *Scrophularia nodosa.*

COMMUNICATIONS, LETTERS, etc., have been received from Dr. Browne, Messrs. Bennett, Wells, Darling, Stanford, Inquirer, G. H. P.

SEEDS OF THE CAMELLIA OLEIFERA (C. DRUPIFERA, HOOKER).

BY HUGH MCCALLUM.

The *Camellia Oleifera* grows abundantly on the hill sides throughout the Kwangtung province and is to be found over the greater part of China. A full botanical description of it is given in Hooker's 'Flora of British India,' which is now being published. Some of the seeds were collected about fifty miles north-east of Hongkong. Freed from the husk, a sample of them yielded 44 per cent. of a somewhat viscid yellowish oil, odourless and having an unpleasant after-taste. The method of extraction was with ether, using a Soxhlet's tube. The oil is practically insoluble in 84 per cent. alcohol. It is a commercial article under the name of Cha Yau, or tea oil, and is popularly thought to be obtained from the tea tree. The fact of the character Cha being used for both plants is doubtless the cause of the error. It is chiefly used as a hair dressing and as an illuminant. Bentley states that it makes a good salad oil, but all the specimens seen have been quite unfit for such a purpose, owing to their unpleasant taste. Expression is the method adopted by the Chinese for extracting the oil. In addition to the oil about 10 per cent. of a glucoside, giving most of the reactions of saponin, was obtained from the seeds. Even then, the marc on shaking with water gave an abundant persistent lather, indicating that all the saponaceous principle had not been extracted.

Cha-tsai-fau.—This is a rough greyish powder having a faint peculiar odour, the dust irritating the nostrils. It appears to be the powdered residue obtained in expressing the oil from the seeds of the *Camellia oleifera.* It is chiefly used as a washing powder, more especially for removing greasy stains. An infusion of it is used by gardeners for destroying worms, grubs, etc., and it is reported to answer the purpose well. It is sometimes used for poisoning fish and it acts with certainty when the fish are in tanks with only a limited supply of water, as is often the case in China, but it is doubtful if it would prove as effective in a running stream. It contains the same glucoside as the *Camellia Oleifera* seeds, and also a small quantity of an oil soluble in rectified spirit, having an odour resembling linseed oil and a very unpleasant taste.

Cha-tsai-peng.—This is a rough, thin, almost circular cake covered with rice husks. It appears to be the same thing as Cha-tsai-fau in a coarser form and contains the same glucoside. It is used with water as a hair wash.

Saponin from the Seeds of Camellia Oleifera.—This is a friable amorphous powder of nearly a pure white colour having only a slight creamy tinge. It is almost odourless when dry, but it has a peculiar somewhat disagreeable odour when dissolved in water. The dust irritates the nostrils. It is hygroscopic and when perfectly dry adheres to the tongue similar to hydrated alumina. Its taste is at first sweetish, resembling liquorice, then bitter and disagreeable, causing a peculiar biting sensation in the throat. It is insoluble in ether, sparingly in absolute alcohol, freely in 84 per cent. alcohol and very soluble in water. Its solution in water has a distinct acid reaction to litmus paper. A watery solution gives white precipitates with barium hydrate and basic lead acetate, none with normal lead acetate in the cold, but a white one on heating. With Fehling's solution it gives a greenish precipitate and on boiling a slight reduction takes place. Heated with dilute hydrochloric acid a floculent white precipitate (sapogenin) is thrown down and a glucose remains in solution. The watery solution emulsifies oils and chloroform, and when shaken in a tube with mercury, the mercury is reduced to a fine grey powder. On incineration it gives 0·9 per cent. of ash.

After several unsuccessful attempts to obtain the glucoside in a pure state, the following method was finally adopted:—The seeds were sliced as finely as possible and the oil removed by ether, using a Soxhlet's tube. The marc was then reduced to powder and exhausted by repeated treatment with boiling 84 per cent. alcohol. The alcoholic solution so obtained was concentrated to a syrupy consistence and gradually poured, with constant stirring, into absolute alcohol. The glucoside separated as a floculent precipitate speedily subsiding and cohering into a brownish sticky mass. This was redissolved in warm 84 per cent. alcohol, digested with animal charcoal, filtered and evaporated to dryness. The substance thus obtained may not be quite pure, and this probably accounts for its not altogether agreeing with saponin derived from other sources. One notable point of difference between it and the *pure* saponin, obtained by Mr. H. Collier from the bark of *Quillaia saponaria*, is the low figure for ash, viz., 0·9 per cent. compared with 3·979 per cent., agreeing, however, in being composed chiefly of calcium.

The poisonous effects on the smaller animals, which this substance undoubtedly possesses, suggests its use as a vermifuge and it is to be hoped a trial will be made with it.

Hongkong, China.

SOURCE OF THE PUNGENCY IN TINCTURE AND LINIMENT OF IODINE.

BY W. H. DARLING.

In this Journal* MacEwan has called attention to the pungency of some liniment made with methylated spirit, and showed by experiment that *pure* methyl alcohol does not develop this peculiarity. He therefore attributes it to the allyl alcohol in the crude wood spirit. In Canada,† Gregory, having noticed the same pungency in some tincture of iodine made with methylated spirit, agrees with MacEwen in attributing it to the allyl alcohol, observing "that the odour of the tincture was decidedly garlicky."

That allyl alcohol is one of the constituents of wood spirit, Aronheim‡ has shown, although Dancer§ does not mention it, for he gives the constituents of rough wood spirit as methyl alcohol, methyl acetate, acetone and bimethyl acetal.

The allyl compounds are characterized by pungency, but they will not be the only pungent compounds present in these preparations when made with methylated spirit, for the halogen substitution products of acetone, present in considerable quantity in crude wood spirit, are of an extremely irritating nature, much beyond the allyl compounds in this particular. It is to acetone rather than to the allyl alcohol must be attributed the pungency noticed in these iodine preparations when made with methylated spirit.

* *Pharm. Journ.*, vol. xiii., p. 615.
† *Pharm. Journ.*, vol. xiii., p. 1082.
‡ Watts's 'Dictionary,' vol. viii., part 1, p. 60.
§ Dancer, *Chem. News*, vol. ix., p. 259.

THE NEW PHARMACOPŒIAS FOR THE UNITED STATES AND GERMANY.

(*Continued from Vol. XIII. p.* 1057.)

Chemical Materia Medica.

Acida.—The already long list of acids in the United States Pharmacopoeia has been increased, five having been introduced and only two omitted. The new acids are—glacial acetic, boric, dilute hydrobromic, oleic and salicylic acids; those omitted are—oxalic and valerianic acids. Glacial phosphoric acid has been replaced by a strong solution. A proposition made by Dr. Hirsch that solutions of acids, alkalies, etc., should be of such a strength that equal quantities should represent equal capacity of chemical saturation, appears to have been under consideration, though not found practicable. But the dilute acids, with the exception of dilute acetic and hydrocyanic acids, have been adjusted so as to contain, as nearly as possible, 10 per cent. of absolute acid. In the Pharmacopœa Germanica the number of acids has been reduced by one. The omissions are aromatic acetic, dilute nitric, succinic and valerianic acids and aqua regia; the introductions are formic, pyrogallic, salicylic and liquefied carbolic acids, besides which crude nitric acid has been replaced by fuming nitric acid. The following is a list of the acids, with some details in connection with them:—

Acidum Aceticum, U.S.P., P.G.—The "acidum aceticum," U.S.P., has a sp. gr. at 59° F. of 1·048, and contains 36 per cent of $HC_2H_3O_2$, being therefore slightly stronger than the B.P. acid, which contains 33 per cent. It would appear that having abandoned crude and distilled vinegars, every precaution is now to be taken to secure a pure acetic acid, new tests having been added for iron, copper, calcium, fixed impurities and foreign acids, empyreumatic substances, and organic impurities. The "acidum aceticum," P.G., comes near to the glacial acetic acid, U.S.P., and especially B.P. It is a colourless liquid at 15° C., becoming solid when cooled, and boiling at about 117° C. Its sp. gr. at 15° C. is 1·064, and it contains 96 per cent. of $HC_2H_3O_2$. When 5 c.c. of acid is diluted with 15 c.c. of distilled water and 1 c.c. of permanganate solution (1 in 1000) added the red colour should not disappear within ten minutes, showing absence of empyreumatic bodies, acetone, and formic and sulphurous acids. The other tests are for the presence of mineral acids; but it has been pointed out that since the choice of a 96 per cent. acid will admit an acid that is usually made by distilling sodium acetate with strong sulphuric acid, it would have been as well to have had a test for cacodyl and other arsenical impurities. In the description there occurs the curious phrase: "Liquor . . . . odoris spinose acidi."

Acidum Aceticum Dilutum, U.S.P., P.G.—The U.S.P. "dilute" acetic acid is made by mixing 17 parts of the stronger acid with 83 parts of water. It has a sp. gr. of 1·0083, and contains 6 per cent. of $HC_2H_3O_2$, being stronger than that in the last edition, which resembled the B.P., and contained 4½ per cent. The P.G. "dilute" acid is much stronger; its sp. gr. is 1·041 and it contains 30 per cent. of $HC_2H_3O_2$. The direction for the volumetric test is rather peculiarly worded: "Ad centimetros cubicos quinquaginta Liquoris Kalii hydrici volumetrici saturandos grammata decem sufficiant, id quod triginta Acida acetici in partibus centum respondet." This, whilst it would ensure a preparation containing 30 per cent. of acid, would not, construed strictly, exclude a stronger one. The same form occurs elsewhere.

Acidum Aceticum Glaciale, U.S.P. (new).—Sp. gr., when liquefied and as near as possible to 59° F., 1·056 to 1·058; contains not less than 99 per cent. of $HC_2H_3O_2$. It is said to be a crystalline solid at or below 59° F., whilst the temperature given in the B.P. is 48° F. It may be mentioned, however, that, according to Hager's table, as well as Oudeman's, which is included in the Appendix to the U.S.P. the sp. gr. of 1·065 to 1·066, given in the B.P., would correspond at 15° C. (59° F.) to only about 95½ per cent. of acetic acid ($HC_2H_3O_2$), although 84 per cent. of acetic anhydride ($C_4H_6O_3$), the quantity mentioned in the B.P., would represent 98·82 per cent. The introduction of glacial acetic acid into the U.S.P. became necessary to meet the requirements of the new solution of acetate of iron. As previously mentioned, the "acidum acetum," P.G., is practically a glacial acid.

Acidum Arseniosum, U.S.P.; *Acidum Arsenicosum*, P.G.—In both Pharmacopœias it is described as being completely, but slowly, soluble, in 15 parts of hot water; the U.S.P. adds, also, in 30 to 80 parts of water at 59° F., and moderately in glycerine. The U.S.P., like the B.P., admits the opaque powder form; but the P.G. has only "frusta alba porcellanæ similia vel pellucida," probably because the mass form is more likely to be pure. According to the U.S.P. it should be "odourless and tasteless." The volumetric test in the U.S.P. requires that a solution of 0·247 gram of arsenious acid with 0·5 gram of sodium bicarbonate in boiling water shall decolorize not less than 48·5 c.c. of vol. sol. of iodine and this is said to correspond to at least 97 per cent. of As_2O_3, but it has been pointed out that the quantity of sodium bicarbonate is insufficient. The point of complete volatilization is given at 424·4° F., but in the B.P. it is "not exceeding 400° F." The P.G. guards against the sulphide by requiring that a solution in 10 parts of hot liquor ammoniæ should not be coloured yellow when hydrochloric acid is freely added. Both works perpetuate the somewhat barbarous test for the recognition of arsenious acid by the alliaceous odour evolved when it is thrown upon ignited charcoal.

Acidum Benzoicum, U.S.P., P.G.—Few subjects have occupied a larger share of space in German pharmaceutical literature than this acid, since the publication of Dr. C. Schacht's paper on the permanganate test for its purity (*Pharm. Journ.*, [3], xii., 517). Although there can be little doubt that other kinds than the sublimed have been freely used in Germany, and that this practice has received indirect sanction by the legal price specified in the *Arznei-Taxe*, the P.G. still orders that benzoic acid shall be prepared from benzoin by sublimation. Apparently to secure this the description of the colour of the crystals has been altered from "whitish, eventually yellow," to "yellowish or yellow-brown;" and besides smelling of benzoin it is to have an empyreumatic odour. The solubility in water has been altered from 1 in 200 to 1 in 320. The change as to colour appears to be intended to utilize the propensity of sublimed benzoic acid to become coloured, so as to exclude a "masked" acid prepared by submitting to sublimation a mixture of artificial or precipitated acid and benzoin, such a product being colourless, or at most occasionally yellowish. This coloration, however,—which is due to a small quantity of adherent volatile oil derived from the resin ('Pharmacographia,' 408),—is not an invariable character of sublimed benzoic acid, especially of the different fractions of a sublimation, though there appears to be some difference in opinion as to the relative colour of the fractions. Hager says (*Commentar*, p. 59) that the first four-fifths of the acid subliming from the resin is pure white, and that the yellowish and stronger coloured crystals make their first appearance when the heat has been considerably increased; also that the empyreumatic odour only becomes apparent in the third or fourth fraction. Sometimes, he says, but only seldom, a benzoin occurs that yields little white and more yellowish sublimate. On the other hand, Schneider (*Archiv*, xvii., 893) says that the first sublimation fraction is most richly saturated with volatile oil and therefore yellow and brownish, whilst the portion obtained last is much poorer in volatile oil and appears therefore almost colourless. Possibly the apparent contradiction is explained by the fact that Hager's results were obtained in using a temperature of 140° C. at the commencement of the operation, and afterwards raising it to 170° to 180° C., whilst Schneider maintained the temperature between 150° and 160° C. throughout. But there can be little doubt that the collected product of an entire sublimation from Siam benzoin is coloured. In preparing benzoic acid by the wet process the later crystallizations are darkest. It is upon the presence of this adherent volatile oil in acid sublimed from Siam benzoin, and its reducing action upon potassium permanganate, that the new test in the P.G., which has provoked much criticism, is based. It provides that 0·1 gram of acid dissolved in 5 c.c. of boiling water, to which, after cooling, 16 drops of permanganate solution (1 in 200) has been added, shall be almost colourless at the end of eight hours. Other substances, however, are known capable of answering this test, for instance, vanillin, which has been met with in Siam benzoin ('Pharmacographia,' 409), and as a result of the discussion on the point, the German pharmacist has been recommended to protect himself by subliming in his own laboratory the benzoic acid he requires. It has been pointed out that an impurity of cinnamic acid would contribute to the reducing action, but then the benzoic acid would not answer to the character that when warmed in a test-tube with an equal weight of potassium permanganate and 10 parts of water the odour of bitter almonds must not be evolved. As, however, cinnamic acid would pass over with benzoic acid in the sublimation and cannot afterwards be separated, the necessity for using a benzoin free from that acid has considerably affected the price of Siam benzoin in Germany. On the other hand, turning to the U.S.P., it is found that the crystals are described as "white," nothing is said of an empyreumatic odour, whilst a provision in the 1870 edition that benzoic acid should be prepared by sublimation, and a description of the process, have been omitted from the new edition. But the tests have been increased in number. A solution in pure cold sulphuric acid, when gently warmed, should not turn darker than light brownish, and then when poured into water the benzoic acid should precipitate white and leave the liquid colourless. When introduced with recently ignited and moistened cupric oxide into a non-luminous flame it should not impart a green or bluish-green colour to the flame (chlorobenzoic acid). It should not have an odour like that of bitter almonds or stale urine. Two parts of acid and one part of potassium permanganate, rubbed with a little water in a mortar, should not evolve an odour of bitter almonds (cinnamic acid). The solubilities given are: in water at 59° F., 1 in 500; alcohol at 59°, 1 in 3; boiling water, 1 in 15; boiling alcohol, 1 in 1; ether, 1 in 3; chloroform, 1 in 7; in carbon disulphide, benzol, benzin, and oils, readily soluble; and freely soluble in solutions of potash, soda or ammonia. The crystalline needles are said to be "friable." This is probably a mistake for "flexible."

Acidum Boricum, U.S.P. (new); P.G.—In the U.S.P. the ordinary tests are given to prove the absence of sulphates, chlorides, calcium, lead, copper, iron, etc. Heated in a non-luminous flame the acid should not impart to it a persistent yellow colour. Solubilities: in water at 59° F., 1 in 25; alcohol at 59° F., 1 in 6; boiling water, 1 in 3; boiling alcohol, 1 in 5. The P.G. also provides for the absence of metallic impurities, sulphates and chlorides; the solubilities, too, are similar. Both works state that a solution in spirit, when ignited, burns with a green-margined flame, and the P.G. says the same of a glycerine solution; but it does not point out that in order to ignite the glycerine it should be previously heated to about 160° C. (*Pharm. Journ.*, [3], v., 441).

Acidum Carbolicum, U.S.P., P.G.—Described in the U.S.P. as a product of distillation of coal-tar between 356° and 374° F. (1873, between 300° and 400° F.), and occurring in "colourless, interlaced needle-shaped crystals, sometimes acquiring a pinkish tint, deliquescent on exposure." The crystals are said to melt at 96·8° to 107·6° F., and boil at 357·8° to 366·8° F., the higher melting and the lower boiling points being given as those of pure anhydrous acid. It may be remarked that deliquescence has been attributed to the presence of cresylic acid (*Pharm. Journ.*, [3], v., 661). The odour is said to be slightly aromatic, "resembling creasote." A minute quantity of ferric chloride added to a one per cent. solution of carbolic acid produces a permanent violet-blue colour (with creasote it turns rapidly greenish and brown). One volume of liquefied carbolic acid, containing 5 per cent. of water, forms with 1 volume of glycerine a clear mixture not rendered turbid by 3 volumes of water (absence of creasote and cresylic acid). In the U.S.P. it is stated that the amount of water in carbolic acid may be determined by shaking equal volumes of acid and chloroform together, the water forming a supernatant layer upon standing; but the correctness of this statement has been questioned by Cripps (*Pharm. Journ.*, [3], xiii., 954). The P.G. describes the crystals as "coloris expers vel vix rubicunda." The melting point given covers a wider range than in the U.S.P., being from 35° C. (95° F.) to 44° C. (111·2° F.), whilst the boiling point is from 180° C. (356° F.) to 184° C. (363·2° F.). In the B.P. the boiling point given is 370° F. According to Schorlemmer (*Pharm. Journ.*, [3], v., 739) the boiling point of absolutely pure carbolic acid is 181·5° C. (358·7° F.). Besides the characteristic reaction with ferric chloride the P.G. gives the formation of white flocks of tribromphenol with bromine solution (*Pharm. Journ.*, [3], vi., 821).

Both works give the solubility of pure carbolic acid in water as 1 in 20 at 59° C.

Acidum Carbolicum Crudum, U.S.P., P.G.—Unlike the B.P., the U.S.P. and P.G. both define a crude carbolic acid for disinfecting purposes. In the U.S.P. it is described as a nearly colourless or reddish-brown liquid obtained during the distillation of coal tar, between 338° and 374° F., and containing variable proportions of carbolic and cresylic acids, together with other substances. It should not be soluble in less than 15 parts of water, and the quantity of undissolved impurities present after the crude acid has been shaken with twenty times its volume of warm water and allowed to cool is now limited to 10 per cent. The crude carbolic acid of the P.G. is described as a clear yellowish or yellowish-brown liquid, easily soluble in alcohol and ether, and incompletely and with more difficulty in water. After shaking 10 vols. with 90 vols. of caustic soda solution, sp. gr. 1·079, the liquid or semi-liquid residue should not exceed 1 vol., and the alkaline liquid, when removed and rendered acid with sulphuric acid, should separate a yellowish or yellow-brown oil, giving the reactions of carbolic acid and scarcely soluble in 30 volumes of water.

Acidum Carbolicum Liquefactum, P.G.—This preparation appears to have been introduced as more convenient in dispensing than the crystalline form, which is sometimes troublesome to remove from a bottle. It is made by mixing 100 parts of carbolic acid with 10 parts of water and is described as a clear colourless liquid, completely soluble in 18 parts of water. It is noticeable, however, that the official carbolic acid, which would be used for the preparation, may be "vix rubicunda," and a simple calculation will show that the solubilities given for the two articles do not correspond.

Acidum Chromicum, P.G., U.S.P.—In the U.S.P. a test defining the limit of sulphuric acid has been inserted and from the P.G. a similar test has been omitted. In both works the crystals are described as "deliquescent," and on this account the P.G. allows a solution of the acid in an equal weight of water to be kept ready prepared for use. But according to Hager (*Commentar*, p. 85) the deliquesence of chromic acid crystals is due to contamination with sulphuric acid, and when they are quite free from this impurity they are permanent in the air. A similar solution is official in the Codex. The U.S.P. contains a warning against the danger attending the contact, trituration or warming of this acid with easily oxidizable substances.

Acidum Citricum, U.S.P., P.G.—No process is given in either work; the tests are for the absence of sulphuric, oxalic and tartaric acids, lime, lead and other metals. In the U.S.P. the solubilities given are in water at 59°, 1 in 0·75; in alcohol, 1 in 1; in boiling water or boiling alcohol, 1 in ½; in ether, 1 in 48; nearly insoluble in absolute ether, chloroform, benzol and benzin. When ignited, 0·05 per cent. of ash is allowed, but this must not turn blue when moistened with ammonia, or blacken with sulphide of ammonium (absence of lead, copper and iron). The above solubility in water corresponds with that given in the B.P., but the P.G. gives it at 1 in 0·54. Moreover, whilst in the U.S.P. the acid is said when heated to 100° C. to melt and gradually lose 8·6 per cent. of its water, in the P.G. it is said to liquefy at about 165° C.

Acidum Formicicum, P.G. — A clear colourless liquid, with a pungent (*spinosi*) but not at all empyreumatic odour and very acid taste. The volumetric test with caustic potash solution corresponds to 25 per cent. of CH_2O_2; but the specific gravity is given as 1·060 to 1·063, the lowest of which figures would represent less and the highest more than that quantity. It is required in the preparation of spiritus formicarum. This acid is said to be used in Germany, dissolved in spirit (5 to 20 per cent. solutions), as an external remedy against chronic rheumatism, and doses of from 0·5 to 2·0 grams dissolved in 80 to 100 parts of water are, according to Hager, given as an antiseptic.

Acidum Gallicum, U.S.P.—Process omitted. Solubilities: in water at 59°, 1 in 100; in alcohol, 1 in 4½; in boiling water, 1 in 3; in boiling alcohol, 1 in 1; in absolute ether, 1 in 39; less soluble in chloroform, benzol and benzin. It is distinguished from tannic acid by not precipitating alkaloids, gelatin, albumen, gelatinized starch, etc. Not included in the P.G.

(*To be continued.*)

THE PREPARATION OF PHOSPHORIC ACID BY THE OXIDATION OF PHOSPHORUS WITH ATMOSPHERIC AIR IN THE PRESENCE OF MOISTURE.*

BY W. T. WENZELL, PH.G., M.D.,

Professor of Chemistry in the California College of Pharmacy.

A preliminary paper announcing some experiments and results favourable to the preparation of phosphoric acid by moist oxidation was read at a quarterly meeting of the California Pharmaceutical Society held in July, 1882.

Since then further experiments were made with the view of devising a process by which the principles here involved could be carried out in a practical way and free from danger. That phosphoric acid might be prepared easily and in any quantity by this process was suggested by the following incident:—

A common ointment-jar, containing ½ pound of phosphorus (the sticks were in a vertical position, immersed in water), loosely covered, was kept in a basement, where the temperature usually varies between 58° and 65° F. On taking off the cover, at the expiration of four months, it was noticed that not only two-thirds of the water had evaporated during that time, but that a relative quantity of the phosphorus had also disappeared, the upper ends of the sticks presenting the appearance of being, as it were, smoothly cut to the level of the water. The liquid was not only very acid, but was also very dense, of a somewhat oily consistence.

That phosphoric and phosphorous acids are produced by the oxidation of phosphorus in moist air is certainly not new, but I could not find in the various standard works on chemistry I then consulted that this process had ever been applied or recommended as a method for the production of phosphoric acid. It was only of late, and after the completion of my experiments, that I happened to find, in Mohr's 'Commentary to the Prussian Pharmacopœia for 1850,' mention that phosphoric acid might be made by a process of slow oxidation in air. F. Mohr recommended to have a stick of phosphorus put into a glass tube narrowed at one end; to have a number of such tubes laid into a glass or porcelain funnel, the end of which (the funnel) dipping into a flask containing water. The phosphorus oxidized, as was stated, very slowly, emitting a luminous vapour, which gave out an odour resembling that usually observed when sparks from a powerful electrical machine are passed through air (ozone). Mohr admitted that it was rather slow as to results. He mentions, also, a process recommended by Doebereiner,

* Read at the Fourth Session of the American Pharmaceutical Association. From the 'Proceedings,' 1882.

which directs pounded glass to be put into the bottom of a flat porcelain dish to the depth of 1 inch, to cover the pounded glass nearly with water, and lay thereon any suitable number of phosphorus sticks, taking care to prevent their touching each other; the whole to be covered with a bell-glass. Oxidation by this process is stated to be more rapid than that of Mohr's.

That neither of the two methods have found favour is no doubt owing to their impracticability and the highly probable risk of dangerous combustion, as no provision was recommended to regulate the supply of air.

I have found that a simple arrangement for the aerial oxidation is had in an ordinary infusion jar. A pint jar, holding 7 fluid ounces up to the perforated diaphragm, will answer for 360 grains of phosphorus (the officinal quantity); a quart jar, holding 10 fluid ounces to the diaphragm, will be suitable for 720 grains. The phosphorus in the form of sticks is laid upon the diaphragm, a sufficient quantity of water is poured into the jar to immerse the sticks to about half their diameter, and the lip of the jar closed by pasting paper over the mouth or inserting a rubber cork. The top of the jar having previously been ground true and smooth was then covered with a porous disk of plaster of paris, about one-eighth of an inch thick.

The jar, having been thus prepared, oxidation of the phosphorus will commence at once, and will continue regularly, requiring no attention until after the expiration of one week. At this time the phosphorus will be found to have disappeared to the surface of the water. It will now be necessary to pour off a portion of the acid liquid in order to expose the lower half of the phosphorus to the influence of moist oxidation, taking care to replace the porous disk. During the course of the second week the acid fluid may require to be poured off more than once, owing to an increase in its volume.

To prepare a larger quantity of the acid, a leaden tray was provided and so constructed as to make the process more automatic in its effects. This arrangement is capable of oxidizing 8 ounces of phosphorus, measured in the clear, 9 inches in length, 5 inches in width and 3 inches in depth. On the inner sides, about $1\frac{1}{2}$ inch from the bottom, a narrow shelf gave support to a grating of sheet lead, having eight narrow slits cut transversely, on which the phosphorus sticks were laid with about $\frac{1}{2}$ inch space between. The upper edge of the tray was smoothed to fit a porous cover of plaster of paris, having a thickness of $\frac{1}{2}$ inch. Into one of the end sides of the apparatus, as near as possible to the bottom, a round hole was provided, and a rubber cork inserted, through which a glass tube was passed bent at a right angle, the bent limb being just of a length to reach accurately the leaden grating, when the latter was placed *in situ* within the tray. Attached to the limb of the tube, and parallel to it, another glass tube was cemented, the upper end on a level with the limb of the bent tube, and extending about $\frac{1}{2}$ inch below the bend of the other tube. The apparatus being thus arranged, the bent end of the tube was stopped with a well-fitting plug, the phosphorus laid upon the slits of the grating, and a sufficiency of water poured into the tray to half immerse the sticks, and the apparatus finally covered with the plaster of paris tile, which should fit the top of the tray sufficiently close as not to allow any fumes to escape.

In about a week, the cover may be lifted, when, if the phosphorus is nearly, or entirely reduced to the level of the liquid, the plug may be removed, and the acid fluid allowed to drain into a suitable receiver, without changing the position of the apparatus. Then replace the porous tile, and if the upper extremity of the bent tube has been adjusted so that the level of the liquid in the tray will just about touch the lower segments of the phosphorus sticks, the final oxidation will be, from this on, entirely automatic, and no further attention is necessary until the phosphorus is consumed. For, from this stage of the process, on to the end, there will be a continual augmentation in volume of the acid fluid. It is by means of the bent tube that the surplus is drained off and thus the acid liquid in the tray kept at the same level. When the process is completed, the acid solution may be drawn off by turning the bent limb of the glass tube down.

The leaden tray was used only on an experimental basis, and is not to be recommended, inasmuch as a certain amount of lead phosphate is unavoidably formed, which is sufficiently soluble in the acid fluid to contaminate it. An apparatus made of white pottery, glazed to resist acids, is no doubt the best. A tray and grating made of gutta-percha may possibly answer.

The products of the moist aerial oxidation of phosphorus are known as follows:—

Phosphoric acid, H_3PO_4.
Phosphorous acid, H_3PO_3.
Ozone, O_3.
Hydrogen peroxide, H_2O_2.
Ammonium nitrate, NH_4NO_3.

Phosphoric acid is produced by far in the largest proportion; next in importance as to quantity will be found phosphorous acid; then ozone and hydrogen peroxide are formed, according to the elaborate investigations of Professor Leeds, in equal molecular proportions. Ammonium nitrate, a concomitant of this process, is produced in small quantities.

During the oxidization of phosphorus in the presence of moisture, a white vapour is always given off. This mist, or white cloud, was at one time supposed to consist of a mixture of the vapours from phosphorus and phosphorous acid. Schoenbein, the discoverer of ozone, assumed that the vapour consisted of monatomic oxygen, or antozone, as he called it. It was only of late that its true nature had been ascertained and demonstrated by the classical researches of von Babo, and Nasse and Engler, who furnished conclusive proof that the antozone of Schoenbein is nothing more than hydrogen peroxide, in a state of vesicular suspension; a condition resembling a mist only that it is more durable, and will continue to exist in this state for some time, even after the vapour of water, with which it is associated, has been completely removed.

The following is the probable rationale of this process of oxidization from the *Journal of the American Chemical Society*, vol. iii., p. 6, "On the Ozonization of Air by Moist Phosphorus," by Professor Albert R. Leeds.

(1.) $P_4+O_{14}=P_2O_5+P_2O_3+2O_2+O+O$.
(2.) $O_2+O=O_3$.
(3.) $H_2O+O=H_2O_2$.
(4.) $N_2+2H_2O+O=NH_4NO_3$.

On viewing the above equations it will be seen that by this method of oxidation ozone and hydrogen peroxide are important products; that they are formed, as it appears, simultaneously, and independent of each other. Of this there can be no question, since it has been shown that ozone is not capable of changing the water molecule into hydrogen peroxide. The only sufficiently assignable cause of the formation of these two substances can be found on theoretical grounds, in the quantivalence of the respective phosphorus and oxygen atoms. It necessitates the splitting of the diatomic or ordinary oxygen molecules, in order to supply the phosphorus atoms with the uneven number of oxygen atoms to form phosphoric and phosphorous oxides. It is hence easily conceived that monatomic oxygen, or oxygen at the moment of its liberation from the ordinary oxygen molecule, would become active oxygen, and as such would be capable of oxidizing an oxygen molecule to ozone, a water molecule into hydrogen peroxide, and finally a nitrogen molecule in the presence of water to ammonium nitrate. The porous covering of our apparatus not only allows the gradual admission of atmospheric oxygen to the interior, but it also permits the dialysation of ozone from hydrogen peroxide. The former is given off by diffusion through the porous septum into the atmosphere, whilst the latter is retained within, dissolved by the acid fluid, and there either serves to oxidize a part of the phosphorous acid into phosphoric, or takes a part in the direct oxidation.

That hydrogen peroxide is absorbed and present in the acid solution is demonstrated by shaking together a portion of it with anhydrous ether, and a drop of a solution of chromic acid, when the ether will at once acquire a blue colour from the perchromic acid formed.

That ozone is given off from the porous covering freely and abundantly, may be shown by its peculiar odour and the colour reaction upon a slightly moistened ozone test-paper (Schoenbein's). As has been stated, the acid solution is composed of a variable mixture of phosphoric and phosphorous acids; but it generally contains also in addition a certain quantity of arsenic, which, in order to make a correctly pharmaceutical product, will require to be removed; and, further, the phosphorous acid should be converted into phosphoric acid. To effect the former, the acid solution is evaporated in a Berlin or Meissen dish, until a thermometer placed in it will indicate a temperature of 160° C. At this temperature the acid liquid will become turbid, and deposits the arsenic in the metallic state as a brownish-black substance, and if this heat is maintained a short time, all of the existing arsenic in the liquid will be completely precipitated, the supernatant becoming clear and colourless.

That arsenic may separate from a heated phosphoric acid solution has been shown by E. A. Schreck, in a paper on "Dilute Phosphoric Acid," published in the 'Proceedings' of the California Pharmaceutical Society for 1880.

He found a separation of arsenic to occur when the temperature was inadvertently allowed to go far above 400° F. (204° C.), a point at which the acid was found to act strongly on the dish. The removal of arsenic at 160° C. (320° F.) is complete, and it is not unimportant to consider that neither this temperature nor the concentration of the acid is sufficient to affect Berlin or Meissen ware materially. (The specific gravity of the acid at this degree of concentration is 1·75.) If, however, the heat be allowed to reach 170° C., and beyond it, the phosphorous acid will resolve itself into phosphoric acid and spontaneously inflammable hydrogen phosphide, which, as it is given off, will burn vividly with a snapping noise.

$$4\,H_3PO_3 = 3\,H_3PO_4 + H_3P.$$

The arsenic probably exists in the acid liquid as arsenic acid, as it is well known that hydrogen peroxide is capable of oxidizing arsenious acid into arsenic. The reduction of arsenic acid to metallic arsenic may be formulated to the following equation:—

$$5\,H_3PO_3 + 2\,H_3AsO_4 = 5\,H_3PO_4 + 3\,H_2O + As_2.$$

The acid solution is next to be diluted and filtered preparatory to the oxidation of the phosphorous acid into phosphoric acid. The filtrate is evaporated until the thermometer indicates 120° to 130° C. At this temperature the oxidation is easily effected by means of nitric acid, the usual nitrous vapours being given off. The amount of nitric acid specific gravity 1·38 required for the completion of an acid solution obtained from 360 grains of phosphorus varies from 2 to 5 drachms. (To oxidize the same quantity of phosphorus requires, by the officinal process, 5 troy ounces of acid of specific gravity 1·40.) By adding the nitric acid until nitrous vapours cease to be given off, an excess of the acid will unavoidably remain, and will require prolonged heating and a high temperature until it is all dissipated. In order to avoid this trouble, in some part of the process, a slight change was made in the mode of procedure by reserving a portion of the acid fluid for the purpose of getting rid of the excess of nitric acid, and thus dispense with the final heating. I have found that by reserving about one-tenth of the solution, an amount usually in excess of what is actually required, the desired end is easily accomplished. The oxidation is conducted in the usual way, the nitric acid being added in small portions at a time until the liquid acquires a yellowish tinge and the effervescence from the escape of nitrous vapour has almost ceased. The reserved portion is now to be added gradually, when, in due time, a point will be reached when the yellow colour of the liquid is replaced by a bluish-green, which, gradually fading, ultimately becomes colourless. Should any of the reserved liquid be left it may be added in small portions, each of which may also be oxidized by the cautious addition of a few drops of nitric acid. A valuable guide for determining the end reaction will also be found in noticing the gas bubbles as they form and break on the surface. If they contain coloured nitrous vapours, more of the reserved liquid should be added; and if, on the other hand, the bubbles are filled with a colourless gas (nitrous oxide), the oxidation may be assumed as practically completed. A minimum excess of phosphorous acid is rather desirable, as it insures the absence of nitric acid, and it will become, in time, converted into phosphoric acid by absorption of oxygen from the atmosphere.

The phosphorous acid may also be oxidized in a flask of from eight to ten times the volume of the acid fluid. This method has the advantage that but a very small quantity of nitrous fumes will escape during the process if the flask is sufficiently large, the nitric peroxide being utilized in the oxidation. This process will hence require a still smaller quantity of nitric acid. The operation is also accomplished with less annoyance to the operator on account of the small amount of nitrous fumes given off into the air from the flask. The reactions taking place within the flask may be formulated as follows:—

(1.) $2\,H_3PO_3 + 2\,HNO_3 = 2\,H_3PO_4 + H_2O + N_2O_2.$
(2.) $N_2O_2 + O = N_2O_4.$
(3.) $N_2O_4 + H_2O = HNO_3 + HNO_2.$
(4.) $\begin{cases} 2\,HNO_3 + 2\,H_3PO_3 = 2\,H_3PO_4 + H_2O + N_2O_2. \\ 2\,HNO_2 + 2\,H_3PO_3 = 2\,H_3PO_4 + H_2O + N_2O. \end{cases}$

The liberated nitric oxide, a product of the first reaction, on coming in contact with atmospheric air which enters the open flask, is there converted into nitric peroxide, and, on being dissolved in the aqueous vapour filling the flask, gives rise to the production of nitric and nitrous acid as shown in third reaction. These acid vapours, condensing on the cooler sides of the flask, flow back into the liquid, causing further oxidation, nitric oxide being again disengaged, as exemplified in the fourth reactions, the final product being nitrous oxide, which escapes. Unquestionably nitric peroxide acts here in a nearly similar manner in promoting oxidation as it does in the conversion of sulphurous oxide into sulphuric in the manufacture of sulphuric acid, nitrogen dioxide being simply a carrier of oxygen.

In using the flask process care should be taken to adjust the amount of nitric acid at a time to the size of the flask, or the amount of nitrous fumes produced should not be formed in such quantity as to cause any considerable escape. Again, no further addition of nitric acid should be made until the nitric peroxide is first absorbed and the interior of the flask above the acid liquid rendered nearly colourless. The mode of conducting the final oxidation by means of a reserved portion may also be used here, and also the manner of ascertaining the end reaction. Should, however, any doubt be entertained as to the absence of nitric acid, its presence is readily detected by moistening a fragment of crystallized ferrous sulphate with a little of the acid fluid by means of a glass rod, producing the well-known dark brown coloration.

This method is, as a matter of course, somewhat tedious, particularly if the quantity of acid to be made is considerable. Its advantages can only be said to outweigh the trouble if the officinal quantity or its double is to be made and no conveniences are to be had for carrying off the nitrous vapours.

OPIUM AND OPIUM SMOKING.*

BY HUGH MCCALLUM.

The morality of the opium trade has been discussed at great length and with much heat, especially by those who denounce the traffic. The effects of indulgence in the opium pipe have been, and are still, represented to be of the most pernicious and degrading character. Neither of these questions has been discussed in the calm impartial manner necessary to ascertain the real facts. Far more attention has been given by the disputants to bringing forward telling points in support of preconceived ideas, than in searching out the truth. In this paper it is not intended to deal with either subject in a controversial spirit and any remarks which may appear to tend in that direction are purely incidental.

It is generally assumed and frequently asserted, that the effects of opium smoking are practically the same as that of opium eating and opium drinking. It is on this ground that most of the denunciations of the opium trade and of opium smoking are based. Nine-tenths of those who pay any attention to the opium question are imbued with this idea. The writer, who had some technical knowledge of the medicinal and chemical properties of opium, held this opinion previous to his arrival in China and for some time afterwards. If it can be shown that this view is erroneous, then all the numerous arguments based thereon are worthless. In the following remarks, it is hoped that it is conclusively proved that the effects of opium eating and opium smoking are by no means analogous, but that they are altogether different.

Sir George Birdwood states, that from personal experience and observation, he can testify that opium smoking is perfectly harmless. He invites unbelievers to try the experiment on themselves, and it is quite certain, whoever does so will become, in a great measure, a convert to his dogma. Sir George Birdwood also points out the difference between eating opium and smoking opium, maintaining that none of the active principles of opium are volatilizable; but beyond quoting Sir Robert Christison, he does not appear to have brought forward any evidence in support of this contention.

In dealing with the subject, the first thing to be done, is to ascertain what are the constituents of opium, and to which of them its physiological activity is due. The following may be taken as representing the *general* composition of opium.

	Per cent.
Morphine	4 to 15
Narcotine	2 to 8
Codeine, Narceine, Thebaine, Papavereine	½ to 2
Meconin	under 1
Meconic acid	3 to 8
Peculiar resin and caoutchouc	5 to 10
Fat	1 to 4
Gum and soluble humoid acid matters	40 to 56
Insoluble matter and mucus	18 to 20
Ash	3 to 8
Water	8 to 30

Of the above substances morphine is by far the most important. East Indian opium is remarkable for the low percentage of morphine it contains, and it is noteworthy that this is the variety of opium which is preferred before all others by opium smokers. Before opium is ready for smoking it undergoes an elaborate preparation, by which a considerable portion of the narcotine, caoutchouc, fat, and resin, together with all the insoluble matters and mucus, are removed. The method of preparation has a destructive action on the alkaloids (morphine, etc.) present in the opium. Anyone who is at all conversant with organic substances will at once recognize that the prolonged boiling, evaporating and baking over a naked fire, in a metal vessel, to which the opium is subjected, must necessarily have a degrading action on its alkaloidal constituents.

Referring to the general composition of opium, the only substances remaining in the finished extract which are capable of producing well-marked physiological action, are morphine, codeine and narceine. All are hypnotics and appear to differ only in their degree of potency. The other substances are either inert in ordinary doses or are present in too small quantity to have any appreciable effect. In the pure state, with very great care, it is possible to volatilize morphine unchanged. That these can take place, even in infinitesimal quantity, during the ordinary smoking of a pipe of opium is highly improbable. Even supposing it does happen occasionally it can only be by the merest chance. Admitting that what is improbable does take place, and that an infinitesimal quantity of morphine is volatilized unchanged, in every pipe of opium which is smoked, it would again assume the solid form and be deposited in the stem of the pipe, long before it reached the smoker's mouth. Codeine and narceine give no sublimate.

Dr. Thudichum in the 'Annals of Chemical Medicine,' part v., of vol. ii., states that he knew from the experiments of Descharmes and Bénard that morphine volatilized and existed in opium smoke unchanged. On these data he applies it as a soothing remedy to nervous patients, and apparently with considerable success. It is well, however, to remark that when tried on himself it had no appreciable effect. It is also worthy of note, that neither the patients nor himself make any remark as to the smoke having a bitter taste. On the contrary, he implies that it is mild and aromatic. This is the general opinion regarding the taste of opium smoke, when drawn through an opium pipe; and from repeated personal experiments the writer can confirm this opinion. Now morphine, even in minute quantity, has a distinctly bitter taste and if it existed in the smoke, it is only reasonable to suppose that the taste would have been observed and noted. It is not likely anyone will advance the theory that a change in the physical condition of morphine, is, of itself, sufficient to destroy the bitter taste. The non-bitterness of opium smoke is a point of considerable importance, but it does not appear to have attracted much attention.

Doubtless Messrs. Descharmes and Bénard found traces of morphine in opium smoke, but it is hardly probable that it was after the smoke had passed through a 16 or 17-inch condensing tube. The stem of most opium pipes is considerably over a foot in length, and this stem is practically a condenser, the temperature of which never greatly exceeds that of the surrounding atmosphere. At temperatures four or five times higher than that of the hottest part of the tropics, morphine is a fixed solid. This alone is sufficient to prove the improbability of morphine being found in the opium smoke issuing from the mouthpiece of an opium pipe.

In Brereton's 'Truth about Opium,' 1st edit., p. 245, the following quotation from a letter by Professor Attfield, F.R.S., is given:—"A substance only maintained in vapour at high temperatures when alone may be carried a considerable distance in a current of quite cool smoke." Quite so. However, the learned Professor is not the man to assert,—without first proving it by experiment,—that morphine will volatilize, and pass in a state of vapour through a condensing tube more than a foot long, the temperature of which, at the highest estimate, is not more than 40° C. So far as is known no such experiment has been made. He further states "active vegetable principles such as those of opium, on being heated, yield vapours having, in most cases, the chief properties of the original principle." That is so, as regards chemical and physical properties, but the Professor does not add that they will be capable of producing similar effects on the human system. To prove

* From the *China Review.*

that this may be far from being the case let us take morphine. The chemical formula for morphine is $C_{17}H_{19}NO_3$, by the action of a strong acid, remove a molecule of water and apomorphine, $C_{17}H_{17}NO_2$, is formed. Here there is no great apparent change in the chemical constitution, but the physiological action of the two substances is totally different. Morphine is a powerful and certain narcotic. Apomorphine is a very powerful and violent emetic. It is very evident, that until the physiological effects of the vapours arising from heated morphine have been properly and scientifically tested, it is mere speculation to regard them as having a similar action to morphine.

It has not as yet been found practicable to take, with any approximation to accuracy, the temperature at which the prepared opium is smoked, but it would appear to be at a higher temperature than that at which the opium alkaloids are decomposed. Should this be proved to be the case, it will be of itself sufficient to show that none of the active constituents of opium exist in the smoke in the same condition as they do in opium.

It appears perfectly clear from the general composition of opium and the method of manufacturing the extract, that morphine, codeine and narceine are the only bodies of any importance.

Codeine and narceine give no sublimate.

It has been shown that it is almost if not quite impossible that morphine can exist, even in infinitesimal quantities, in opium smoke which has passed through an opium pipe.

The opium smoke does not possess the well-marked bitterness of morphine.

The variety of opium most affected by smokers is characterized by the small percentage of morphine which it contains.

The method of manufacturing smoking extract has a destructive action on morphine.

So far as is known, no authentic case of acute poisoning from opium smoking has been recorded.

It is well known that many European gentlemen have smoked comparatively large quantities at one sitting, and for the first time, without experiencing any marked sensations.

During nearly a four years' residence in Hongkong, considerable attention being given to the subject, not a single case of narcotism from indulgence in the opium pipe has been observed.

A consideration of all these points clearly demonstrates that whatever the effects of opium smoking may be, they are certainly not the same as those produced by opium eating, nor do they appear to be due to the same active principle, namely, morphine.

It may be urged, that although morphine does not act as morphine on the opium smoker, yet the product or products of its decomposition by heat are the active agents. About two years ago, some experiments were made bearing on this point. The results were somewhat startling. They are not put forward as conclusive evidence, but simply as being corroborative of the idea that morphine is not the active agent which gives pleasure to the opium smoker. Specimens of prepared opium containing widely different amounts of morphine were submitted to a Chinese expert, who was connected with a Hongkong opium firm, for his opinion as to their quality. At the same time, duplicate specimens were given to an old opium smoker for the same purpose. The first series of samples were as follows:—

No. 1. Ordinary prepared opium from Hongkong Opium Farm.
No. 2. Prepared opium *minus* morphine.
No. 3. No. 1, with 10 per cent. morphine added.
No. 4. No. 1, with 20 per cent. morphine added.

The opium expert reported as follows:—

"No. 1 is fairly good, is a mixture of Bengal opium and omething else.

"No. 2 is black and coarse, smell fairly good; is not opium.

"No. 3 is coarse, but can be smoked, contains opium with some other mixture. It is not so good as No. 1.

"No. 4 is very coarse and black, burns like charcoal, contains no opium."

The old opium smoker gave the following as his opinion of the same specimens:—

"No. 1. Good.
"No. 2. Not very good.
"No. 3. Same as No. 1.
"No. 4. Fairly good, but not so good as 1 and 3."

A second series of specimens was submitted with a very similar result. They were as follows:—

No. 1. Opium Farm prepared opium which by assay contained 7 per cent. morphine.
No. 2. No. 1, with 15 per cent. morphine added.
No. 3. No. 1, with 25 per cent. of morphine added.
No. 4. Prepared opium *minus* morphine.

The opium expert gave the following report:—

"No. 1. The appearance is coarse, and when burned it becomes black and hard. It is Bengal drug but not pure. It is mixed with some other stuff and has no taste.

"No. 2. Burns very quick and has no taste or smell of opium at all. Colour red and coarse, when burned gives out plenty of smoke, and leaves simply ash instead of opium to smoke.

"No. 3. Just like No. 2, only a shade better.

"No. 4. When applied to the lamp burns just like opium but in a moment burns quite black, and the dross leaves a bad smell. When burning gives out strong smoke."

The old opium smoker gave the following laconic report:—

"No. 1. Very good.
"No. 2. Same as No. 1.
"No. 3. Not good.
"No. 4. Same as No. 1."

The prepared opium *minus* morphine was made from Patna opium having as little as possible of the other opium constituents removed with the morphine. The specimens were submitted without any remark beyond desiring an opinion as to quality.

It will be observed that the Chinese expert bases his opinion on the physical appearance of the extract; its behaviour in the flame of the lamp and its smell; not on its effect when smoked. The old opium smoker apparently judged of its quality in a somewhat similar manner, but as he actually smoked a considerable quantity of each, his opinion is considered of most value. By request, he got some of his friends to try No. 4, in the second series, and they agreed with him that it was good. On one occasion, in about twelve hours, he smoked a quantity of opium (to which morphine had been added) equal to at least twenty grains of morphine.

We have an opium expert,—a man whose occupation is to judge of the quality of opium for smoking purposes,—gravely asserting that the Hongkong Farmer's best quality of "prepared opium," containing 7 per cent. of morphine is not good. Not only that, but he condemns the same opium altogether when it contains 15 and 25 per cent. of *added* morphine, and states it is not opium at all. At the same time, opium practically containing no morphine receives only qualified condemnation. The old opium smoker does not recognize the same differences as the expert. He classes prepared opium, containing 7 per cent of morphine, the same opium with 15 per cent. of morphine added to it, and an opium practically free from morphine, together, all as being equally good. An opium containing 25 per cent. of added morphine is stated not to be good. Such statements could never have been made had these men based their judgment on the well-known effects produced by opium and morphine when eaten. Had anyone dared no make a similar series of experiments on opium eaters, there cannot be the shadow of a doubt but the experimenter would have made the acquaintance of the coroner's court, and been indicted for manslaughter. Although these facts show that morphine has little, if anything, to do with the pleasure of opium smokers, it cannot be denied that they appear to derive much pleasure and consolation from their pipe. Whence the pleasure? What gives rise to it? What are the temporary and permanent effects caused by smoking opium? These are questions that have not yet been satisfactorily answered, yet they ought to be, and in a scientific manner. Until this is done, the Anti-Opium Society and its supporters are not justified in branding the opium trade with infamy, or the lovers of a pipe of opium as degraded beings.

THE ACTION OF CERTAIN DRUGS ON THE SENSITIVE PLANT, MIMOSA PUDICA.*

BY A. S. RAUSCHENBERG, PH.G.

The old authors have from time to time used the term "sleep of plants" to designate the peculiar nocturnal position assumed by most compound leaves. Ever since the days of Linnæus, we find recorded investigations of this phenomenon.

In Curtis's 'Lectures on Botany,'† we find a very interesting discourse on the relation of the movements of plants and animals.

Ducrochet‡ endeavoured to show that the motion of the mimosa is the effect of galvanic agency.

MM. Bert and Blondean (1868) experimented on the plant with galvanism.

Mr. C. Mackenzie has shown that the movements of the leaves have their origin in the nodules situated at the articulation of leaflets with the petiole and of the petiole with the stem.

Of more recent date, we have the well-known work by Darwin, 'The Power of Movement in Plants,' in which he investigates the so-called "sleep of plants."

He also shows that leaves compelled to remain horizontally at night suffer more from radiation than those allowed to assume the vertical position; it makes no difference whether the apex, the base, or one of the lateral edges is directed to the zenith.

This position which the leaves occupy at night shows that the benefit derived therefrom is the protection of their upper surfaces from radiation and the mutual protection of all the parts from the cold by being closely imbricated.

If with *Mimosa pudica* the opposite leaflets would simply move upwards, their upper surfaces only would come in contact and be protected; but, as it is, they move towards the apex, and they thereby become imbricated and protect one another as well as the petioles.

He also shows that many plants will not "sleep" unless they have been well illuminated during the day; this proves that it is not the decrease of light in the evening, but the contrast between the amount at this hour and during the early part of the day, which excites the leaves to modify the ordinary mode of circumnutation.

Brücke has shown that the movement caused by irritation results from a different state of turgescence in the cells from that which results during sleep.

Professor Marcet performed experiments upon the plant with chloroform and ether.

These experiments were repeated and verified by Dr. Porcher, who states that the tinctures of opium, capsicum and camphor, and morphia and tartarized antimony, produced no effect, while chloroform and ether were the only drugs which caused a contraction of the leaves. He also states that "a drop of oil of aniseed, placed on a leaf-stalk, seemed to have the effect of arresting the transit of any influence beyond it."

Other authors have experimented on the various species of sensitive plants, but none mentions having used other agents besides chloroform, ether, oil of aniseed, tartarized antimony, morphia, liquor potassæ, sulphuric and nitric acids, and a few tinctures of active drugs.

In the experiments mentioned below, it will be seen that I have used a larger number of drugs, and in several instances procured quite different results from those mentioned by these various authors.

During my investigation, the plants were kept in a conservatory at the temperature of 80° F. (26·6° C.). A separate plant was used for each experiment, which was performed by applying a drop of the liquid drug directly to one of the pinnæ.

The leaves of *Mimosa pudica* possess a remarkable degree of sensibility or irritability. When roughly touched, the plant suddenly contracts its leaflets, and applies them one over the other upon the secondary petiole.

If more strongly irritated, the secondary petioles are also bent forward, and approach each other, while the main petiole sinks at the articulation with the stem.

These motions are also produced by anæsthetics and other drugs, but are prevented by low temperatures.

As an illustration, I will describe the effect of chloroform.

When this substance is applied to the apex of the lateral pinna, the opposite leaflets, with the points forward, approach each other seriatim, and fold one over the other, thereby protecting the upper surfaces.

Next, the main petiole sinks by the bending of the articulation with the stem.

After this, the leaflets of the remaining three pinnæ contract successively as the sympathy passes from the articulation to the apices.

At the same time, the four pinnæ slowly approach each other until the whole leaf forms a compact bundle.

After about three or five minutes, the next lower leaf on the main stem of the plant sinks by the articulation of the primary petiole, and then the leaflets of the four pinnæ contract as the sympathy passes to the apices. Four or five leaves below the one to which the drug was applied are affected in the same manner; in this respect, my results do not coincide with those of Dr. Porcher.

The following drugs have the same effect as that produced by chloroform:—

1st. Acetic, formic, ethylic, hydriodic, hydrobromic, hydrochloric and methylic ethers, nitrite of amyl, carbon disulphide, ethylic and methylic alcohols.

2nd. Sulphuric, nitric, nitro-hydrochloric, hydrobromic, hydrofluoric, phosphoric, sulphurous, chromic, carbolic, acetic, monochlor-acetic, lactic and oxalic acids; iodine, chlorine, and bromine waters; creasote and essential oils, as anise, mustard, etc.

Those in the first list do not cause the leaflets to become so densely imbricated as those in the second list.

Many substances have an effect which can only be attributed to the alcoholic solvent, as a glance at the lower list will show. The following tinctures give the same results as alcohol, namely, aconite, belladonna, opium, nux vomica, hyoscyamus, digitalis, capsicum, conium, and veratrum.

Certain other physiologically powerful substances have no effect at all, viz., aconitine, atropine, morphine, strychnine, hyoscyamine, digitaline (so-called), duboisine, apomorphine, curare, bichloride of mercury, and tartarized antimony.

I found that *dilute hydrocyanic acid* and *tincture of cantharides* produce peculiar results.

If the former be applied to the apex of a leaflet, it will cause no irritation, but when applied to the articulations of the leaflets with the pinna, it causes a rapid contraction, the same as chloroform.

Five or ten minutes after they have re-expanded, they

* From a thesis presented to the College of Pharmacy of the City of New York, March, 1883. Reprinted from *New Remedies*, April, 1883.

† Vol. i., sec. 2, 1805.

‡ 'Sur la Motilité,' etc., Paris, 1824.

begin to contract in series formed by six or eight opposite leaflets; but when about half closed, they are arrested, and then slowly assume their normal position.

When tincture of cantharides is applied to the articulation of the two opposite leaflets situated in the centre of a pinna, it causes the leaflets below this point to contract in series as above described, and with a pause before each series begins to move.

It never causes all the leaflets of a pinna to contract at once; but it always proceeds downwards, that is, towards the articulation with the main petiole.

Those leaflets which have not closed may be made to do so by touching the tincture to their articulations.

About ten minutes after they have again expanded, they begin to contract in series as before, until all the previously affected ones are imbricated.

This remarkable phenomenon I found to be produced only by the two above-named substances.

Oil of anise placed in several spots on the pinnæ does not prevent the transmission of extraneous irritation beyond that point to which it is applied.

I have performed experiments similar to those of Mr. C. Mackenzie, and with the same results as he procured, as the following will show.

By removing the lower half of the node situated at the articulation of the petiole with the stem by means of a longitudinal section, the petiole will remain depressed, it having lost the power of elevating itself. If the superior half be removed, the petiole will remain constantly elevated, it having lost the power of depressing itself.

These facts show that the motions of the petiole depend on the alternate turgescence of the upper and lower half of the pulvinus situated at the point of articulation, and that, consequently, contraction is not the principle of these movements.

The following experiments are in accordance with those of M. Ducrochet; they prove that the interior movement is propagated by the ligneous fibres and vessels.

The irritation is transmitted equally well, even if a ring of bark be removed and nothing remains to communicate between the divided portions of bark except the ligneous fibres; it is also transmitted when the parts are connected by a fibre of bark, and also when the pith is the only connecting link.

But when the communication exists only by the cortical parenchyma, the irritation is not transmitted.

Transit is more rapid in the petioles than in the stem.

The experiments with electricity are those suggested by the results of M. Blondean.

A plant was acted on by a galvanic current for about five minutes, when it became contracted, but soon again expanded its leaflets. Another operated on for ten, and still another for fifteen minutes, became contracted, but again expanded.

When it was operated on for thirty minutes, it did not re-expand its leaflets.

An etherized plant was not affected by the current.

If a plant which has been kept in an obscure place be suddenly exposed to the sun, the leaflets will contract; in this case, the sun-light seems to act as if it were a touch. This is called the "Diurnal Sleep of Plants," or "Paraheliotropism," which, according to Professor Wiesner,* seems to have for its object the protection of the chlorophyll, which is destroyed by action of concentrated sun-light in contact with oxygen.

It will be seen from what has been stated so far that I have experimented with a larger number of drugs than previous observers, and that I have classified them as substances which have the same effect as chloroform, and as such which have an effect merely produced by the alcoholic solvents, as is shown by the fact that the active principles of the same drugs produce no effect whatever upon the plant.

My experiments differ from those of Dr. Porcher by the irritation being transmitted down the main stem of the plant, until four or five leaves have contracted, and by the oil of anise failing to arrest the transit of influence beyond the spot to which it is applied.

Like Mr. Mackenzie, I find by dissection of the node situated at the base of the petiole that the motions depend on the alternate turgescence of the upper and lower half of this organ.

The results, similar to those of M. Ducrochet, prove that the interior movement is transmitted by the ligneous fibres and vessels.

The experiments with galvanism show that etherized plants are not affected by a current which would destroy them under other circumstances.

But the principal fact first shown by my experiments is, that, after the plant has recovered from the primary effect of hydrocyanic acid or tincture of cantharides, there is a secondary effect produced, similar in character to the first, after which the leaves re-expand, assuming their natural position.

* 'Die natürlichen Einrichtungen zum Schutze des Chlorophylls,' 1876.

GERMS AND EPIDEMICS.*

BY JOHN S. BILLINGS.

In these days of the diffusion of knowledge, which is sometimes spread not only wide but thin, everyone is more or less familiar with the phrases "disease germs," "the germs of small-pox," "the malarial germ," etc., although some who speak of these in quite a familiar and patronizing way might, perhaps, find it rather difficult to state clearly the conception which they have as to the nature of these so-called germs, or as to the manner in which they produce disease. Very possibly, indeed, some may be inclined to consider these germs as being rather imaginary entities than actually observed things, an ingenious hypothesis rather than a demonstrated fact. It is the object of this lecture to state what we really do know at the present time about this subject, and to indicate the bearings of this knowledge in relation to epidemics.

That certain prevalent diseases are due to the entrance of minute living organisms from the air or water into the lungs or stomach, whence they work their way into the blood, is a very old idea. For example, Terentius Varro, a Latin author of the first century before Christ, says in his work 'De re rusticâ,' that marshy places are to be avoided because in them there grow certain minute animals which cannot be perceived by the eye, and which being carried in the air enter the body through the mouth and nostrils and produce very serious diseases. Varro states this as if it were an old and familiar idea, and it is quoted approvingly by subsequent writers, but no attempt seems to have been made to give the theory with precision until after the introduction of the microscope and the publication of the discoveries of Leuwenhoek. You can, perhaps, imagine the astonishment and delight with which those who used the first microscopes peeped into the new and unexplored world which lay before them; and as what is seen through this instrument depends quite as much on the training of the eye at the upper end as on what is placed beneath it, it is not surprising that some remarkable discoveries were announced.

Father Athanasius Kircher, in his treatise on the Pest, published in 1659, says, that with his new "Smicroscope" could be seen the extremely minute worms which cause the pest, and the writers in the next century made some similar announcements, but the theory was not fully formulated until after the cholera epidemics of 1832 and 1848, when it was urged by Dr. Cowdell

* A Saturday afternoon lecture delivered at the National Museum, Washington, D. C., Feb. 17, 1883, by John S. Billings, Surgeon U.S. Army. Reprinted from *The Sanitary Engineer*.

that this disease was due to a minute fungus which inhabits the rice plant in India. Dr. Mitchell, of Philadelphia, taught in 1844-46 that malarious and epidemic fevers were due to minute fungi, and his essay is even to-day highly suggestive and interesting. The demonstration by Pasteur that various forms of fermentation and putrefaction of organic matter are due to vegetable organisms first put the matter on a scientific basis, and within the last ten years the germ theory of disease has found many advocates.

To understand the present prevailing views it is necessary that we should know the meaning of certain terms much used in discussions on this subject, and often used in a very confused way, since the words bacteria, germs, microzymes, etc., are not only used by different authors, but by the same author at different times, in different senses. In the first place we want some word to designate the great variety of particles which we find throughout all air and water under ordinary circumstances, and which are almost invariably present in decomposing organic matter—minute bodies, most of which are perceptible only with the best microscopes, and which present the most characteristic phenomena of life. These we will call microdemes, or little living things, and under this term are included the microphytes, or little vegetable organisms, the microzoa or minute animals, the microzymes or little ferments, the microbes or microbia of Pasteur, meaning literally, little lives, the bacteria, etc. Mingled with these microdemes there are usually other minute particles which are not living, and which may be either organic or inorganic. It is often extremely difficult, and sometimes impossible, to distinguish these from the microdemes, but usually the latter may be known by the uniform size and minuteness of the granules, their independent motion, and by signs of growth and reproductive division as shown by their being found in pairs or chains. The minutest spherical forms of these microdemes are called micrococcus or little grains, and when these are joined to form a chain they are called streptococcus or arthroccus. The short cylinders or rods are called bacteria, a term which is often improperly used to include the whole class. The microphytes, properly so called, are classed between the algæ and the fungi, forming what Professor De Bary calls the Schizomycetes and Naegeli the "Spaltpilze."

At present it is not believed that these microdemes are ever spontaneously generated, or arise from any source other than living organisms. There is no proof that the microphytes which cause the various forms of fermentation, or putrefaction, develop into the higher forms of fungi, such as the common moulds; but this is not yet a settled question, and some careful observers believe that at all events certain common moulds may act as ferments. Since decomposing organic matters vary greatly in composition, and give very different products, while the microdemes which they contain also vary slightly in size and mode of grouping, it is a question whether the different results depend on a difference in the microdemes or a difference in the matter on which they are nourished.

The prevailing opinion at present is that there are many kinds of microphytes, each having special powers, and that each can only propagate its own kind within a certain limited time. But it also seems possible, that by changing the food of these organisms, and varying the temperature, the process of evolution and natural selection to fit them to their new surroundings goes on very rapidly, and that the result is the production of what might be called new species having very different habits and powers. But we must remember that all microdemes are not minute fungi, nor are they all germs. Using the words germ and organism in the ordinary sense, the germ theory is that certain diseases are due to the presence, and propagation in the system, of minute organisms which have no part or share in its normal economy. The word germ, however, is applied not only to independent organisms which originate outside the body, but also to living particles of protoplasm or cells forming, or what have formed, a part of the body itself, which are not microphytes, and can hardly be called independent organisms.

Let us now briefly consider some of the diseases produced by organisms foreign to the normal or healthy body. When these organisms are comparatively large and well known, the diseases which they produce are called parasitic. Of those which are thus produced by fungi, the best known are certain skin diseases, such as some varieties of ringworm and the so-called liver spots. One peculiar variety grows in the ear, another is sometimes found in the windpipe and lungs. These diseases are called mycoses, and are for the most part confined to the skin and mucous membranes, being those surfaces of the body which are either exposed to, or in free communication with the air. In other words, they are superficial affections, and the fungi do not appear to enter the blood, or to be generally distributed throughout the body. Even in that curious disease called mycetoma, or the fungus foot of India, where the comparatively large threads of a fungus pentetrate the foot and ramify throughout its tissues, finally destroying them even to the bones, the disease is entirely local, being confined to the affected foot; and it appears to be necessary that there should be some wound or injury of the skin to permit the parasite to gain an entrance into the interior.

One of the most important of the diseases due to fungi of the nature of the common mould is one which has for some time been known in cattle but was first observed in man about four years ago, the so-called actinomycosis. It occurs locally in the form of a tumour near the lower jaw, and also in a general or internal form, in which last case it is always fatal, The fungus seems to gain admission to the tissues usually through carious teeth, and gives rise to tumours and abscesses containing small yellow bodies, which are bundles of the threads of the fungus. Let us contrast with this a disease due to the presence of minute vegetable organisms in the blood, such as splenic fever, in which the fact that these organisms were the cause of the disease was first clearly made out. Splenic fever, also known as anthrax, contagious carbuncle, the black quarter, the Siberian plague, and malignant pustule, affects sheep, cows, and horses, and also man. In the blood of animals suffering from this affection, there are found large numbers of short, straight, motionless rods or bacteria, about as long as the diameter of a blood corpuscle. These were discovered over twenty years ago, and it was known that blood containing them transmitted the disease with great certainty, provided it was fresh. These rods, however, did not explain many of the peculiarities of splenic fever, the cause of which sometimes seems to adhere very tenaciously to certain limited localities, as, for instance, to a stable, or to one small field, where it would reappear after intervals of several years. It was found that the rods rapidly lost their vitality, and that the contagious properties of the blood containing them soon disappeared; and from this it was evident that if the contagion or cause of the disease depended on the bacteria these must exist in some other form which was more permanent. Time passed on, and a German botanist, Professor Cohn, discovered that many of the bacteria have a stage of development in which they extend into long, slender rods, or threads, which he called bacilli, and that at regular intervals in these threads there developed extremely minute, highly refractive, spherical bodies, which were finally set free by the dissolution of the threads, and to which he gave the name of spores. Upon these characters he defined a genus of plants, which he called *Bacillus*, and in view of the shape of the little rods in splenic fever blood, he ventured to predict that these would be found, under some circumstances, then unknown, to develop into bacilli and produce spores, which spores would prove to be far more permanent in their vital properties than the bacteria. This prediction was verified by a series of careful culture experiments carried out by Professor Koch. It was found that the little rods, when placed in various animal fluids suited to give them nutriment, and kept at a temperature near that of the human body, began to lengthen in a few hours, and very soon grew into slender threads, which were from twenty to a hundred times the length of the original rods. In a few hours more, minute dots began to appear in these threads and went on to form spores, which being set free, sank to the bottom of the vessel. Now these spores are found to retain their life very persistently in spite of all manner of ill-treatment. They may be wetted and dried, buried in earth for an indefinite period, but even after many years, when they are placed in contact with a proper nutritive fluid and at the right temperature, they will germinate and elongate into rods precisely like the originals from whence they sprung, and after repeated cultures in this way, the results will still produce splenic fever, when inoculated in animals, so long as and no longer than they will produce fresh rods and spores in culture fluids. Baron Seebach, of Saxony, had suffered great losses from the repeated occurrence of splenic fever on his estate, and finally began to suspect that the disease was propagated from the graves of dead animals. He observed one day that the clover was growing with great luxuriance over a place in the corner of his fields where a sheep dying of the disease had been buried two years before. A few days later he noticed that some one had stolen the clover which grew at that corner, and the next day a woman, one of his tenants, came to him with great lamentation to tell him that her goat had just died and her cow was very ill. It was found that both the animals were affected with splenic fever, and the woman confessed that they had been fed with the stolen clover. In 1865 Baron Seebach was minister to Paris, and he then drew up a memorandum giving his views, which memorandum was placed by the French minister of agriculture in the hands of M. Pasteur. He reported, after investigation, that if the carcass of an animal dying of anthrax be allowed to decompose at once with free access of air and moisture, its virulence is soon destroyed. The ordinary bacteria of putrefaction take possession and do their work, which in this case is a highly beneficent one and gives us a hint of how one species of micro-organisms may be used to drive out, destroy, or counteract the effects of others.

But if the carcass be so buried that but a limited supply of air comes to it, as in damp clay soil, the *Bacillus anthracis* goes on to form its spores, and there the locality becomes a dangerous one. These spores, buried for years, may be brought to the surface by earth worms, and thence find access through food or water to other animals.

Pasteur proved to the satisfaction of a commission appointed by the Academy of Medicine of Paris, that the germs of this bacillus were present in earth over the grave of an infected animal buried twelve years before, and also in the casts deposited by earth worms in similar localities.

Closely analogous to anthrax is the disease of hogs, known as the hog plague, which is also due to a bacillus which can be cultivated outside the living animal. The *Bacillus anthracis* is to all appearance identical with a very common bacillus, the *Bacillus subtilis*, which is found in all infusions of dried grass or hay, the only apparent difference being that the bacteroid form of *Bacillus anthracis* is motionless while that of *Bacillus subtilis* is very active. This *Bacillus subtilis* is, so far as known, a perfectly harmless form, but a possible connection between the two forms was at once suspected, and after many experiments Dr. Buchner has announced that he can, by varying the methods of culture, transform the one into the other with great certainty. After carrying on the culture of the *Bacillus anthracis* with free access of air for several hundred generations he found that it would no longer produce anthrax when inoculated, that it began to grow on the surface of the fluid, which is a characteristic of the hay bacillus, and finally that it would grow in an acid hay infusion which at the beginning of the cultures was fatal to it, in short, that it had become *Bacillus subtilis*. The reverse process was more difficult; but by limiting the supply of air and gradually substituting animal for vegetable culture fluids he finally produced malignant anthrax germs from common sweet hay. His reported results are not yet accepted as conclusive, however, and further and more careful experiments are needed to settle this question.

There occurs among fowls a disease which is commonly known as chicken cholera, not because its phenomena resemble those of cholera in man, but because it once prevailed in France at the same time as Asiatic cholera. The blood of fowls thus affected contains a microphyte which will grow and multiply in great abundance in chicken broth kept at a proper temperature. If a needle be dipped in broth containing this germ, and then dipped in other broth which has been sterilized by boiling, this last broth soon becomes turbid, and in a few days is swarming with the organisms. This process may be repeated a hundred times and a drop of the hundredth culture will produce the disease if inoculated as surely as would one from the first, nor will the disease thus produced be any the less virulent or fatal.

But if, instead of making these successive inoculations while the fluids are still turbid, and the microphyte is flourishing, we wait from one to six months, the malignancy of the microphyte becomes greatly diminished, and when inoculated upon an animal it no longer produces fatal results, and its effects seem at first to be confined to the production of some trifling local irritation. The virus has been, as Pasteur phrases it, attenuated. "The extraordinary and very important fact, if it is a fact, discovered by Pasteur, is that this tamed and attenuated microphyte does, nevertheless, produce a change in the whole system of the living animal, which is no longer susceptible to injection by subsequent exposure to the influence of the unattenuated germs." In other words, this attenuated virus acts as a sort of vaccine against the more malignant forms.

Having discovered this, Pasteur next tried to attenuate the virus of splenic fever in like manner, but at first was not successful because the bacillus when cultivated would form spores, and the virulence of these spores did not diminish. At last he found that by keeping his culture broth at a comparatively high temperature, about 100° F., spores did not form, the attenuation could be obtained, and that this attenuated virus could be used as a vaccine against splenic fever. This sort of vaccination is now undergoing a very extensive test in Europe—a large number of cattle in France, Germany and Hungary having been inoculated for this purpose.

What may be the real value of this protective inoculation is as yet uncertain; in part, because sufficient time has not yet elapsed to enable us to say whether the protection is permanent, in part, because this attenuated virus may reassume its virulent properties if cultivated in young pigs—and very possibly under other circumstances.

(*To be continued.*)

OILY SUBSTANCES IN RICE.

According to G. Campari ('Annals of the Milan Society of Applied Chemistry'), oily substances are contained in large quantities in the embryo of the rice, which he finds to be composed of 95·54 per cent. of fatty acids, and 4·46 per cent. of glycerine. Treatment with bisulphide of carbon produces a yellow wax-like substance which readily saponifies with bases, melts at 32° C., becoming quite solid at 28° C., with a specific gravity of 0·93005. It is completely soluble in ether, chloroform, and benzine; its composition appears to be C 79·2, H 10·9, O 9·9 per cent. The fatty acids melt at 36° C., emit a perceptible pear-like odour, and yield, when saponified and heated with magnesium acetate, a body which melts at 62° C., and exhibits the composition of palmitic acid $C_{16}H_{32}O_2$.

The Pharmaceutical Journal.

SATURDAY, JULY 14, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

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THE PROPOSED PHARMACEUTICAL LEGISLATION IN FRANCE.

We mentioned recently that the Commission entrusted with the consideration of two *projets de loi* dealing with the regulation of the practice of pharmacy in France that have been introduced into the Legislative Assembly had completed its report. Now that this report has been published *in extenso*, it proves to be a most exhaustive review of the whole subject and includes a number of propositions as the basis of a Bill which shall take the place of the two remitted to the Commission. The elaborate *résumé* of the inconveniences and defects of the "loi du 21 germinal an XI.," and of the many abortive attempts to amend it, with which the report opens, although full of interest, can only be mentioned here, since it will be difficult to condense within moderate bounds the many points discussed in the report which have at present a wider interest.

The first question presented for the decision of the Commission was, whether in future the practice of pharmacy in France should be controlled at all by regulations; whether, in fact, in future the diploma of a pharmacien should be simply a stamp of the State, sought for by men of science, but conferring no privilege, or whether its obtainment should continue to be required from all who wished to engage in the supply of pharmaceutical products by retail for use in medicine. It is not surprising to learn that absolute liberty had its partisans in a republican commission, and that some of the members thought both pharmaciens and the public should be free to buy or sell medicines as they please, and to attach any or no importance to diplomas as an evidence of qualification. But the majority was doubtful as to the attainment of this ideal at one bound, and looked upon abstract principles as being at present not necessarily favourable to successful legislation. The present law, however, under which it is illegal for a grocer to sell a small quantity of lime flowers, was felt to be too restrictive, and as a compromise it was agreed to recommend that there should be inserted in the Codex a list of substances used in medicine, but recognized as not being dangerous, which might be sold by any person. If this were done, the alleged necessity for the class of herbalists would cease and their certificates need no longer be issued. But with the exception of the supply of such articles, it was decided to recommend that no person should be allowed to carry on the business of a pharmacien in France, either in the supply of medicine for human beings or for veterinary purposes, without being provided with a diploma obtained in France or in a French colony and being subject to certain regulations.

Having decided that the practice of pharmacy ought to be restricted and regulated, the Commission had next to consider as to the nature of the regulations it should recommend. The first agreed to was that veterinary pharmacy should be subject to the same restrictions as the dealing in medicines intended for human beings, on the ground that otherwise the law would be liable to evasion by means of misrepresentation as to the object for which medicines were supplied. Next it was decided to recommend the cessation of the issue of diplomas of the second class, which authorize the holders to practise pharmacy only in the departments in which they are granted, it being considered illogical that a person should be held qualified to practise in one district and not in another. The third question discussed, and the decision upon it, are worthy the attention of the few persons who have objected to the introduction into the English Bill of a clause providing that branch pharmacies shall be conducted only by qualified managers. The question was whether one and the same pharmacist should own several pharmacies, and whether he ought to reside habitually in the place where his pharmacy is situated. No serious discussion, we are told, arose on this point. It was assumed, as a matter of course, that the responsibility falling on the pharmacist and the watchful superintendence he is required to exercise are alike opposed to the same person keeping open more than one pharmacy, and for the same reason it was held that he should ordinarily reside in the locality where that pharmacy is situated. A decided opinion is expressed in this part of the report that the greater the liberty of action accorded to the pharmacist, the more necessary it becomes to take every precaution that his responsibility shall be effective. It was further decided that the name of the actual proprietor of a pharmacy ought to appear on the front of the establishment and on the labels; and that where it is desired to retain the use of a familiar name, the name of the actual proprietor should be placed underneath. Another point discussed resembled one that frequently exercises pharmacists in this country, namely, whether a medical man should be allowed to practise pharmacy even if he possess a pharmacien's diploma, or to translate it into the conditions which obtain in Great Britain, whether a medical man who is a licentiate of the Society of Apothecaries should be at liberty to keep an open shop for the supply of medicines. At present this practice is allowed in France, but the Commission considered the custom to be liable to abuse and to involve the medical profession in discredit and therefore recommends it should be prohibited. It is, however, proposed in cases of urgency and when there is not an open pharmacy within six kilometres (rather more than three and a half miles) to allow a medical man or a veterinarian to supply medicine, but not to allow him to keep an open shop for the purpose. The Commission proposes also to prohibit persons not possessing a diploma from carrying on business with the aid of a qualified manager, but it would allow an association of pharmaciens, all of whom possessed diplomas, to employ a qualified manager to carry on business on their behalf, provided that the manager is also one of the proprietors. With respect to public companies it is recommended that these shall be allowed to carry on the business of a pharmacy only when the manager of the pharmacy also occupies the post of acting manager of the company. Hospitals and religious and secular communities would be allowed to have a pharmacy in connection with their operations, but only on condition that it be managed by a qualified pharmacien and that medicinal substances be not sold to persons outside the particular association. This would appear, however, to be sufficiently wide to include co-operative associations. It is also recommended that after the death of a pharmacien, his widow or heirs be allowed to keep the pharmacy open for a period not exceeding one year from the date of his death, provided that it is carried on under the management of a pharmacien, or of a pupil who is approved by the school of the district in which the pharmacy is situated.

Another class of subjects was approached in the raising of the questions, whether the supply by retail of pharmaceutical substances should henceforth be unrestricted, under the guarantee of a diploma; whether the supply of secret remedies should be published; and what should be understood by the term "secret remedies." Under the present French law, construed strictly, it is illegal for pharmaciens to supply by retail any medicinal preparations or compounded drugs whatever, except upon the prescription of a qualified medical man. But such illegalities are, nevertheless, continually practised, and it was felt unanimously by the Commission that the stringency of the law needed relaxation, the doubt being as to what extent. The opinion predominant from the first was that the pharmacien should be at liberty to sell any medicinal substance, whether poisonous or not, upon the express demand of the buyer, supplemented in the case of a poison by his signature. It was argued that since the passing of the existing law the pharmaceutical body has become more enlightened, whilst the mass of the people has become better informed; and that a pharmacien, knowing thoroughly the properties of the articles in which he deals, and remaining responsible for accidents arising through his negligence, would always be very circumspect in his transactions. Under existing restrictions a person wishing to try a remedy upon himself, which he had successfully used in another country, could not legally be supplied with it except upon the authority of a medical man, which he might not be able to obtain. The objection was raised that such freedom would promote irregular practice, and this led to the definition that if, after the removal of restriction, a pharmacien served a customer who asked definitely for twenty drops of Sydenham's laudanum, there would be no offence committed; but if, on the contrary, the customer described his case and asked for an opinion, and the pharmacien recommended him to take syrup of sarsaparilla, or any other medicine however simple, that would be an irregular transaction, which would render him liable to a penalty under the law relating to the practice of medicine. For these and other reasons the Commission had decided to recommend the granting of absolute liberty of sale under the guarantee of a diploma, but upon the intervention of the Minister of Commerce an exception was made in respect to the sale of poisons. As to secret remedies, under the present law the sale of these is prohibited, and the law courts have decided that the designation covers any medicine that is not either included in the Codex, authorized by the Government after a favourable report from the Academy of Medicine, or made up on the order of a medical man. It is evident that such a prohibition reaches a large number of specialties of known composition, and the Commission considered that it must operate as a bar to pharmaceutical progress. But it is worthy of note that the main idea of the reporter as to pharmaceutical progress is apparently the supersession of preparations made in the pharmacy by ready made goods produced on a manufacturing scale, and he mentions, with evident meaning, that already specialties are exported from France to the value of thirty or forty millions of francs annually. The Commission recommends that such preparations, when they do not contain the excepted poisons or preparations of them, shall be allowed to be prepared and sold by pharmaciens with no other restriction than that the labels shall bear the names and doses of the active ingredients, the Codex name being used when an official drug is present. On the other hand, it is considered that all "secret" preparations of undisclosed composition should be rigorously interdicted.

One other subject must be referred to briefly before closing this rather lengthy summary. The report provides for the publication of a Codex, written in Latin and in French, which it is recommended should be drawn up by a committee consisting of an equal number of professors of medical faculties, professors of superior schools of pharmacy and pharmaciens holding a pharmacy, with the addition of two veterinarians.

In the course of a statement made in the House of Commons on Monday evening with respect to public business the Prime Minister stated that the Medical Acts Amendment Bill would be proceeded with and it being one that had met with general acceptance he hoped it would become law this session. According to the *Standard*, however, the prospects of the Bill passing this session are very doubtful. The Scotch members are said to have by no means withdrawn their opposition to the clauses fixing the representation of the Universities and of the medical bodies, and it is understood that the Government is not prepared to make the desired concessions. The second reading was set down for Thursday, but at the time of going to press had not yet been reached.

* * *

At a recent extraordinary meeting of the College of Physicians a communication from the Pharmacopœia Committee of the General Medical Council was considered, and a Committee, consisting of Drs. Munk, Garrod, Ringer, Brunton, Baxter and Thudichum, was appointed to consider and report what alterations, additions or omissions, if any, it is desirable should be made in the proposed new edition of the British Pharmacopœia.

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A return recently presented to the Academy of Medicine by the French Minister of Public Works is quoted by the *Lancet*, from which it appears that there are no less than 1027 mineral springs in France at the present time, of which 357 are "alkaline," 318 "sulphurous," 215 "saline," and 136 "ferruginous." In the case of 641, the temperature exceeds 59° C., and these are classed as "thermal springs," the others being called "cold springs." Of these 94 are situated in the department of the Puy-de-Dôme, 77 in the Ardèche, 76 in the Vosges, 69 in the Ariège and the same number in the Pyrénées Orientales and 64 in the Hautes Pyrénées. The department in which the largest number of persons took the waters last year was the Puy-de-Dôme. The total outflow of all the mineral springs in France is estimated at 10,334 gallons per minute.

* * *

In 1881, with an estimated population in England and Wales of 12,676,276 males and 13,379,130 females, or rather over 700,000 more women than men, there were registered 253,605 deaths of males to 238,330 of females, or an excess of 15,725 deaths of the least numerous sex. Put into another form, the male death-rate in 1881 was 20 per 1000 and the female death-rate only 17·8 per 1000, the relative proportions of the deaths being 1124 males to 1000 females. Even this shows some improvement in favour of the "stronger" sex, the average relative proportions of the deaths during the previous decennium having been 1134 males to 1000 females.

* * *

A correspondent of the *British Medical Journal* reports a case in which a woman, aged 31, recently took probably at least 7½ grains of tartar emetic and possibly double that quantity, mixed with treacle, instead of cream of tartar. The powder was taken from a previously unopened packet that was purchased about two years ago in Barbadoes, and still bore a "cream of tartar" label. The woman eventually recovered, but had the "remedy" been administered to the child for whom it was originally intended the final result would probably have been a different one.

* * *

In the island of Ceylon, at the instance of the Planters' Association, the Government has decided to allow prescriptions in cases of urgency to be made up at the dispensaries connected with the Medical Aid Ordnance, on the payment of a fee to cover the cost. The conditions are that the prescriptions shall be written in English (except the names of drugs), without symbols or abbreviations; that no medicine shall be ordered which is not in the British Pharmacopœia; that the prescriptions shall bear on the back a certificate that the medicine is required in a case of urgency; and that the medicines be paid for at once.

* * *

According to Mr. Consul Jordan the betel-nut forms a very large item of export from the Chinese island of Hainan. The two districts of the island most noted for their betel-nut groves are Ai-chou and Ling-shui, the fruit from the latter of which is considered the best. The trees are planted some 15 feet apart, and bear fruit from the age of ten to ninety years. Their most prolific period is between their fifteenth and thirtieth year, when one tree will produce seven hundred or eight hundred nuts, valued at about forty cents. Large herds of cattle are allowed to roam at will through the plantations, and their manure serves to fertilize the soil from which the trees derive their sustenance. The groves are said to be the seat of pestilential malaria, especially at the season when the trees are in flower. In preparation for the market the nut is made to assume a variety of forms to suit the fastidious tastes of the Chinese consumers, which are different in almost every province.

* * *

A new "glass," produced by fusing pure acid phosphate of lime, is reported to present several advantages as compared with ordinary glass in chemical manipulations. According to M. Sidot, the inventor, it can be made into retorts, flasks and tubing, resembling those made from ordinary glass in appearance, but which are not attacked by hydrochloric acid or even by hydrofluoric acid.

* * *

According to a writer in the *Pharmaceutische Centralhalle* a good method for making labels adhere to zinc or iron, is to carefully roughen the surface of the metal with sandpaper, then to coat it with a solution of an alkaline silicate, and lastly apply the label. It is important that the silicate solution should be painted on the roughened metal and not on the label.

* * *

It may be of interest to some readers who have experienced loss consequent upon the deterioration of indiarubber through exposure, to learn that some experiments made by Professor McLeod seem to show that caoutchouc undergoes alteration under the combined influence of light and oxygen, but that neither alone produces any effect.

* * *

The meeting of the American Pharmaceutical Association at Washington is to be held in the Smithsonian Institution, the use of a lecture room in the new museum building having been granted for the purpose by the Directory, together with ample space for an exhibition.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council of this Society was held on Wednesday, July 4, in the College of Physicians, Dublin, at three o'clock.

The President, Professor Tichborne, in the chair.

The other members of the Council present were:—Messrs. Allen, Brunker, Dr. Collins, Messrs. Draper, Grindley, Hayes, Minchin, Dr. Montgomery, Sir George Owens, Messrs. Simpson and Wells.

The minutes of the last meeting having been read and confirmed,

Mr. Fennell, the Registrar, read a letter from Dr. Kaye, Q.C., Clerk to the Privy Council, enclosing a copy of a petition which had been sent to the Lord Lieutenant and Privy Council, praying for a revision of certain regulations which had been made by the Council under the Pharmacy Act (Ireland), 1875. The petitioners set forth that that Act recognized the then existing chemists and druggists as competent to carry on the business of chemists and druggists for the sale of poisons, and authorized the Council of the Pharmaceutical Society of Ireland to hold examinations for the licence of succeeding chemists and druggists; but that they had declined to do so, preserving that business for the members of the pharmaceutical body. That course, it was alleged, was an inconvenience to the public. The chemists and druggists had a body of capable assistants and apprentices who had reasonable hope of becoming in time masters of their own business, and many of them of becoming pharmacists, and in the practice of their own business they had been performing all the duties which belonged to the pharmacist, the compounding of prescriptions alone excepted. The Pharmacy Act had appointed one test of qualification only for future chemists, druggists, or pharmacists, namely, an "examination" which the Council of the Pharmaceutical Society should "cause to be held at such times and in such manner as might be prescribed by regulations made in pursuance of that Act." The regulations adopted by the Council of the Society and approved of by the Privy Council superimposed a Preliminary examination and apprenticeship, or its equivalent, neither of which was required by the Act. The effect of this was to deprive those at present trading as chemists and druggists of their right to present themselves at the appointed examination for licence. Further, the object of the apprenticeship appeared to be the gaining of experience in the compounding of prescriptions, thereby removing the safeguard the public were supposed to have under the Act, and exposing them to the dangers which must arise from allowing unregistered and legally unqualified persons to compound, more particularly youths who were only learning the business. There was nothing in the Act disqualifying a registered pharmaceutical chemist from keeping open shop *for* or *in partnership with* an unqualified person; nor would his doing so be a disadvantage to the public who would have the benefit of his ascertained skill and the capital of his principal, while in the event of accident there would be the civil and criminal responsibility of each respectively. It was, therefore, prayed that the existing regulations might be amended:—1st. By having the present dealers in poisons and drugs registered under a new Act; 2nd. By providing a test examination for the continuance of their business as such under the title of chemists and druggists; 3rd. By abolishing the Preliminary examination and apprenticeship. 4th. By recognizing the right of the registered pharmacist to keep open shop for or in partnership with an unqualified person.

Mr. Fennell read a letter addressed to the Lord Lieutenant by Mr. Robert James Downes, L.P.S.I., who had been entrusted with the presentation. A copy of this letter had also been enclosed to the Council by Dr. Kaye. The writer said the recent action of the Council in ignoring certain just claims, and then seeking to increase the impediments in the way of aspirants for their licence, had stimulated the petitioners to action in this matter. They requested His Excellency not to sanction any new encroachments, and also to withdraw the sanction already given to regulations framed for the purpose of promoting and conserving a monopoly. They maintained that the Act gave no power to impose apprenticeship or curriculum. The principle contended for in the fourth request had been admitted and acted on by the first members of the Council, and it was only of late that that body had been putting a contrary interpretation on the Act. Amongst the hardships which it entailed were, that while the 32nd section provided for the carrying on of the business of a deceased pharmacist, the widow or minors of the deceased chemist and druggist could only sell their interest, which was *nil*, to a pharmaceutical chemist, or close their business. A case had arisen where the senior partner, having been forty years in the business, put forward the son who had obtained the licence of the Pharmaceutical Society, but they could not trade as pharmacists unless the senior withdrew both himself and his capital from the business. A young pharmacist might desire to obtain or open a business, and a friend might be willing to help him, but he could not do so as a partner, though he might by a bill of sale or mortgage upon the business. It was more than doubtful that the Council of the Society had the approval of the body of their licentiates, who on January 1, 1883, numbered 219, of whom only 100 were keeping open shops on their own account, the remainder being variously employed, while 61 only were subscribing members; and last year they had only 12 candidates for the licence. Of the 21 members of the Council, 8, the writer added, were original members, one was a registered apothecary, and the remaining 12 were all admitted by examination only, without apprenticeship.

The President said that as regarded the first of the four amendments which were requested, the Council had been for the last two years petitioning to get power to register the gentlemen to whom it related. As regarded the other amendments which were sought, some of them were very peculiar and others important, and he was inclined to recommend that the petition and letter be referred to a committee, who should be requested to draw up a reply to them.

Sir George Owens said it would be a very dangerous thing to make it possible for a monster house with six partners to carry on pharmaceutical business with the aid of one pharmaceutical chemist.

The President: As regards the objections to our bye-laws bearing on the examinations, we have full power to alter the regulations from time to time; but still there are points in the letter worthy of consideration.

Sir George Owens said he did not want to dictate to whatever committee the documents should be referred to, but he hoped they would not throw overboard the practice of apprenticeship. The amount of ignorance of necessary manipulations that was displayed by physicians, surgeons, and other men having university degrees, was surprising.

Mr. Simpson: The apprenticeship is a thing that we should stick to through thick and thin.

Mr. Hayes: The root of the complaint is that the chemists and druggists cannot take apprentices who want to go on to the higher grades of pharmaceutical chemists, and that that throws the necessary apprenticeships into the hands of the pharmaceutical chemists.

On the motion of the President, seconded by Mr. Allen, the petition and letter were referred to the Law Committee.

The Registrar read a letter from Mr. James N. Hardy, L.P.S.I., of the City of Dublin Drug Hall and Plate and Sheet Glass Warehouse, No. 17, Lower Sackville Street. The writer stated that he had found by the report of the last meeting of the Council that they had declined for the present to give a definite answer to a question put by Mr. Curham as to whether they would accept from him (Mr. Hardy) a certificate of practical pharmacy for Mr. Curham's son. Clause 2 of the syllabus for the final pharmaceutical examination declared that candidates must produce a certificate of having been engaged in compounding and dispensing in the establishment of a pharmaceutical chemist "keeping open shop;" and he (Mr. Hardy) maintained that he did that strictly in accordance with the Act, which evidently meant a shop to which the public could have access, and where an apprentice or assistant would obtain the experience of an ordinary pharmacy. As he understood, the difficulty was occasioned by his being in partnership with Mr. Beater in the general family drug business. But certificates from the qualified members of the firms of Messrs. Boileau and Boyd, Boyd and Goodwin, W. Hayes and Co. (from 1875 to 1878), and, he doubted not, others who had non-qualified men for their partners, had not been refused by the Society; and the Act of 1875 actually named four gentlemen, Messrs. Goulding, Goodwin, Hayes and Hodgson, who were thus circumstanced, and bestowed upon them all the privileges of pharmaceutical chemists. Again, when the Council recently called on two houses to cease compounding, the reason alleged was that the qualified member had in one case died, and in the other withdrawn. His (Mr. Hardy's) case, however, was different from that of a "composite firm," for by an agreement of April 17, 1883, he rented from his firm a portion of the premises where their general business was carried on, to be used by him as a compounding department. He was the sole legal proprietor of that compounding business; all dispensing was done in his name; and apprentices would be engaged to himself personally. He therefore submitted that the fact of his having a partner not a pharmaceutical chemist in another business did not disqualify him from giving such a certificate as the Society could accept; and he thought that on further consideration the Council would see that his case was wholly different from that of Mr. Grindley.

Mr. Brunker said Mr. Hardy appeared to have made very elaborate preparations to evade the law, and the only question was whether he was evading it successfully or not. A somewhat analogous case was mentioned in the *Pharmaceutical Journal* of last week. An analytical chemist was prosecuted by the Pharmaceutical Society of Great Britain for selling poisons. His defence was that he had a qualified assistant whom he allowed to sell the poisons in his shop. It did not appear that he had a separate counter for the purpose, but the qualified assistant was in the habit of selling the poisons on his own account. The employer, however, was fined, as he was the person supposed by law to be "keeping the open shop." Now, in the case of Messrs. Beater and Hardy, if there was but the one entrance to the shop, but a portion of it inside was set apart for Mr. Hardy, an acute lawyer might raise a question as to who it was that kept the "open shop;" but he (Mr. Brunker) maintained that it was the firm of Beater and Hardy, and not Mr. Hardy.

Mr. Grindley: It is not the business of the Council to settle a question of that kind.

Mr. Simpson: According to Mr. Hardy's argument he would be entitled to issue certificates from a compounding department in the establishment of Messrs. Arnott and Co.

Mr. Wells said he had seen an account of another case in England, in which a man who sold poisons in a part of his shop was convicted, and had to pay the full penalty.

Dr. Montgomery said this was a very complicated question, and they should leave Mr. Hardy to get a legal opinion for his own guidance.

The President remarked that Mr. Hardy represented himself to be the sole proprietor of the department. That made his case somewhat different from the others.

Mr. Simpson: He rents a counter in the shop, but his name is not outside the door anywhere.

The President: But his name is on the labels, "J. Hardy, Pharmaceutical Chemist."

Mr. Brunker moved the following resolution:—

"That in reply to Mr. Hardy's letter of the 22nd ult., he be informed that the query addressed by him to the Council is a purely legal one, to which they are not in a position to give any other answer than that addressed to Mr. Curham."

Mr. Hayes seconded the motion.

Mr. Simpson moved by way of amendment—

"That the letter of Mr. Hardy be referred to counsel for an opinion and advice."

Mr. Draper seconded the amendment.

The amendment was negatived by six votes to four and the original resolution was carried.

A letter was read from Mr. John I. Pierce, of Trim, stating that he had served four years with Mr. H. Byrne, chemist and druggist, of Marylebone, London, and that he had been assistant to a pharmaceutical chemist for twelve months; and he desired to know would a certificate from the first-named gentleman admit him to the Society's examination qualifying for a pharmaceutical chemist.

The President remarked that the regulation restricting the persons with whom the two years' compounding and dispensing should be spent to pharmaceutical chemists and apothecaries should not be on their books at all. It was said through the city that their object was to prevent men from coming up for the examination; that the student in England got as much experience in compounding with the chemist and druggist as with the pharmaceutical chemist.

Dr. Montgomery: But we should keep up the *prestige* of the Society. I would not go in for admitting chemists and druggists to complete equality.

Mr. Brunker: The bulk of the dispensing body in England are only chemists and druggists.

The Registrar was ordered to inform Mr. Pierce that the certificate he offered could not be accepted under the present bye-laws.

The result of inquiries made in the case of Mr. Hance having been reported to the Council, it was ordered that the Registrar should inform him that his certificates of practical pharmacy could not be accepted.

The President reported the result of inquiries which had been made by a Committee appointed to look out for new premises for the Society.

A resolution was passed authorizing the Committee to complete the negotiations for renting of premises in Harcourt Street.

A petition, which the President and members of a Committee had by authority of a resolution passed at the last meeting of the Council drafted and forwarded to Parliament, praying that members of the pharmaceutical bodies of the United Kingdom should be represented on the Committee for the revision of the Pharmacopœia, and also that the new Medical Bill should be amended so as to restrict general practitioners under it from compounding and dispensing medicine to any but their own patients, was submitted and approved of.

The President moved, pursuant to notice—

"That on and after October 1, 1883, the office of President of the Society shall not be held for more than three consecutive years by the same person."

Two or three other members of the Council concurred with him in thinking that the presidentship should not be permanently held by one member of the Council, but should be movable to a certain extent. When a gentleman had occupied the office for a succession of years a delicacy was felt about removing him, and that feeling was likely to increase the longer he was left in office; and on the other hand it might happen that the opinions of the President might cease to be in harmony with those of the rest of the Council on important points, and at the same time they might not like to oppose him in reference to those matters, or he them.

Mr. Simpson said he quite concurred in the observations made by the President, and had great pleasure in seconding the motion.

The resolution was unanimously passed.

Some other business having been disposed of; the Council adjourned.

Proceedings of Scientific Societies.

SOCIETY OF CHEMICAL INDUSTRY.

Annual Meeting.

The Second Annual Meeting of the Society of Chemical Industry was held on Wednesday morning last, in the Lecture Theatre of the Institute of Civil Engineers, Great George Street, Westminster. The chair was taken at 11 o'clock by the President of the Society, Sir Frederick Abel, C.B., F.R.S. After the minutes of the last annual meeting, held in Birmingham, had been read and confirmed, the Chairman called upon the General Secretary to read the following:—

Report of the Council.

"In the first report of the Council the number of members on the Society's Register was stated to be 297. At the last annual meeting, the President announced that there were on the list 1140 members, and at the present time there are 1390 names on the Register, 8 having been lost by resignation and 7 by death.

"The local sections of London and Liverpool have been doing active work during the past year, and in October last an addition was made to these by the establishment of a Manchester section.

"The Council has also to congratulate the members upon the amalgamation of the Newcastle Chemical Society as a section of this Society.

"The Journal has been carried on much upon the same lines as last year, but numerous additions have been made to the Publication Committee in order to ensure more complete and systematic revision of the matter contained in it. It has sometimes been difficult to keep the Journal within the limits which the income of the Society imposes on it, but the Council has arranged that individual numbers shall not be strictly limited to a particular size when matter of interest is in the hands of the editor, which it is desirable to disseminate amongst the members without delay.

"It is satisfactory to note that several of the suggestions made to Mr. Chamberlain in a letter published in the July number of the Journal last year have been adopted in the Government Patent Bill.

"The Patent Laws Committee has had several meetings and its report to the Council will be submitted to the members.

"The Council has to submit to the members the proposal that a Parliamentary Committee be appointed to watch over all legislation affecting the future welfare of chemical industry.

"Early in the year the Council appointed a Committee to revise the bye-laws. The recommendations of that Committee have been carefully considered, and the bye-laws, amended in accordance with them, are submitted to the members for their approval.

"It has been found that the present mode of electing members entails considerable delay, and steps are now recommended to remove this. Some gentlemen may have been deterred from joining by the existence of an entrance fee, which it is, therefore, proposed to abolish.

"It is proposed to abolish the offices of honorary metropolitan and northern secretaries, as the secretaries of local sections (which, with the chairmen, it is proposed to place upon the Council) perform the duties which it was thought, in the first instance, would devolve upon those officers.

"The Council has also recommended an alteration of the office of General Secretary, it being desirable that this office should be thoroughly at the disposal of the Council and of Committees, and that he should not occupy the anomalous position of servant of the Council and member of that body.

"The Treasurer's report will show that the Society is in a good and sound financial position, at the same time it is the duty of the Council to call the members' attention to the circumstance that the arrears of unpaid subscriptions are somewhat heavy. In view of this the Council has been compelled to carefully revise the rule which makes a continuance of the privileges of membership contingent upon the fulfilment of the obligations which it entails."

The report of the Treasurer (Mr. E. Rider Cook) was then read, which showed that at the end of the year 1882, the date up to which the accounts had been audited, there was a balance in favour of the Society of upwards of £600. An informal supplemental account read by the Treasurer showed that this balance had since been augmented to upwards of £900.

The Chairman then proceeded to deliver his Presidential Address. After a few preliminary words of welcome, Sir Frederick Abel congratulated the members upon the rapid development of the Society, which he attributed chiefly to two causes: the provision as to the meetings of sections or local branches, and the existence of the Journal. Last year the Chairman was able to announce that sections had been established in London and Liverpool; this year he was able to say that there was a third at Manchester, and through the amalgamation of the long-established Newcastle-on-Tyne Chemical Society, a fourth at Newcastle; whilst it was probable that there would soon be a section established in Birmingham, as well as one in Ireland. It had been thought desirable to depart from the custom of having a series of papers read at the general meetings, in order that as many communications as possible might be available for the meetings of the local sections, and it had been proposed that the annual meeting should be the occasion of the delivery of an address upon some topic of interest to the members by a person specially qualified to speak upon the subject. The proposal had commended itself to his judgment, and he had hoped himself to have inaugurated the practice by an address upon the subject of explosives, to which his attention had been principally directed. The numerous calls upon his time by official and other duties had prevented this, but he would nevertheless lay before the meeting, in an informal way, some information that might prove interesting. Sir Frederick Abel then entered upon what turned out to be a very lengthy *résumé* of the history of explosives, of which the following is only a brief outline. He commenced by remarking, that up to within the last quarter of a century very few important modifications had been introduced into the processes for making gunpowder, and even in the present day some of the old methods are followed in a few powder mills on the Continent. As a rule, however, improved methods had been adopted for granulation, charcoal burning in retorts had displaced the older process, and more attention was paid to the purification of the saltpetre. For a long time there had been little advance in blasting agents, the low-priced blasting powder holding its own, but now the miner had become critical in his choice of blasting materials. Many such compounds that had been introduced had enjoyed but a brief existence. The speaker referred in detail to some of these, pointed out the advantages presented by compressed cylindrical charges, referred to the plan of submitting the materials to a heat above the melting point of sulphur, and to attempts to substitute hydrocarbons for charcoal, and many others, the rationale of which was unfathomable by the chemist.

In the case of firearms it was necessary to use a material more under control and less uncertain in the violence of its action than was required for blasting operations, and this had proved an obstacle in the way of the utilization of gun-cotton. Various plans for overcoming this difficulty were described, and this was followed by an interesting account of recent progress in the development of the manufacture of powder, which was illustrated by specimens of pebble, prismatic, and the enormous cylindrical powder. Sir Frederick Abel admitted, however, that results nearly equal to those yielded by the best of these had been obtained by the Italians, at Spezzia, in using an irregular powder made by breaking up cakes possessing different degrees of inflammability. Nitroglycerine, dynamite, blasting gelatine and similar explosives were then passed in review, and this portion of the address concluded with a reference to Dr. Sprengel's proposal to treat hydrocarbons or their nitro-derivatives with nitric acid, and some of its possible applications. Finally, the Chairman referred to some of the topics in the report, and mentioned that the General Secretary, Mr. George Davies, having resigned, the Council had decided to engage a paid secretary, and had appointed Mr. G. C. Cresswell.

At the close of the address a vote of thanks to the President was proposed by Dr. Longstaff. The motion was seconded by Mr. John Williams, and carried unanimously.

The report of the Patent Law Committee was then read by Mr. Ludwig Mond, who stated that alterations in accordance with two out of the three recommendations contained in it had been made in the Government Patents Bill during its passage through the Grand Committee.

The adoption of the report was moved by Mr. Weldon, seconded by Dr. Longstaff, and carried unanimously.

Mr. Muspratt then moved the adoption of certain alterations in the bye-laws in the direction indicated in the report of the Council, to facilitate the election of new members more promptly, and to fix a limit with respect to the arrears of subscriptions.

The motion was seconded and carried unanimously.

Mr. Chance moved the appointment of a Parliamentary Committee, to consider and report upon any proposed legislation that might affect chemical manufactures. Mr. Chance pointed out that it would be advisable that such a Committee should be as widely representative as possible, since the interests of the members would not always be identical, as, for instance, in the case of any Bill dealing with the pollution of streams.

The motion was seconded by Mr. Mond, and carried unanimously.

Mr. Muspratt then proposed that Mr. Walter Weldon should be chosen to fill the office of President of the Society during the ensuing year, and in doing so enlarged upon the important services rendered by that gentleman in connection with applied chemistry, and especially in the alkali manufacture.

The nomination was seconded by Mr. David Howard, and carried with acclamation.

Sir Frederick Abel having vacated the chair, it was taken by Mr. Weldon, who briefly returned thanks for the honour conferred upon him.

The next business was the election of the new Council, and Scrutineers were appointed to examine the balloting papers. During their absence,

It was resolved, on the invitation of Mr. Lowthian-Bell, supported by Mr. Pattinson, jun., that the next annual meeting of the Society be held in Newcastle-on-Tyne, the exact date to be settled by the Council after consultation with the Local Section.

The Scrutineers then presented their report, and the Chairman declared that the Council for the ensuing year would be constituted as follows:—

President:—Walter Weldon, F.R.S. *Vice-Presidents*:—Sir Frederick Abel, C.B., F.R.S., I. Lowthian-Bell, F.R.S., George E. Davis, Dr. J. H. Gilbert, F.R.S., F. H. Gossage, David Howard, D. B. Hewitt, M.D., E. K. Muspratt, H. Lee Pattinson, W. H. Perkin, F.R.S., Professor H. E. Roscoe, F.R.S., Sir William Siemens, F.R.S. *Ordinary Members of Council*:—Eustace Carey, Alexander Chance, Professor Charles Graham, Peter Greiss, F.R.S., James Mactear, Rudolph Messel, John Pattison, B. S. Proctor, Dr. Angus Smith, F.R.S., John Spiller, John Williams, P. J. Worsley. *Treasurer*:—E. Rider Cook. *Foreign Secretary*:—Ludwig Mond.

This concluded the business of the meeting.

The Annual Dinner.

On Wednesday evening, a number of the members sat down to dinner together at the Freemasons' Tavern. The chair was taken by the retiring President, Sir Frederick Abel, C.B., F.R.S.

At the commencement of the after-dinner proceedings the Chairman read a telegram from Professor Roscoe, expressing his regret at not being able to be present and his wishes for a successful meeting.

After the usual loyal toasts had been duly honoured,—

Mr. Lowthian-Bell proposed the toast of the Houses of Parliament, remarking that he must advocate its acceptance upon the basis rather of the traditions as to what the Legislature had done in the past than what it was doing now. Most of those present were suffering from the evils of over-production, a condition from which the House of Commons was at present singularly free. However, as a rule, manufacturing chemists only wished to be let alone. He associated with the toast the name of Mr. Samuelson, M.P., President of the Iron and Steel Institute.

Mr. Samuelson, in acknowledging the toast, said he thought Parliament would probably leave chemists alone just as long as they left the public alone, but when they commenced to pollute the water or foul the air they must expect to be interfered with. As President of the Iron and Steel Institute he represented a body of men who were much indebted to the studies of chemists, since preliminary investigations could be carried out in the laboratory that could not be satisfactorily made with the blast furnace. So much was the iron industry dependent upon the application of chemical principles that he was of opinion that if the Society of Chemical Industry had been then in existence the Iron and Steel Institute, instead of being established as a separate society, would probably have formed one of its sections. As to the House of Commons, the present one had made considerable progress with a Bill that would give great protection to inventors and would affect many present for evil or for good; he hoped, for good. Any shortcomings of this branch of the Legislature were referable to the electors who chose it and had power to make it reflect public opinion, and he called upon the Society of Chemical Industry to make its voice heard upon subjects in which it was specially interested, just as chambers of commerce and similar bodies made their influence felt.

Dr. Perkin, President of the Chemical Society, proposed the toast of the evening, "The Society of Chemical Industry," coupling with it the name of the new President, Mr. Walter Weldon. He said the work now undertaken by the Society of Chemical Industry was formerly done to some extent by the Chemical Society. Specially trained chemists were capable of rendering great services to manufacturers, but he was of opinion that at present a sufficient provision did not exist for training in good chemical schools; what was lacking was thoroughness.

Mr. Weldon, in replying, said that considering the vastness of the scale on which chemical industries were carried on and the extent to which they contribute to the wealth of the country it was a wonder that the Society of Chemical Industry had not been established earlier than it was. A debt of gratitude was owing to Professor Roscoe for the important place given to technical chemistry in the great educational institution in Manchester with which he was connected, but a far greater one for the part he had taken in the foundation of that Society. Mr. Weldon thanked the members for the honour they had conferred upon him that day by electing him to the office of President, and expressed a hope that when the Society met next year at Newcastle-upon-Tyne it would be found that he had not been an unprofitable servant.

Professor Odling proposed the toast of "The Scientific Societies." After referring to the loss the scientific world had recently suffered in the death of Mr. Spottiswoode, he associated with the toast the name of the Treasurer of the Royal Society, Mr. Evans, who, he said, carried on a large manufacturing industry, involving chemical operations, and was himself a student in many sciences.

Mr. Evans briefly acknowledged the compliment.

The Chairman, in proposing the toast of "Our Visitors," referred to the pleasure many of the company had experienced that day in visiting the Lambeth Art Pottery, and mentioned the name of Mr. Doulton as one who had applied the highest development of the national art schools in conjunction with a chemical industry.

Mr. Doulton said that the origin of the art potteries in Lambeth might be attributed to his life-long affection for the potter's wheel, and amongst the work done by himself in his younger days on the wheel was the making of some special apparatus required by the Chairman in his earlier experiments.

The next toast was that of "The President." It was proposed by the Treasurer of the Society, Mr. Cook, who said that in his relations to the business of the Society during his year of office Sir F. Abel had shown himself to be not only a man of science but a man competent to manage affairs.

Sir F. Abel briefly replied, saying that some difficulties inseparable from the early life of such a Society had been met with and overcome, and he felt confident that the future of the Society was comparatively clear.

The last toast was "The Officers of the Society," proposed by the Chairman, who coupled with it the name of Mr. Tyrer, the indefatigable Secretary of the London Section, to whom so much of the success of the meeting was due.

This well-deserved compliment was received with acclamation, and appropriately acknowledged by Mr. Tyrer.

During the evening an admirable selection of vocal music was sung by a company of gentlemen, most of them members of the Society, which had been organized by the London Secretary.

Visits to Manufactories.

On Wednesday afternoon, a considerable number of members were, by the kind arrangement of Mr. Doulton, conducted over the Lambeth Art Pottery.

On Thursday morning a numerous company were conducted over the South Metropolitan Gas Works; after which they visited the Hammond Electric Light and Power Company's works in Bermondsey Street, where the ingenious invention of Mr. Mackie for blowing the glass capsules for incandescence lamps, the exhaustion of the capsules and other details were shown. In the afternoon a party went, at the invitation of Sir F. Abel, on a visit to Woolwich Arsenal. Other parties visited the premises of the Electrolytic Company and the Vacuum Pump and Ice Company, and the Edison Central Station.

On Friday the arrangements were to visit Messrs. Duncan and Co.'s Sugar Refinery, Messrs Ohlendorf's Guano and Chemical Works, and Messrs. John Knight and Son's Soap Works, Victoria Docks; proceeding from thence to the Lager Beer Brewery and Crystal Ice Factory at Tottenham, and returning to town in time for the Conversazione and Reception by the President of the Society of Chemical Industry, the Chemical Society, and the Institute of Chemistry, held in the Galleries of the Institute of Painters in Water Colours, and the Prince's Hall, Piccadilly.

Correspondence.

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

A Query requiring an Answer.

Sir,—Recently the profession has deemed itself startled by Dr. Paul's revelation that the fluid extract of cinchona is deficient in the alkaloids of the bark, but I cannot understand why it should be so.

If water alone could extract the alkaloids, why, may I ask, is it necessary to employ acids to do so? If, again, acids are indispensable for the purpose, it stands to reason that water alone cannot extract the constituents of the bark; therefore, to call the B.P. preparation Extractum Cinchonæ Liquid. is a misnomer, and for anyone to advertize a preparation containing all the alkaloids and call it "Extract. Cinchonæ Liquid." is equally so.

I can understand making a fluid extract as by the B.P. process, and adding to it definite quantities of the alkaloids of the bark and then calling it Extractum Cinchonæ Liquid., but until some better process is devised than the one in the B.P., we are really without an extract representing the constituents of this valuable agent.

50, *Elgin Crescent, W.* Percy Wells.

The New Patents Bill.

Sir,—The discussion at the Council table on the subject of the 94th section of this Bill, now before the Grand Committee of the House of Commons, is really a most important one, inasmuch as there are, I imagine, amongst printers none who do not regularly keep in stock a set of labels with the royal arms thereupon, and these are from time to time supplied to chemists throughout the world; so that whilst recognizing the right of the Legislature to put any reserve desired upon the arms of the nation, would it not be fair if representation could be made in the proper quarter drawing attention to that fact? For it is no doubt largely the pride and loyal habits of the commercial element of the English people which has induced their adoption, and any sudden law of the nature proposed would be productive of considerable loss and inconvenience to a wide section of the community (besides chemists). On the other hand, it occurs to me to ask, whether, as an alternative, there would be any objection to the use of the royal arms of Germany, Belgium, or indeed the Republics of France and America, in the event of further restriction being placed upon those of the United Kingdom of Great Britain and Ireland?

35, *Baker Street, W.* A. W. Postans.

Easton's Syrup.

Sir,—In reply to "John," in last week's Journal, I beg to state that I have been in the habit of making my Easton's syrup with the sulphate of quinine for some time now, and get a most satisfactory preparation; it is perfectly transparent and keeps well. My receipt is—

Quiniæ sulph.	96 grs.
Acid. phosph. dil.	℥iij.
Liq. strychniæ	ʒvj.
Liq. ferri phosph. (1–5)	℥ij.
Syrup. simp.	ad fl. ℥xij.

Modus operandi: rub up the quinine in a mortar with a little (℥ij.) syrup, add the acid. phosph. and liq. strych., then the liq. ferri phosph., and make up to ℥xij. with the syrup.

Scotus.

M. H. Dumes.—Such a practice would be quite optional, and we do not think it is at all usual.

J. Constable.—You appear to lose sight of the fact that the examination is not a technical one, but is intended as a test of the general education of the examinee.

Broad.—Extractum Ergotæ Liquidum, B.P.

Communications, Letters, etc., have been received from Messrs. D. Stewart, Constable, Kay Brothers, Roberts, Broad.

THE ACTION OF SOME POLYHYDRIC ALCOHOLS UPON BORAX,

INCLUDING THE CHEMISTRY OF GLYCERINUM BORACIS AND MEL BORACIS.*

BY WYNDHAM R. DUNSTAN,

Demonstrator of Chemistry in the Laboratories of the Pharmaceutical Society.

The experiments described in this paper had for their object the elucidation of the general character of the reaction between polyhydric alcohols and sodium pyroborate (borax). In the instance of one of these alcohols, namely, glycerol (glycerin), the reaction has been studied by my friends, Dr. Alfred Senier and Mr. A. J. G. Lowe, who have already published some results to which I shall subsequently allude. They have since been independently engaged in a much more detailed inquiry into this same reaction. This inquiry is still in progress, but I learn that some of the results are similar to those described in this paper. It will be convenient here to recapitulate the principal work which has been done upon this subject.

In 1877, Iles (*Chem. News*, xxxv., 204) recorded the fact that a mixture of borax with glycerin imparts a green colour to the flame, and proposed to utililize this fact as a test for borates.

In 1878, D. Klein (*Bull. Soc. Chim.*, xxix, 195) showed that when certain polyhydric alcohols are added to a solution of borax an acid reaction is the result; this was observed with glycerol (glycerin), mannitol (mannite), erythrol (erythrite), levulose, dextrose, α-galactose and β-galactose. A special study was made of the reaction in which mannitol is involved, and published in the same year (*Bull. Soc. Chim.*, xxix, 357). Klein found that when half a molecular weight of borax is dissolved in water and added to one molecular weight of mannitol, also in aqueous solution, the resulting liquid is neutral; but when the quantity of borax added was less than this quantity, the liquid is acid. From the neutral liquid a compound was obtained of one molecule of borax with one molecule of mannitol. From the acid liquid, after fractional precipitation with alcohol of different degrees of strength, a residue was obtained which was very acid, and was supposed to be a compound of mannitol with boric acid, but was not further examined. By heating together mannitol and boric acid to 150° C. for seven or eight hours, treating the resulting substance with water and barium carbonate, and subsequently purifying by precipitation with alcohol, a substance was obtained which Klein calls barium biboromannitate $\left.\begin{matrix} C_{12}H_{12}O_{10} \\ 2\,BO_3 \end{matrix}\right\} BaO$. This was decomposed by sulphuric acid, yielding a compound which crystallized into needles, but did not receive further investigation. The results of Klein's work which bears upon the present question amounted to showing that when mannitol is added to an aqueous solution of borax two compounds are formed depending upon the amount of mannitol present. If the borax be in excess, a compound of borax and mannitol, molecule for molecule, results; if the mannitol is in excess, a compound with boric acid is formed, the exact composition and properties of which were not determined, analogy leading to the supposition that it was a conjugate acid.

In the same year, Senier and Lowe (*Pharm. Journ.*, [3], viii., 819) published the results of experiments on the action of glycerol upon borax, from which it appeared that free boric acid was liberated and a more basic borate formed. Experiments made with a view of isolating the free boric acid, either directly or indirectly, gave negative results. These same observers (*Journ. Chem. Soc.*, xxxiii., 438) proposed to utilize the fact that a mixture of glycerol and borax yields a green colour to the flame as a test for glycerol, for they found that the reaction was not shared by the majority of polyhydric alcohols, erythrol and glycol alone resembling glycerol in this respect. In 1881, Donath and Mayrhofer (*Zeits. für anal. Chem.*, xx., 379) found that the acid solution resulting from the action of glycerol upon borax became alkaline when heated, and proposed this reaction as a test for glycerol. In 1882 (*Pharm. Journ.*, [3], 257), I showed the limits of this test and proposed a new method of applying it, at the same time pointing out that it could not be relied upon as a distinctive test for glycerol unless special precautions were taken to exclude other polyhydric alcohols, for I had found that the same reaction was given by mannitol, erythrol, guaiacol, pyrogallol, saligenol, dextrose, levulose, lactose and mycose, and in fact might be considered to be characteristic of all polyhydric alcohols. Since that time my work has been extended with the view of discovering the *rationale* of the general reaction.

Action of Glycerol upon Borax.—When anhydrous borax and anhydrous glycerol, the latter in excess, are heated together the mixture becomes acid and imparts a vivid green tinge to the flame. Anhydrous borax and anhydrous glycerol, the latter slightly in excess, were heated to a temperature of 120° C. As the temperature neared 100° C. water began to be abundantly given off, but it was necessary to raise the temperature to 120° C. in order to effect entire expulsion of the water. Very many experiments were made with varying quantities of the two substances to estimate the amount of water given off and so to determine the formula of the compound produced, but no reliable results were obtained, owing to the inevitable loss of glycerol at this temperature. The mass obtained in the above manner, and which gave the boron flame reaction, was reduced to powder and extracted with ether, which removed a glassy, uncrystallizable, extremely deliquescent body. It was freely soluble in alcohol and was left as a gummy film after the spontaneous evaporation of the alcohol. Upon treatment with a small quantity of water it yielded a mass of crystals which were recognized by the usual tests as boric acid. The original substance imparted a vivid green tinge to the flame, was not appreciably acid to test paper, but on moistening the paper with water became powerfully so. The acidity of the aqueous solution was not affected by ebullition. In another experiment a mixture of anhydrous borax and anhydrous glycerol was heated to 120° C., the borax being in excess; the mass upon extraction with ether yielded the body just described. It was in like manner decomposed by water, and glycerol was found in the aqueous solution by mixing with lime, drying and exhausting with ether. Absolute alcohol also extracted this substance without decomposition from the original mass, but in this case

* The part of this investigation which concerns the chemistry of Mel Boracis formed the subject of a Report upon Organic Chemistry to the School of Pharmacy Students' Association, on May 24, 1883.

it was associated with sodium borate. The residue, after extraction with ether, was found to contain a basic borate, probably sodium metaborate. The above experiments are conclusive in showing that the primary action of glycerol upon sodium pyroborate under the above conditions results in the formation of a compound which is evidently a boric ether of glycerol, that is, glycerol in which some of the hydroxyl has been displaced with the formation of water by the boric radical. This ether may be termed *glycerol borin.* It is decomposed by water, forming boric acid and regenerating glycerol; hence the acidity of aqueous mixtures of glycerol and borax. The glycerol borin produced in the manner above described agrees in its main properties with the boric ether of glycerol isolated by Schiff and Becchi (*Compt. Rend.*, lxii., 397) from the action of heat upon a mixture of glycerol and boric acid, which was represented by the formula, $C_3H_5BO_3$. Glycerol, then, acts upon sodium pyroborate, combining with half the boric anhydride which the salt contains to form glycerol borin, sodium metaborate remaining.

Action of Mannitol upon Borax.—The experiments of Klein upon this subject, which have been previously described, are open to the objection that water was employed in order to obtain the final products. My previous experiments with glycerol had shown that water annihilates the glycerol borin which results from the action of glycerol upon borax, and therefore had a similar ether been produced in the present instance it would have been *ex hypothesi* decomposed by the water employed in Klein's experiments. For this reason, my experiments in the first place were made in such a manner as to exclude the use of water. Anhydrous mannitol and anhydrous borax, the former being slightly in excess, were heated together to a temperature of 140° C. The deliquescent mass thus obtained, which gave no green flame reaction, was extracted with anhydrous ether. The ethereal solution upon spontaneous evaporation yielded a body which apparently crystallized in feathery tufts and gave an intensely green flame reaction. Absolute alcohol extracted from the original mass the same substance, together with unaltered mannitol and sodium borate. The body thus obtained was easily soluble in absolute alcohol and this solution was faintly acid in reaction. Water likewise dissolved this substance, and the aqueous solution, which was strongly acid, yielded the reactions for boric acid and also for mannitol. The residue which had been extracted with ether was found to contain sodium metaborate. An aqueous solution of borax was treated with an aqueous solution of mannitol, until strongly acid, and evaporated to dryness; then exposed for some time to a temperature a little exceeding 100° C. Ether extracted from this mass the substance above described. These experiments indicate that the action of mannitol upon borax gives rise to the formation of a boric ether in which some of the hydroxyl of the mannitol is replaced by an equivalent amount of the boric radical. This substance, which may be termed *mannitol borin*, is decomposed by water, yielding mannitol and boric acid; the acidity of aqueous mixtures of mannitol and borax is, therefore, due to this acid. There are probably many secondary reactions involved when aqueous mixtures of mannitol and borax react and some of these doubtless give rise to the formation of the bodies described by Klein. It has already been observed that a mixture of mannitol and borax, unlike a mixture of glycerol and borax, does not impart a green colour to the flame, although, as the above experiments show, a substance possessing this property, namely, mannitol borin, is present in the mixture. Klein (*Bull. Soc. Chem.*, xxix., 368) supposes that this is due to the interference of mannitol, which, acting like tartaric acid, masks the green flame reaction of boric acid when heated with it. This is a possible explanation, but the fact may also be due to dissociation, as I have shown that it is in the instance of a similar phenomenon which will be considered later on.

Action of Dextrose upon Borax.—The first experiments upon this subject were made with commercial glucose. An aqueous solution of this substance was mixed in excess with an aqueous solution of borax until the mixture was strongly acid; the solution was evaporated to dryness and the residue heated for some time at 110° C. The mass thus obtained did not give any green flame reaction and was not acid. It was extracted with absolute ether and the ethereal solution upon evaporation left a white residue which imparted a vivid green tinge to the flame. This substance was easily soluble in alcohol and this solution was only faintly acid; it also dissolved readily in water, and this solution, which was strongly acid in reaction, deposited crystals of boric acid and gave plentiful evidence of glucose with Fehling's solution. From the original mass absolute alcohol extracted the same substance in an impure condition. These experiments were now repeated with pure dextrose, the dextrose and anhydrous borax, the former slightly in excess, being heated together to about 140° C. Absolute ether extracted from this mixture a substance which behaved in precisely the same manner as that obtained from commercial glucose. The residue contained sodium metaborate.

The above experiments show that dextrose decomposes borax, forming a compound which is probably a boric ether similar in character to those ethers which have been obtained from glycerol and mannitol; sodium metaborate is at the same time produced. This ether may be termed *dextrose borin.* It also follows from the above experiments that the acidity produced when aqueous solutions of dextrose and borax are brought together is due to boric acid. A mixture of dextrose and borax resembles a mixture of mannitol and borax in giving no flame reaction for boric acid and probably for the same reason.

Action of Levulose upon Borax.—Pure levulose was prepared from invert sugar by Dubrunfaut's method. It was heated with a small quantity of anhydrous borax to a temperature of 120° C. and extracted with absolute ether. In this way a substance was obtained which behaved in the same manner as the similar body obtained by the action of dextrose upon borax. An aqueous solution of levulose was added to an aqueous solution of borax until a strongly acid reaction prevailed. The liquid was evaporated to dryness and heated to 120° C. until all the water was expelled. Ether extracted from this mixture the same compound that was obtained by heating the anhydrous substances together. Sodium metaborate was found in the residue which had been extracted by ether. Thus levulose decomposes borax, forming a compound, probably a boric ether, which is decomposed by water, yielding boric acid and regenerating levulose; it may be termed *levulose borin.* An aqueous solution of borax to which excess of levulose has been added consequently contains boric acid, but yet this solution gives no flame reaction for boric acid.

The Chemistry of Mel Boracis.—In connection with the above results it was interesting to examine the mel boracis of the British Pharmacopœia which is practically a solution of borax in honey. Mel boracis in its normal condition is acid in reaction, but gives no flame reaction for boric acid. If some of it be mixed with a small quantity of water it is found to be strongly acid, but if large excess of water be added it becomes alkaline. Some mel boracis was exposed at a temperature a little exceeding 100° C. until all the water was expelled. The resulting mass was powdered and exhausted with absolute ether, which removed a substance which imparted a vivid green tinge to the flame. This substance was soluble in absolute alcohol and also in water; this latter solution was strongly acid and contained a sugar which reduced Fehling's solution. Strained honey was found to be slightly acid; this acidity was neutralized by the addition of sodium carbonate. The faintly alkaline honey thus obtained was added to a solution of borax, which is also alkaline; an acid reaction ensued, which was destroyed by heat, the solution becoming alkaline but regaining the acidity on cooling. The liquid gave no green flame reaction. A saturated solution of borax was mixed with faintly alkaline honey until acidity was strongly developed and slight excess of honey had been added. No green flame reaction could be obtained with the solution, although a great number of trials were made. The solution was evaporated to dryness until all the water had been expelled. The mass so obtained was not acid in reaction, neither did it become so upon the addition of absolute alcohol; contrariwise the addition of a small quantity of water caused the development of a marked acid reaction. The mass gave no flame reaction for boric acid. After powdering, it was extracted with absolute alcohol, which upon evaporation left a residue consisting of some unaltered honey together with a body which apparently gave a green flame reaction, although the colour was much masked by the honey present. Another portion of the mass was exhausted with ether, which extracted a substance giving a vivid green tinge to the flame of a Bunsen lamp. It dissolved readily in absolute alcohol and this solution was only faintly acid. The substance readily dissolved in water yielding a strongly acid solution, the acidity of which was unaltered by boiling. The aqueous solution readily reduced Fehling's solution. The mass after extraction was found to contain sodium metaborate. These results agree precisely with those predicted from previous observation of the action of dextrose and levulose upon borax. Thus the acidity of mel boracis is due to boric acid which has been produced by the action of the dextrose and levulose contained in the honey upon borax in presence of water. Mel boracis also contains sodium metaborate.

Elucidation of a Secondary Reaction.—I have previously shown (*Pharm. Journ.*, [3], xiii., 257) that it is a property characteristic of polyhydric alcohols to render a solution of sodium pyroborate, which is normally alkaline, acid in reaction, the original alkalinity being restored upon heating. Since that time I have had the opportunity of trying this reaction with some pure glycocine (prepared by Mr. T. S. Dymond), a substance which resembles dextrose and allied carbohydrates in its principal properties. This substance, unlike dextrose, did not yield the reaction with sodium pyroborate, in accordance with the prevision from the fact that it is not a polyhydric alcohol but amidoacetic acid (CH_2NH_2COOH).

This altogether interesting and anomalous behaviour of the polyhydric alcohols towards a solution of sodium pyroborate, I am now, after having made clear the general nature of their action upon this substance, able to explain. The experiments now described show that these alcohols in presence of water liberate boric acid from sodium pyroborate, sodium metaborate being at the same time produced. It seemed probable that this characteristic behaviour was in reality due to a secondary reaction occurring between the free boric acid and the sodium metaborate and was in no way directly affected by the presence of polyhydric alcohol. Subsequent experiment has completely confirmed this conjecture. The pure sodium metaborate ($NaBO_2$), the aqueous solution of which is alkaline, was very faintly acidified by the addition of boric acid; this solution as it was slowly raised to the boiling point gradually regained its alkalinity, which again disappeared as the liquid became cool, the indications being observed with the aid of phenol phthalein.

The addition of large excess of water produced an effect similar to that of heat. These same phenomena are observed when sodium pyroborate, the aqueous solution of which is likewise alkaline, is substituted for sodium metaborate and when other acids are employed in the place of boric acid. Let a solution of sodium pyroborate be made neutral or faintly acid with boric or with hydrochloric acid and the alkalinity is reproduced by heating but is again destroyed as the temperature of the solution is lowered. Water also is able to annihilate the acidity and reproduce the alkalinity of the liquid. Now when sodium metaborate or pyroborate is dissolved in water dissociation occurs, resulting in the formation of an acid borate or boric acid and the liberation of free alkali;* hence the alkalinity of such solutions. Upon adding acid in sufficient quantity to neutralize this alkalinity, a stable neutral system is the result. The addition of more water disturbs this system of neutrality, by producing further dissociation of the salt indicated by renewed alkalinity. A rise of temperature produces in this neutral solution the same effect as excess of water, namely, alkalinity, which, however, disappears as the solution cools, the heated water effecting dissociation, and recombination occurring as the liquid cools.

If excess of acid be added no change is observed upon heating, doubtless because acid, and therefore more stable, salts are produced. It follows from these experiments that when a polyhydric alcohol is added to an aqueous solution of sodium pyroborate in quantity just sufficient to produce an acid reaction due, as we have previously seen, to the liberation of

* Berthelot has shown (*Essai de Mécanique Chimique*, vol. ii., 225) that increased addition of water produces increased dissociation; thus when boron trioxide combines with sodium oxide to form sodium metaborate ($B_2O_3+Na_2O$) in presence of 220 molecules of water, 11·75 heat units are liberated.

$B_2O_3+Na_2O$ in presence of 330 H_2O liberates 11·56 h.u.
$B_2O_3+Na_2O$ in presence of 440 H_2O liberates 11·13 h.u.
$B_2O_3+Na_2O$ in presence of 1320 H_2O liberates 10·91 h.u.

boric acid from some of the sodium pyroborate with formation of sodium metaborate, upon the addition of more water or application of heat dissociation of the undecomposed sodium pyroborate and metaborate takes place, liberating alkali in quantity more than sufficient to neutralize the free acid, hence the liquid is alkaline. As the temperature is lowered recombination takes place with the consequent regeneration of the original neutrality or faint acidity. If excess of the polyhydric alcohol be added, that is, more than enough to render the liquid neutral or faintly acid no reaction is produced upon heating, evidently because excess of boric acid has been set free.

General Considerations.—The chief result of this inquiry is to show that polyhydric alcohols decompose sodium pyroborate with the formation of sodium metaborate and a boric ether or, if water be present, free boric acid. There are no doubt many secondary reactions involved; in fact, one such reaction has just been under discussion. The principal properties of these bodies have been described, but whether they are mono-, di-, or tri-borins, has not directly been determined. In the case of glycerol, however, there can be little doubt that the substance produced is glycerol in which all the three hydroxyl groups are substituted by the boric radical ($C_3H_5BO_3$). The following equations symbolize the action of glycerol upon sodium pyroborate and similarly other polyhydric alcohols:—

$$2C_3H_5(OH)_3 + (2NaBO_2.B_2O_3) = 2C_3H_5BO_3 + 3H_2O + 2NaBO_2.$$

But inasmuch as water itself is a product of the decomposition, the above reaction is never complete save at high temperatures, owing to the conversion or partial conversion of the borin into boric acid under the influence of the water, thus*—

$$C_3H_5BO_3 + 3H_2O = C_3H_5(OH)_3 + H_3BO_3.$$

In aqueous solutions the reaction may be thus represented in one equation—

$$2C_3H_5(OH)_3 + (2NaBO_2,B_2O_3) + 3H_2O = 2NaBO_2 + 2H_3BO_3 + 2C_3H_5(OH)_3.$$

This is a reaction, which, taken by itself, might be attributed to what has been called "catalysis," for the glycerin remains unchanged at the close of the reaction. It is, however, now manifest that the production of a boric ether is the determining cause of this reaction, which is thus brought under the category of chemical action and the use of a fictitious explanation, if at any time legitimate, is here rendered superfluous.

Not only are the results of this investigation interesting on the side of the polyhydric alcohols but also as additional evidence in favour of regarding anhydrous borax as a sodium pyroborate; that is, a compound of boric anhydride with sodium metaborate.

* *Cf.* the experimental investigations of Berthelot (*Ann. Chim. Phys.*, [3], lxv., lxvi., lxviii.); Menschutkin (*Ber.*, x., 1728) on 'Etherification;' also the admirable discussion of the whole subject by Berthelot ('Essai de Mécanique Chimique,' vol. ii., pp. 79–95.)

PERFUMES AND ESSENTIAL OILS.

A NEW MODE OF EXTRACTION BY MEANS OF VACUUM AND COLD.†

BY LAURENT NAUDIN.

This communication has for its principal object the description of a new mode of extraction of essences and perfumes by volatile solvents with the aid of vacuum and cold.

The collection and preparation of odorous substances date back to the most remote periods of historical tradition. Perfumes have, in short, from the earliest ages occupied a prominent place in the religious services of the most diverse nations, and even in the present day incense is burnt in the ceremonies of many creeds. The etymology of the word perfume alone—*per fumum*, by smoke—shows the manner in which the substance it designates was used, and that the art of combining delicate and refreshing odours, or more properly the art of the modern perfumer, originated in the ancient custom of burning incense on the altar.

This art has been handed down during several centuries without any great modifications. Thus the processes for the extraction of essential oils and the preparation of waters and scented oils that were used in India and by the Arabs are the same as those carried on in the laboratory of the modern perfumer. Mechanical improvements have aided in perfecting the apparatus, which, however, is not very complicated. Progress has been made, not in the extraction of the rich and varied perfumes of nature, but solely in the compounding of mixtures of perfumes. Indeed, it is curious to read in ancient writings textual descriptions of the principles upon which the processes still employed in the current manufacture of perfumes are based.

Lenormand, in his 'Traité de la Distillation,' states expressly that the Arabs have from time immemorial effected the extraction of the aromatic parts of plants by distillation. These people in their incursions into Europe introduced their processes successively into Italy, Spain and France. But in France this industry was localized first in the department of Hérault, from which it has almost completely departed to settle in Provence, under the beautiful climate of the Alpes-Maritimes. Algeria commenced to send her products into the market, but owing to the absence of any systematic cultivation of flowers, the perfume industry in this French colony has nearly died out. Thirty years ago, Millon called the attention of perfumers to the immense resources of Algeria, but his urgent appeal, though justified by the richness of the Algerian vegetation, was not listened to.

At present essential oils and perfumes are obtained industrially by distillation, hot and cold enfleurage, and expression.

The mode of extraction by distillation with steam consists in placing the odoriferous vegetable substances (flowers, seeds, wood, roots, etc.), together with a certain quantity of water in an ordinary still, and heating to the boiling point. Under the influence of this temperature (100°), the plant cells are ruptured, and the essential oil carried over mechanically by the steam is condensed with it in a cooled receiver and separated in an oily form. Formerly the heat was applied by a naked fire, but the essential oil then acquired a very marked empyreumatic flavour; recently the use of steam has replaced this barbarous way of applying heat.

There are two great objections to this mode of proceeding: the destruction of a part of the perfume, owing to the high temperature that is necessary, and the great modification sustained by the undestroyed portion of the perfume from contact with the steam. Consequently the essential oils obtained by this mode never contain the perfume of the flower in all its perfection, but inevitably possess an odour, known to perfumers and distillers as the "flavour of the still." The quantity of perfume destroyed by the steam may amount in certain cases to as much as 50 per cent.

In the hot enfleurage the flowers are digested for a sufficient time in oil heated in a water-bath. When exhausted, they are withdrawn from the oil and submitted to a strong pressure in order to recover the fatty matter with which they are saturated. To the inconveniences enumerated when speaking of distillation, the following may be added: (1) the loss of the fat remaining in the cake of flowers submitted to pressure; and (2) the rancidification of the fatty matter when heated to a high tempera-

† Abstract of a paper in the *Moniteur Scientifique.*

ture. It is known in practice that the glycerides heated to 100° C. acquire a rancid flavour.

Cold enfleurage is adopted in the case of the more instable perfumes, which are destroyed by heat, rendering it necessary to impregnate the oily body at a low temperature. For this purpose the flowers are laid in contact with a linen cloth saturated with oil or on a glass tray having a layer of oil spread over the bottom. The flowers are renewed at intervals of twenty-four hours. One inconvenience of this primitive method is the rapid rancidifying of the oily matter under the influence of a partial fermentation of the flowers and of the humid temperature of the climate in which it is necessary to carry on these operations, and the consequent alteration of the perfume. It may be mentioned that in the flower season, the same oily matter stands, for a month at least, in contact with air at a temperature of 35° to 45° C. Besides this there is the loss of a great part of the perfume, the flowers never being quite exhausted when renewed, as well as the loss of the oily matter left in the flowers. To obviate these inconveniences, it has been proposed to employ glycerine and syrup of sugar in the place of oil and fat in the processes of hot and cold enfleurage. Neither of these bodies are susceptible of rancidity, but the solubility of glycerine in alcohol, and the instability of syrups when exposed to contact with air, have prevented their practical employment.

Several years ago paraffin and vaseline were tried as substitutes for olive oil in hot enfleurage; but paraffin has been abandoned, whilst vaseline yields alcoholic extracts of which the perfume is contaminated with a petroleum odour.

Expression is undoubtedly the best of all the processes at present in use. It is applied, however, only to a limited class of oils: those of the lemon, bergamot, orange, cedrat (*Citrus medica*) and lime (*C. Limetta*). The products derived in this way from the rind of these members of the genus Citrus, are incomparably superior to those obtained by distillation or enfleurage.

In 1835, Robiquet described the preparation of the delicate perfume of jonquil by means of ether, but the process was not then carried out industrially. Two years after, Buchner, in a note on "L'Arome de quelques Fleurs," expressed the idea that practical application might be made of Robiquet's method. Afterwards, Millon, the principal of the central chemical laboratory in Algiers, in an able memorandum on the nature of the perfume of flowers and on some flowers that might be cultivated in Algeria, mentioned a series of experiments as to the employment of volatile solvents in the extraction of perfumes of flowers. The solvents were chloroform, carbon bisulphide, ether, methylic alcohol, vinic alcohol, etc.; but he distinctly gave the preference to ether. His co-worker, Ferrand, took out a patent with this object in which he described the mode of working. It consisted in introducing the flowers into a displacement apparatus, covering them with ether, and allowing the liquid to run after being in contact for about ten minutes. The ether was evaporated in an ordinary distilling apparatus, the perfume being left as residue.

Apparently Millon and Ferrand had no knowledge of Robiquet's experiments twenty years before, but however this may be the results announced by Millon were important. Trials were made on a large scale, but it was nevertheless found necessary to abandon this process on account of the danger of using large quantities of ether in open vessels and the loss of a considerable quantity of the solvent in each operation, through it being impossible to drive off the last traces of it from the perfume. Dr. Quesneville, as early as 1857, had perceived and pointed out the moderate practical value of the process. Since that time, however, new attempts have been made in the same direction, some of which are worthy of notice.

An industrial experiment of Lemettars and Bonnière, of Rouen, had for its object the extraction of the perfume from dry species and fresh plants by carbon bisulphide rectified by treatment with alkalies and lead salts.

Deiss, of Marseilles, introduced a system of purification of perfumes extracted by carbon bisulphide. In his patent, Deiss stated that the employment of carbon bisulphide, easily decomposed by the water contained in fresh flowers, communicated a sulphurous odour to the perfumes. He therefore proposed to wash the perfumes with an alkaline solution or a solution of monosulphide of sodium for the purpose of removing chemically the solvent retained mechanically by the perfume mixed with the wax of the flowers. Considering the extreme alterability of certain perfumes by alkalies, this idea was hardly a happy one.

Then came the experiments of G. Ville with chloroform and De Hirtzel with the light petroleums. Neither of these modifications of Millon's method was, however, able to stand a practical test.

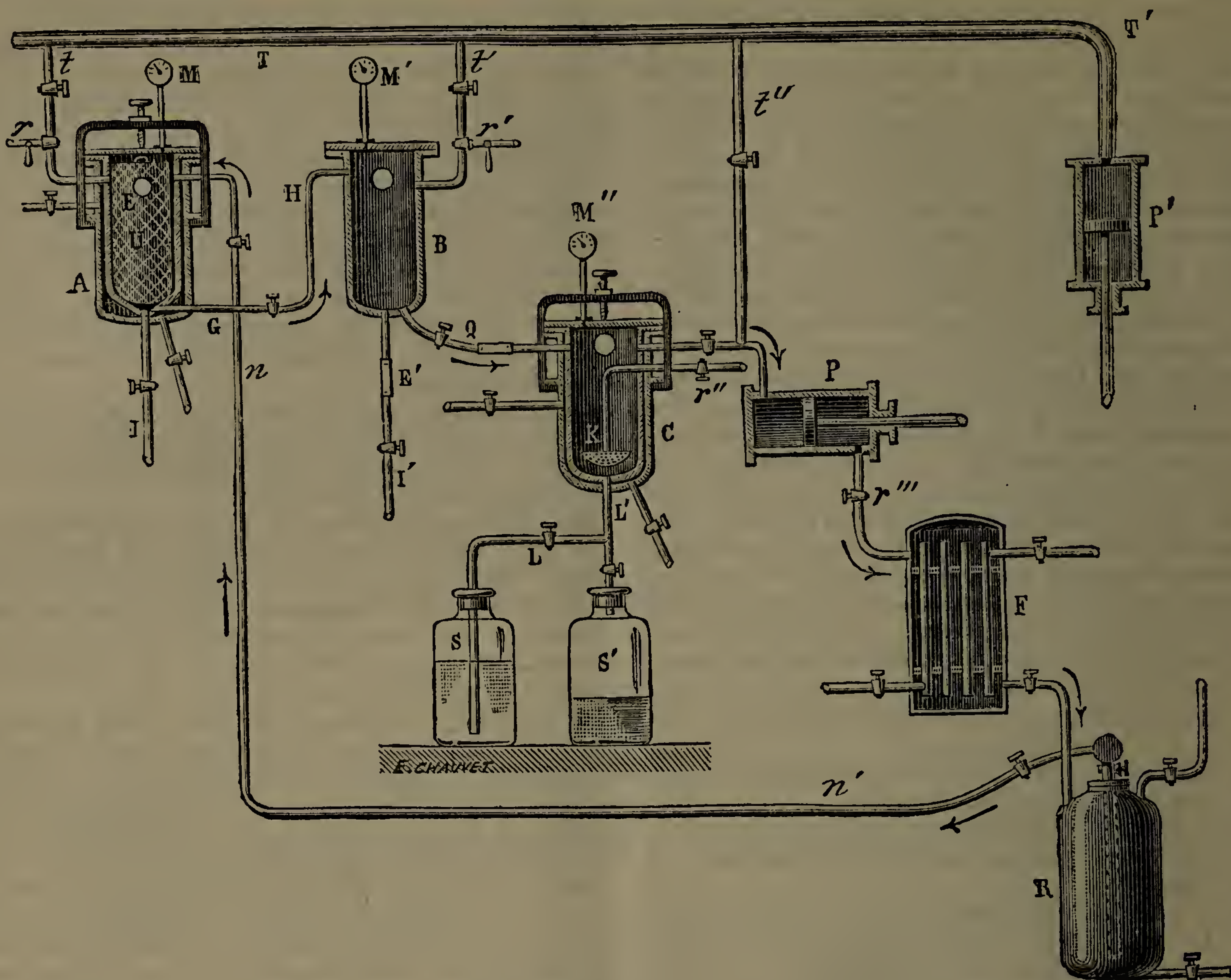
The official reports of the Exhibitions of 1862 and 1867 show that the question of solvents had not yet been solved. The reporter at the Exhibition of 1878 mentioned as the only improvement worthy of notice the substitution of steam for the naked flame in the heating of vessels; no mention was made of the industrial employment of volatile solvents.

It is only just, however, to notice the persevering efforts of Piver to replace the ordinary process of enfleurage by what he called the pneumatic method. Piver also proposed in 1862 the washing of the perfumes extracted with carbon bisulphide with an alkaline solution, an idea that had already been patented by Deiss.

This rapid *résumé* will show that the use of volatile solvents had not been rendered practical, because: (1) owing to the work being done in open vessels there was a great danger of fire and serious accidents; (2) the loss of the solvent was not less than 10 per cent. each treatment; (3) for the purpose of entirely getting rid of the solvent it was necessary to raise the temperature considerably and in doing this the perfume was sensibly altered. Therefore, notwithstanding the incontestible truth of the principle discovered by Robiquet, this method has been practically abandoned.

The author of the present paper, M. Naudin, has been occupied with the study of this question for four years, and has contrived an apparatus by which he seeks to avoid the causes of failure before mentioned. This apparatus, based on the distillation of volatile solvents in closed vessels in a vacuum and at a very low temperature, is composed of the following six elementary parts:—(1) A digester (A) in which the perfume is extracted by contact of the volatile liquid with the odorous substance. Instead of a single digester, a series of vessels can be used, communicating with each other in such a manner as to allow of a systematic exhaustion being carried on. (2) A decanting vessel (B) in which the perfumed solution is purified by decantation from the aqueous portion of fresh flowers, removed mechanically during the digestion. (3) An evaporating vessel (C) in which the volatile solvent is distilled off, leaving the perfume as a residue. (4) A suction and forcing-pump (P) for the purpose of hastening both the distillation of the volatile solvent by the aspiration of its vapours, and the condensation and liquefaction of the vapour, by compression in the refrigerator (F), and to collect, at the end of the operation, the traces of the solvent remaining in the different parts of the apparatus and drive them into the refrigerator (F). (5) A cylindrical refrigerator (F) in which the volatile liquid is condensed. This condenser is kept cool by one of the known methods, such as ammonia, sulphuric acid, etc. (6) A receiver (R) in which to store up the solvent employed.

The three vessels A, B, C, and the refrigerator can be hermetically closed by means of joints. The tube T, T′, which is in connection with the whole apparatus, distributes the vacuum caused by the pneumatic pump (P). This tube communicates with the vessels A, B, C, by the



tubes t, t', t'', supplied with taps. Air is readmitted at pleasure by r, r', $r''r'''$, or by means of compressed air, consisting of air removed from the apparatus and forced into a special receiver. The manometers M, M′ M″ indicate at any moment the state of the vacuum in each vessel. The level of the liquid solvent is shown by means of a glass window in each vessel (see E in A). The vessels A and C have each a double lining so as to allow the introduction of air or hot or cold water.

The flowers, leaves, etc., are introduced into the digester (A), and confined in a basket (U). The vessel is closed and a vacuum, obtained by opening the tap (t), causes a suitable quantity of the solvent to ascend from the receiver (R), by the tube n, n'. The materials having been left to digest for about fifteen minutes, the solvent liquid charged with the perfume is passed from A into B, in which a vacuum has been previously made, by connecting A and B by means of the tube G, H, which proceeds from the base of A. The water contained in the flowers is carried over mechanically by the solvent, and accumulates at the bottom of the vessel B, whence it is got rid of by the tube I. A glass window (E) allows the distinct separation of the two liquid layers. Communication being established between the evaporator (C) and the refrigerator (F), a vacuum is established by means of the tube t''; the solvent, charged with perfume and free from water, is then allowed to run from the vessel (B) into the evaporator (C). Communication between B and C is then closed, and the refrigerator (F) cooled energetically, after which the pump (P) is set to work. The vapours of the solvent are drawn from C, and then forced into and rapidly condensed in F. During the distillation, the evaporator (C) is kept at the temperature of the surrounding atmosphere; this is effected by passing a current of water between the double lining, which restores the latent heat borrowed by the volatile solvent upon its conversion into vapour.

When a very energetic source of cold is at disposal, the employment of the pump as a means of liquefaction may be dispensed with. In this case the vapour passes directly from C to F. After complete evaporation a white or coloured residue is found on the sides of the evaporator C, which may be a solid, liquid, oily, or semifluid substance, eventually becoming solid.

When the distillation is finished, the distilled liquid condensed in F is allowed to run into the receiver R. If a sufficiently low temperature has been maintained during the distillation this liquid will not be sensibly tainted with any odour, and may be used in the manufacture of different perfumes. The perfume mixed with the wax of the flowers and leaves, dissolved also by the ether, requires to be separated. For this purpose, a given quantity of alcohol contained in the vessel S is drawn up through the tube L by means of a vacuum into C, and is left there to digest some time. Solution is favoured by the readmittance of air through K, which agitates the mass violently; the liquid is then drawn off into the vessel S, which is kept at a temperature of $-10°$ in order to precipitate the wax, whilst the perfume remains dissolved in the alcohol, and the whole is filtered at the same low temperature. The perfume thus prepared consists of an alcoholic solution.

In the manufacture of perfumed oils or fats, this manipulation with alcohol is not necessary; the perfume, mixed with its natural wax, is dissolved in the oil or lard, which are the vehicles generally employed.

The exhausted flowers in the digester A mechanically retain some of the solvent. To recover this the mass is heated by the introduction of steam into the outer jacket, and the solvent is condensed in a special refrigerator. The employment of a vacuum allows the whole of the solvent to be recovered.

It will be seen from the foregoing description that the movement of the solvent liquids from one vessel to another is effected simply by differences of pressure, and that the volatile liquid circulates in closed vessels in a vacuum, without ever coming into contact with the outer atmosphere while passing from liquid into the gaseous state, or *vice versâ*. The other advantages presented by this apparatus are that there is no danger of fire; the perfume is completely and quickly extracted, however instable it may be; solution is effected in a few hours in an appropriate menstruum (alcohol, oil, grease or glycerine); pure perfumes, containing all the aroma, are obtained, owing to the low temperature maintained during the extraction; the perfumes are condensed in an exceedingly small volume, and in a form which allows them to be kept for an indefinite period; the greater value of the yield from all the perfumes than in the old method; and the use of extremely volatile liquids, amongst which the following have been tried:—

	Boiling point.
Hydride of butyl	0°
Hydride of amyl	30°
Chloride of ethyl	9°
Chloride of methyl	–23°
Light petroleum spirit.	

The choice of a solvent for a particular perfume is not without importance, the delicacy and sweetness of a perfume depending upon the nature and purity of the solvent. This method yields extremely delicate results, and in operating with care the slightest variation in nature may be reproduced with extraordinary fidelity.

Commaille reports that the separation of the odour of the milk of the cow has enabled Millon as well as himself, to recognize certain plants eaten by these animals, the *Smyrnium Olusatrum* amongst others. M. Naudin has made a series of experiments which show what accuracy can be obtained in this direction. By using a mixture of hydride of butyl and amyl as a solvent he has been able to distinguish clearly and isolate the perfume of roasted coffee from different sources. He obtained a similar result with the fine shades of quality in tea. He also gives instances of isolating and fixing different special odours, as toasted bread, the human skin, raw or cooked food, earths, etc.

The time of collection of the flower is very important. Each flower must be gathered at an appropriate time of the day, and in a certain degree of bloom which experience alone can recognize. Thus the pink only yields its perfume when collected two or three hours after being exposed to sunlight. On the contrary, roses must be gathered in the morning as soon as they are well open. The flower of the jasmine ought to be picked a few minutes after the first exposure to sunlight. The false acacia always gives a fragrant perfume, but differing according as the flower is gathered in the morning, in the evening, or even in the middle of the day.

In distillation, as Millon has already remarked, all the modifications of the flower are mixed in one and the same essence, which does not resemble any of them exactly; but probably the mixture corrects, up to a certain point, the defective parts of the collection. In the new mode of extraction, the slightest alteration, the least variation in the state or quality of the flowers, is revealed in a perfume; to obtain, therefore, a perfume possessing all the freshness and fragrancy of the flowers it is necessary that the flowers used be fresh and fragrant.

The perfumes obtained by the solvent method, instead of dissipating like ordinary essences, are marked by a great permanence. In fact, perfumes become altered by contact with other principles of the plant, which involve them in their own decomposition; but when once isolated from the destructible organs of the plant, the perfumes escape their influence, and obey their own laws of transformation or decomposition.

Millon states that he has kept isolated perfumes for several years in open capsules or tubes, without finding any sensible loss. M. Naudin also has experimented on perfumes that have been in his possession four years. The experiments were at first limited to flowers gathered under the climate of Paris, such as the pink, narcissus, violet, rose, lilac, hyacinth, the lily of the valley, etc.; but have since been extended to the flowers of Cannes, such as the orange, rose, jasmin, false acacia and tuberose. All the perfumes obtained from these flowers have remained unaltered even in contact with air.

As already stated, the perfume, although it remains unaltered in the presence of the oxygen of the air, becomes involved in the general decomposition if left in the presence of the decaying organism of the flower from which it was derived. Now the decomposition of certain flowers when plucked from the plant is extremely rapid; it is therefore obvious that when the apparatus for extraction is at a distance from the place of collection, the perfume obtained does not exactly resemble that of the flower, even when extracted by the solvent method. Thus, it is known that the essence of neroli manufactured at Cannes, the centre of floral cultivation in the Alpes-Maritimes, is superior to that made at Grasse, about ten miles distant. The reason is that some time is necessarily lost between the moment of gathering and the time of manipulation; besides this, there is the transport of flowers in the hottest days of summer, the effect of which is manifest in the diminution of the yield.

The above inconvenience can be met by keeping the fresh flowers in a special vessel, void of air and full of vapour of the solvent, as of ether. The presence of the latter body and the absence of oxygen prevent fermentation, especially if the temperature be kept sufficiently low. The perfume of the orange has thus been kept in its intensity with the flower itself for a month. A manufacturer could thus preserve his materials from fermentation upon the days when the great abundance of flowers—sometimes 20,000 to 30,000 kilograms—would render his digesters of insufficient size to treat the whole at the same time.

The chemical nature of perfumes has been studied by Millon. He recognizes two classes, the essential oils and the perfumes, properly so called. His experiments led him to the conclusion that the extremely small quantity of these bodies contained in the flowers renders their chemical study difficult, if not impossible. In a great number of cases only a milligram of pure product can be obtained from a kilogram. He is of opinion that the perfume of flowers is a fixed or rarely volatile principle, remaining unchanged in air and contained in the flower in only imponderable traces. It is decomposable by heat when the temperature is raised above the ordinary limits of the atmosphere, but is nearly always volatile without apparent decomposition in alcohol, ether, oily bodies and a great number of liquids such as carbon bisulphide, chloroform, benzine, etc. The perfume is nearly indefinitely diffusible in air, that is to say, it vaporizes and denotes its presence there by a fragrant odour, but does not suffer a sensible loss of weight. It is equally diffusible in water, to which a beautiful aroma can be imparted by the addition of a few drops of an alcoholic solution of perfume.

As already mentioned, Millon makes a distinction between essential oils and perfumes. M. Naudin thinks this may be correct as long as the term essential oil is confined to those of which the odour forms an integral part of the properties of the body, such as the oil of wintergreen or salicylate of methyl. Most of the oils with well-defined chemical functions (alcohol, phenol, ether, etc.), may be entered in this class, but the oils of the genus Citrus and of the labiates cannot be included in the broad definition which Millon gives. He also believes that in many cases the isomeric hydrocarbons of the group C_nH_{2n-4} are probably only the substratum of the perfume. A very simple experiment tends to prove this. If the oils of lemon, bergamot, orange, lime (*C. Limetta*) and cedrat (*C. medica*) be boiled for a short time with a slight trace of caustic soda, the odour peculiar to each oil will be replaced by a common odour similar to that of terpene $C_{10}H_{16}$. Indeed the energetic action of caustic alkalies is not necessary to destroy these odours, since light alone, aided by time, has enough influence over these oils to change their special odour into that of oil of turpentine. Oil of angelica, obtained from an umbelliferous plant, gives a $C_{10}H_{16}$ carbide, terebangeline, with an odour of hops, and possessing the same organoleptic character.

Further than this, these general considerations on perfume can be applied to the special odour of fatty oils. No attempt has yet been made to isolate the perfume dissolved in the glycerides, but no doubt it would reveal the same fact, the solution of a very minute quantity of a very odorous and strongly-flavoured body in an inodorous or nearly inodorous vehicle.

Perfumes have not yet been chemically classified; their organoleptic character alone has served to distinguish them, through want of a more intimate knowledge of them. The question therefore remains very obscure; but M. Naudin is sanguine that this new mode of extraction, by putting uncontaminated substances within the reach of chemists will allow of deeper research into their nature. In any case he believes that therapeutics will find, in pure perfumes, a new field of research and will perhaps discover the means of applying them as medicaments.

NOTE ON THE MANUFACTURE OF PHOSPHORIC ACID AS RECOMMENDED BY PROFESSOR W. T. WENZELL.*

BY PROFESSOR E. W. RUNYON.

At the last meeting of the American Pharmaceutical Association, Professor Wenzell presented a paper† containing the observations and experiments he had made in the preparing of phosphoric acid by aerial oxidation. From the published reports of that meeting, it seems that but little discussion took place on the subject. It was spoken of as a very old process, and one not likely to be of practical importance. The writer having made several thousand pounds of phosphoric acid, direct from phosphorus, and having for six or seven years followed the valuable suggestions of Professor Markoe in his paper to the American Pharmaceutical Association, in 1875, was very much interested in the paper of Professor Wenzell on this subject. At his request, some weeks ago, I entered upon a series of experiments, to determine the practicability of the process for the manufacture of phosphoric acid in large quantities.

For this purpose I made use of a square, stoneware crystallizing pan, such as are made by R. C. Remmey and Co., Philadelphia, which holds five gallons. For the bottom of this I had made a vulcanite diaphragm resting on supports of the same material; the slats of this tray were 1 inch wide and placed about an eighth of an inch apart. The sticks of phosphorus rest in the divisions so as to prevent their rolling against each other, should the apparatus be jarred. A porous cover was made of plaster of paris, and ½ or 2 inches thick, and sufficiently large to extend about 1 inch over the four sides of the crystallizing pan. This plaster cast was quite thick and heavy, necessarily so, on account of the large size of the pan —17 × 21 inches. It required several days for the plaster cover to dry with the temperature of the drying closet at 130° F. The cover was then levelled off by passing it over medium coarse sandpaper, tacked on a table. The top edges of the stoneware pan were perfectly levelled, by means of a sheet iron plate, and fine emery, with a little water. It is necessary for the cover to fit perfectly and evenly on all sides of the pan, and for this reason, both cover and pan should be ground.

By means of an auger or bit, an inch hole is bored in the plaster cover, and a cork inserted, through which a thermometer is passed, to record the temperature during the process of oxidation. The apparatus is now complete.

The vulcanite shelf was placed in the bottom of the pan, and distilled water was poured into the pan, until the shelf or diaphragm was barely immersed. The one-eighth inch spaces between the slats of the shelf were then covered with sticks of phosphorus, and the surface of the water brought up to about half the diameter of the sticks of phosphorus. If it be found that there is too much water after the shelf has been covered, it can easily be siphoned off with rubber tubing. The cover of plaster of paris is now placed on, and the apparatus is to be undisturbed for two or three days. At the expiration of that time the cover can be removed for a few moments, without danger of the phosphorus taking fire, and it will be noticed, as Professor Wenzell states, that the acid water has increased in bulk. By means of glass and rubber tubes, sufficient of the acid is drawn off to again partially expose the oxidized sticks.

The cover was replaced and the operation was allowed to continue for three or four more days, when a second portion was drawn off for the last time.

The time for the complete oxidation was about thirteen days, and the time and attention it required during that period did not exceed as many minutes.

The most important and practical feature in the making of phosphoric acid by this process over all the other processes which I have used, is the ready removal of the arsenic with which commercial phosphorus is universally contaminated. Professor Markoe, and others, who have made large quantities of phosphoric acid, give no other way of removing arsenic from phosphoric acid than by passing sulphuretted hydrogen gas through the diluted acid ; and my experience has been, that it is exceedingly troublesome to thoroughly remove it in this way ; the small percentage present (one-sixth to one-quarter of 1 per cent.) seems hardly worth so much trouble. Even after standing a week or more, traces of arsenic sulphide will be precipitated along with some sulphur. Wittstein, in his valuable little book, says: "If, after saturating with the gas, and allowing the solution to stand some days, a yellow deposit is formed, it must be filtered. The acid cannot yet be considered pure, but must again be treated with sulphuretted hydrogen, and is only to be looked on as pure when this treatment no longer causes a precipitate of sulphuret of arsenic. To arrive at this point I found it necessary to treat the phosphoric acid four times with sulphuretted hydrogen."

Our Pharmacopœia calls for a preparation free from any trace of arsenic. Now, by Professor Wenzell's process, all the arsenic is separated (owing to the presence of phosphorous acid) by simply heating the acid solution as it comes from the aerial oxidation pan to a given temperature for a short time. Professor Wenzell states that at a temperature of 160° C., the separation of the arsenic as a brownish-black substance is complete. In the manufacture of several hundred pounds by this process, I have not found this to be the case; true, at 160° C. the liquid was of a dirty black colour, of garlicky odour, owing to the reduction of the arsenic to the metallic state; but when diluted and filtered, it still showed traces of arsenic with hydrogen sulphide.

I find it necessary to heat the acid to 190° C. and 200° C., or to the temperature at which hydrogen phosphide commences to be given off with slight explosions, and keep it a little below this (190° C.) for thirty minutes or more. When at this degree of concentration and temperature, an exceedingly penetrating, disagreeable garlic odour is given off, and the operation should be conducted in a fume chamber.

The acid solution now has a specific gravity of 1·75, equal to about 89 per cent. H_3PO_4. It is diluted with an equal bulk of distilled water, filtered through double, white filtering paper, and then oxidized with nitric acid. The acid solution has a strong, disagreeable odour of hydrogen phosphide, which is entirely removed during the oxidation of the phosphorous acid.

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* From the 'Proceedings of the California Pharmaceutical Society and College of Pharmacy,' 1883, p. 30.

† See before, p. 24.

Finally, the only deviation the writer has made in the manipulation given by Professor Wenzell is that of carrying the temperature to 190° to 200° C., or until hydrogen phosphide begins to be given off. One of the concomitants of that temperature is the decomposition of a portion of the phosphorous acid into phosphoric acid and hydrogen phosphide. There are other interesting features relating to this process, both in respect to time, economy, and material, in which it has given better satisfaction than some other processes employed by the writer, and to which he may refer at some future time. In oxidizing with nitric acid, care should be taken to have a sufficiently large dish, and not to have the temperature of the phosphoric acid solution above 125° C. on the addition of the first portions of the nitric acid, else a portion of the acid will be lost by the sudden disengagement of the nitric oxide. The reaction commences at 118° to 120° C. and the temperature gradually rises to 140° C. The operation of oxidizing with nitric acid was reversed by pouring the phosphoric acid solution into the heated nitric acid, but without success.

CHEMISTRY THE NYMPHÆÆ.*

BY W. GRÜNING.

Amongst popular remedies in Germany, *Nymphæa alba* and *Nuphar luteum* have long occupied a prominent place, but were omitted from the officinal list of medicinal plants in the beginning of the present century; they have since attracted the attention of chemists on account of their tannin, as a probable substitute for other tanning materials.

Morin, in 1821, published an examination of the rhizome of *N. alba*, and Dragendorff, in 1879, described an alkaloid obtained from it. He promised further researches; but did not carry them out. The author undertook their examination at his request, and made both qualitative and quantitative estimations of the constituents of different portions of the two species, *N. alba* and *Nuphar luteum.*

Moisture and Ash.—Seeds and stalks dried at 110°, and the residue ignited; *N. luteum* showed a richness in alkali which, calculated from sulphates, equals Na_2O, 4·63 per cent., and K_2O, 32·15 per cent.

Fat and Resin.—The former, obtained by treating the pulverized substance with light petroleum, was greenish in colour and thick, easily saponified with soda. The seeds of *N. luteum* yielded a fat, congealing at the ordinary temperature, melting on the hand, and transparent when cold; the resin is the residue of the fat operation treated with ether; in the case of nuphar an intermediate washing with water is given to remove the tannin.

Matter soluble in ether should theoretically equal the sum of those soluble in light petroleum and in ether, but in fact there is a difference.

Soluble in Alcohol.—After extraction with absolute alcohol, evaporation, drying, and weighing, the residue was treated with water, a part of the solution again evaporated, the remainder of the aqueous solution was employed for estimation of tannin by Sackur's process—precipitation by copper acetate.

Soluble in Water.—20 grams macerated for one or two days at ordinary temperatures in 400 c.c. water, a part evaporated, dried and weighed, and a part precipitated with alcohol, the precipitate dried and ignited—the nitrogen in both estimated by soda-lime; part treated with lead acetate for tannin, and freed from lead with sulphuretted hydrogen; the remainder was employed to estimate glucose and saccharose. An examination for vegetable acids other than tannin showed the presence of citric, oxalic, and malic acids. Tests for salicylic, tartaric, benzoic, succinic, and fumaric acids yielded negative results.

Soluble in Soda Solution.—Part of the residue from the previous operations was treated with an aqueous solution of 1 per 1000 of soda, filtered, the filtrate neutralized with acetic acid and decomposed with alcohol; the precipitate after deduction of ash was called metarabic acid.

Starch.—The residue from the soda treatment, boiled with water, a small quantity of diastase added, left to digest four hours at a temperature of 40°, filtered, 4 per cent. hydrochloric acid added and boiled in connection with an upright condenser for three hours: the resulting sugar, estimated by Fehling's solution, was calculated to starch.

Pararabin.—The residue, after removal of starch, was digested for a day with 1 per cent. solution of hydrochloric acid, quickly boiled and filtered, the filtrate treated with alcohol, and the precipitate (ash deducted) reckoned as pararabin.

Wood gum of Thomon was sought, but not found.

Cellulose.—After the various processes described, the portions of the plants were treated with freshly prepared chlorine water, and successively with clean water, dilute soda solution, and again fresh water; the loss of dry matter between two weighings, less albuminous matter, was reckoned as lignin and similar substance.

The following table shows the results of the analysis:—

	Nuphar.		Nymphæa.		
	Rhizoma.	Seeds.	Rhizoma.	Roots.	Seeds.
Moisture	10·30	11·31	10·56	6·71	9·06
Ash	5·19	0·89	5·47	10·07	2·12
Fat	0·77	0·51	0 49	0·59	1·06
Resin soluble in ether	0·60	2·11	1·55	1·38	0·21
Resin insoluble and phlobaphene	1·54	1·97	2·52	0·30	0·42
Mucous matter with traces of albumin	1·31	0·26	3·62	6·94	1·47
Tannin	2·27	0·72	10·04	8 73	1·10
Matter not precipitated by copper acetate	0·54	—	0·03	1·00	0·86
Glucose	5·93	—	6·25	5·62	0·94
Saccharose	1·21	—	—	—	—
Substances soluble in water indirectly estimated	4·40	1·38	1·92	3·60	1·18
Metarabin, etc.	2·50	0 86	3·26	6·11	0·46
Soluble in dilute soda solution not precipitated by alcohol	8·36	0·59	5·80	3·60	1·51
Starch	18·70	44·00	20·18	4·09	47·09
Pararabin	3·81	—	1·80	1·20	—
Albumin	3·99	7·08	4·06	7·21	9·79
Lignin, etc.	14·82	6·45	14·26	8·99	4·78
Intercellular substance	—	3·22	—	2·47	0·98
Cellulose	14·11	13·21	9·36	17·42	11·66

Alkaloids,—The author succeeded in separating an alkaloid from *N. luteum*, and also from *N. alba.* Dragendorff had already isolated it in the case of the latter. The chemical and physical properties appear to be identical as well as their behaviour towards group reagents, but in their colour reactions there is a decided difference; *Nupharine*, as the alkaloid of *N. luteum* is named by the author, is a whitish, brittle mass, which on being rubbed sticks to the fingers. It solidifies at 40° to 45°; at 65° it is of a syrupy consistence; it is easily soluble in alcohol, chloroform, ether, amyl alcohol, acetone, and in dilute acids, but almost insoluble in light petroleum; the acid solution has a peculiar and characteristic smell, and is acted on by most of the group reagents for alkaloids, potassium chromate, picric acid, iodide of potassium. etc. With trouble the author discovered colour reactions which distinguish it from all other alkaloids. A small quantity when dissolved in dilute sulphuric acid and warmed on a steam-bath, assumes a brown colour, which gradually passes into a dark black-green; the addition of a very few drops of water causes the colour to disappear, with precipitation of a voluminous yellow-brown substance. The acid solution when placed over sulphuric acid and lime, after ten or twelve days, becomes a magnificent green, increasing in intensity for

* From *Arch. Pharm.*, [3], xx., 582–605, and 736–761. Reprinted from the *Journal of the Chemical Society.*

about another ten days, until it becomes a dark blue-green; a few drops of water causes the colour to disappear immediately with separation of a yellow crystalline precipitate, which when removed from the filtrate, liquefies in air, or over sulphuric acid, with return of the green colour. This experiment can be repeated frequently with the same sample.

The alkaloid is tasteless, but its acid solution is intensely bitter; it has not yet been obtained crystalline.

The formula given to the alkaloid is $N_2C_{18}H_{24}O_2$. The formula requires an equivalent of 300; by experiment it was found 285·5; the differences are attributed to impurities in the sample.

The same formula has been given by Pelletier and Couerbe to menispermine and paramenispermine; the three alkaloids are probably isomeric. With Wild's polariscope nupharine is optically inactive. Its physiological effects were tried on cats, with no toxic effect.

The alkaloid of *Nymphæa alba* does not give the green reaction with dilute sulphuric acid, but on the contrary, it gives the following, which are not given by nupharine. Concentrated sulphuric acid and potassium chromate colour its solution first red-brown, after some hours clear green. Concentrated sulphuric acid alone produces a red-brown, which passes into grey. Frohde's reagent colours first red, then dirty green. The alkaloids are not present in the seeds of *N. luteum* nor in the blossoms or seeds of *N. alba.*

In the second paper the author continues the examination of the two plants of the family, *N. alba* and *Nuphar lutea.* As far as examination of two members of it allows him to come to a conclusion, he thinks that the tannin contained in them is their most important constituent from a chemical point of view; after that the alkaloids and then the starch. The tannins of the two species differ slightly in their properties, but are closely related in their reactions. They both differ from tannin derived from other sources in yielding characteristic secondary products. The insoluble tannin found in them is very characteristic, but a somewhat similar substance was found by Löwe in oak-bark, and as methods of examination are now in use which were not then employed, it is probable that the substance has often escaped detection, and will be more frequently found in future.

The insoluble tannin of oak-bark is the anhydride of the soluble acid; the insoluble acid of Nymphæa appears to be a hydrate of its phlobaphene, and the author thinks it more than probable that the phlobaphene is an intermediate product between the soluble and insoluble tannin.

The tannins of Nymphæa are also notable for yielding many secondary products, which have individually been found in other tannins, but their presence together has not been hitherto noted. Ellagic and gallic acids are easily obtained; another substance, which rapidly absorbs oxygen from the air and passes into a body of the nature of phlobaphene, and a second substance, which by similar absorption of oxygen passes into two bodies, or assumes two phases with properties similar to chlorophyll. Sugar was looked for in consequence of Strecker and others having asserted it to be one of the derived products of tannin from gall-nuts and oak-bark, but it was not found.

The author's experiments lead him to believe that the molecule of the tannin obtained from Nymphæa is of a very complex nature.

GERMS AND EPIDEMICS.

BY JOHN S. BILLINGS.

(*Continued from page* 32.)

You will notice that Pasteur's method of diminishing the virulence of various germs depends largely upon exposing them to the influence of oxygen.

Recently MM. Nocard and Mollereau have reported that this same attenuation can be produced by mixing the virus with oxygenated water, but much more rapidly than by the method of successive cultures (*Bull. Acad. de Med.*, 1883, 2 sec. v., xii., p. 3).

It cannot be said that Pasteur's claim to have established the general rule that inoculation with artificially modified virus will afford protection against the disease is yet to be considered valid. His methods and conclusions have been sharply criticized by Koch, who is certainly a competent judge, and for the present we must suspend judgment. It will probably at once occur to you that vaccine may be in like manner an attenuated virus of small-pox, in fact, Pasteur calls his method vaccination, and it is claimed by some experimenters that true vaccine vesicles have been produced on cows by successive inoculations of virus derived from small-pox. The question is one of much practical importance, but other skilled experimenters have not obtained the same results, and at present the connection is a doubtful one. It has recently been authoritatively announced that Professors Schutz and Loefler, of the Imperial German Board of Health, have discovered the pathogenic organism of glanders, have succeeded in cultivating it to the production of spores, and with the results of these cultures have produced the disease in sound horses, which is the scientific demonstration that the cause is really the organism in question.

Of the specific contagious diseases of man in which micro-organisms have been found, one of the best marked is the so-called relapsing fever, a disease which has been known in Ireland for over a hundred years, being known there by the terribly significant name of the famine fever; and which within the last century has several times spread widely in epidemic form over Europe and this country. In the blood of persons affected by this disease there are found micro-organisms consisting of extremely delicate threads, varying in length from two to six times the breadth of a blood corpuscle, twisted into a spiral or cork-screw shape, and moving about actively. They are found only during the paroxysms of the fever, and disappear during the intervals. When a little blood containing these spirilla is kept at the ordinary temperature of a room, the organisms will live for several days, but if this blood be kept at the temperature of the human body, say 98° F., they will die in about eighteen hours, while if the temperature be raised to fever heat, 104° F., they will survive only about eight hours. Inoculation with blood containing these spirilla causes relapsing fever in a healthy person, but as yet attempts to cultivate the microphyte outside the living body have not been successful, and spore development has not been observed. In form, size and appearance this spirillum is almost identical with a common microphyte found in foul water, and which also has been found in the mouth of a healthy person, but as yet no connection has been traced.

Among the most interesting and practically valuable advances in our knowledge of the relations of micro-organisms to disease in man, are those which relate to the causation of the various disturbances which occur after wounds and injuries, and which are known as septicæmia, pyæmia, erysipelas, wound fever and puerperal fever; all of which, it now seems probable, are due to the action of the microphytes which are concerned in ordinary putrefaction, and which are to be found almost everywhere. They do not exist in the blood and tissues of healthy men, but are present in enormous quantities on the skin and in the mouth and alimentary canal. The precise method in which they cause disease probably varies somewhat in different cases. Sometimes they act mechanically by collecting in heaps and plugging the smaller vessels, but in most cases they do not multiply in the blood so much as in certain limited localities among the tissues to which they gain entrance through wounds, and it is supposed that the inflammation, suppuration and fever which they produce is due not so much to their mere mechanical presence as to a poison which they produce from the fluids which nourish them, somewhat as the yeast plant produces alcohol.

Dr. Ogston, Surgeon to the Aberdeen Royal Infirmary, who has for some time been specially studying this subject, thinks that this poison is one of the ptomaines, a peculiar group of alkaloids which are gradually produced in dead bodies by the process of putrefaction. Attention was first called to these compounds in the examination of dead bodies in cases of suspected poisoning when it was found that the application of chemical tests produced results similar to those which might have been expected if the person had been killed by a vegetable poison; in fact, in one case in Italy, the chemists concluded that a man had been poisoned with delphinium, which they supposed they had found in the body, when in fact it was a ptomaine formed in the body after death. Several years ago it was discovered that a decomposing organic fluid, which produced rapidly fatal septicæmia, when injected into the blood vessels of an animal, might be so filtered by passing it through unglazed porcelain, that all the micro-organisms were removed, and that from the structureless liquid thus prepared there could be obtained by evaporation and extraction with alcohol, a substance capable of producing septicæmia and death. This substance was named sepsin, and the ptomaines appear to be much the same thing. In fact, the accounts of the latter in the reports of the French Academy remind one a little of that worthy and learned professor who discovered that the poems of Homer were not written by Homer but by another man of the same name. These poisons are not themselves capable of growth or reproduction, and it is not certain that they are produced only by microphytes; on the contrary, M. Gautier maintains that he has found them to be common products of the decomposition of our tissues which is a necessary part of life, and that they are found in normal human saliva. If this were true the saliva of a healthy child might be simply one end of scales of virulence of which the others are formed by the slaver of the mad dog or the venom of the cobra. This is, however, not probable, for although human saliva, as contained in many mouths, is very deadly to certain animals, it has been shown that this is due to certain micro-organisms which multiply rapidly in the blood of rabbits and produce death like the germ of chicken cholera, and the virulence of which can be attenuated in the same manner.

The knowledge that the gravest dangers after wounds and surgical operations are due to micro-organisms, which are probably identical with the ordinary bacteria of putrefaction, has led to the careful use of means to destroy the vitality and power for harm of all such organisms which may gain access to wounds. This constitutes what is called antiseptic surgery, and the surgeon now undertakes without hesitation operations which twenty years ago would have been deemed quite unjustifiable, for he knows that by ensuring that neither through the air nor the water, or by the sponges or instruments or fingers, or crevices under the finger nails, there shall be conveyed to the wound one single germ which has not had its powers of growth and reproduction totally destroyed, he need have no fear of blood poisoning. In some of the great hospitals of St. Petersburg, overcrowded and unventilated, where you catch the peculiar hospital odour while you are yet in the street, and in which I was told that twenty years ago an amputation of a finger was considered to be a very serious operation, so certain was it to be followed by erysipelas and suppuration, they now perform the most extensive operations antiseptically with excellent results. Not that the bad condition of the hospital does not produce ill effects, but that these effects are of a very different kind from those which used to appear.

About the end of March, 1882, a new form of fever appeared in Aberdeen, Scotland. A characteristic symptom was a swelling of the glands about the angle of the jaw. In a day or two the fever subsided leaving the patient very weak. Usually there was a relapse two days after, and sometimes there were as many as six of these. There were about three hundred cases and three proved fatal. It was found that all of them had been using milk from a certain dairy, and that the milk from this dairy contained spores, which, when cultivated, produced bacilli. Rats inoculated with these soon died and their tissues were found to be filled with bacilli. Matter taken from one of the sick was found to contain these bacilli, and rats inoculated with this matter died in the same way as the rats infected by the milk. Further investigation showed that the organisms had been added to the milk with water. The observations were made by competent physicians and microscopists and the chain of evidence seems fairly complete. In a communication presented to the Academy of Medicine, December 12, 1882, M. Pasteur states that he has proved that the upper part of the spinal cord of a man or animal dying of hydrophobia is always virulent, and that he has preserved specimens for three weeks which retained their virulence. He also claims to have three or four dogs which having once been inoculated with hydrophobia, and recovered, are no longer susceptible. Unfortunately the great majority of dogs die in the process of rendering them insusceptible. He does not, however, state that he has discovered any micro-organisms peculiar to this disease. With regard to malaria, the latest published researches of importance are those of Professor Ceri. His conclusions are, that it is produced by micro-organisms, the vital properties of which are destroyed by high temperatures and by quinine in the proportion of 1 to 800 of water. They lose their infectious qualities in the animal organism, but may regain them in the soil under favourable conditions. He considers that it is proved that malaria may be carried by human beings into places hitherto free from malaria, although it is not communicable from one man to another (*Philadelphia Medical Times*, Dec. 16, 1882, p. 194).

According to Lind, the first rains which fall in Guinea are considered the most unhealthy, and they have been known in forty-eight hours to make leather quite mouldy and rotten. Mungo Park observes that three minutes after the rain commenced many of the soldiers were affected with vomiting, and others fell asleep and seemed as if intoxicated.

With regard to diphtheria the evidence is not yet satisfactory, but it seems most probable that it is caused by a micro-organism, which occurs also very commonly in a harmless form and becomes virulent under conditions which are not yet understood. I will refer to but one other form of disease which it is claimed is due to vegetable germs, and that is tuberculosis, better known to you in its most common form—consumption. Dr. Koch has announced that this disease is due to minute motionless bacilli, which can be cultivated outside the human body, but require a high temperature and have a very slow growth. The bacilli are found in the sputa of consumptive patients, and such sputa will produce the disease in animals, nor do they lose their virulence by dying, at least for the period of eight weeks. This tenacity probably depends on the spores, which are formed in the body and not out of it, this being contrary to the habit of *Bacillus anthracis*. Koch produced the disease in animals by inoculation of his culture products; but in the animals chosen for his experiments tubercle is caused sometimes by inoculation of matters which are not tuberculous. This reminds one of an objection made several years ago in the French Academy of Medicine to a report of a somewhat similar series of inoculation experiments. Professor Gubler said they were not conclusive because they had been performed on rabbits, and "the rabbit is a melancholy animal to whom life is a burden and who only asks to leave it." The contagiousness of consumption has long been a disputed point, although the opinion has been growing among medical men that it is sometimes communicated, and statistics contribute a curious bit of evidence in this direction. It is found that of the widows of men dying of consumption the proportion dying of the same disease is larger than it is among widows of men dying of other diseases. Upon the whole, the connection of consumption with a bacillus is still doubtful, though not improbable, and the same may be said with regard to malaria; meaning by this much-abused word the specific cause of intermittent fever.

The bacillus of leprosy was discovered by Dr. Hansen, of Norway, in 1874, and has been confirmed by numerous investigations. Dr. White, of Boston, a most competent authority, remarks of this disease, that "its origin is older than history, and it does not appear to have changed for ages. It prevails over large portions of the earth's surface, and we have at present three centres of it in the United States—one in Louisiana, another in the North West, and a third on the Pacific coast, affecting three entirely distinct nationalities, in different climates and under quite diverse methods of life." He believes there is danger of its spread, and that it should be controlled by isolation and by the prohibition of the immigration of lepers. The danger is no doubt small—that is to say, there is a very small risk of a very great danger—but it exists, and now is the time to guard against it.

The word germ is used not only to designate independent organisms, which can grow outside the human body, but also particles of living matter which have formed a part of the living body itself, such as at present are believed to constitute the contagion of such diseases as small-pox, measles or scarlet fever, according to what is called the bioplast or graft theory. This use of the word germ is improper and confusing. This graft theory of disease is that a particle of animal matter growing, or capable of growth (bioplasm), may be transplanted and continue to grow; it will grow normally if it be normal, abnormally if abnormal, and so carry on in the new body the diseased process of which it has formed a part in the old. The results are supposed to be analogous to those observed in cases where from a stock below a graft, fruits and flowers of the kind borne by the scion have appeared, for instance, in the pear grafted on the mountain ash. This analogy did not escape Mr. Darwin, who says, "It is certain that where trees with variegated leaves are grafted or budded on a common stock, the latter sometimes produces buds having variegated leaves, but this may perhaps be looked at as a case of inoculated disease."

Because minute organisms are found in the blood and tissues in cases of disease, it does not by any means follow that they are the efficient causes of the disease. For example, last July, in Chicago, a boy was seized with tetanus as the result of a wound from the explosion of a toy pistol. Upon examination his blood was found to be swarming with sphæro bacteria. The blood of a horse affected with tetanus was then examined and found to contain similar organisms. Had they stopped there a very pretty theory of the germ origin of tetanus might have been constructed. But they proceeded to examine the blood of the mother and sister of the boy and found that it contained the same forms. Furthermore, after the boy had entirely recovered, his blood still was crowded with these bacteria. Whereupon it is suggested that this particular sphæro bacterium, at least, "should be recognized as an altogether pleasant and lovely schizomycete, dancing away its dizzy life in the vascular channels with a levity born of utter guilelessness. This is called the too-too theory. Nay more, it is claimed that this micrococcus should be regarded in the light of a benefactor. It carried the boy safely through an attack of tetanus and did not desert him when he was convalescent, it sustained his mother nursing with sore anxiety her only son, threw its protecting ægis over another child of the family, and enabled the mother at the same time to attend to the wants of her customers to whom she was in the habit of dispensing a superior quality of lager beer. How can we refuse assent to the proposition that this Chicago bacterium is a good thing to have in the family? In comparison with it, how worthless is the prescription of that obliging clergyman, whose sands of life have been running out—lo! these many years."

Some of the relations of meteorological conditions to disease, and especially to epidemics, depend, no doubt, upon the influence which these conditions exert either directly or indirectly upon the growth and development of the lower organisms. As an example of direct influence may be instanced the striking effects of cold upon yellow fever, a single sharp frosty night putting an abrupt end to an epidemic. As specimens of indirect influence we may consider the increase of typhus in cold weather due to over-crowding on the part of the poor for the sake of warmth, or the frequent outbreaks of typhoid fever after heavy falls of rain, due to the washing of the infectious particles of typhoid excreta into the sources of water supply. Temperature and light have a powerful influence on the growth of bacteria. Each peculiar organism requires a special temperature which often has very narrow limits. Koch states that the bacillus of tubercle will not propagate at temperatures below 86° F., and therefore it must gain access to the interior of a warm-blooded animal if it is to increase, unless, perhaps, in hot climates.

(*To be continued.*)

INULIN IN THE BRACTS OF THE ARTICHOKE.

The presence of a perceptible amount of inulin in the bracts of the artichoke (*Cynara Scolymus*) is recorded by Pistone and de Regibus in the *Journal of the Royal Turin Academy of Medicine*. The bracts were boiled in water until a dark-green sap could be expressed from them, which reduced with difficulty Fehling's solution. This was again boiled, and filtered off while hot. If slowly cooled, there was precipitated, after some time, a white flocculent substance, which, after repeated washing in boiling water and alcohol, proved to be nearly identical with Sachs's spherocrystals of inulin. It is not coloured by iodine, and turns the plane of rotation in the polariscope to the left, even in the presence of a dilute acid.

CHEMICAL COMPOSITION OF WOODY TISSUES.

In an inaugural dissertation before the University of Dorpat, N. Schuppe gives the following result of experiments as to the quantitative composition of different woody tissues.

Treatment with nitric acid and potassium chlorate confirms the accepted composition of cellulose, $C_6H_{10}O_5$, in the pine, poplar, mahogany, American and European nut, oak and alder. As regards the quantity of gum left after treatment with water, alcohol, and dilute soda lye, he finds none at all, or only a trace, in the wood of Coniferæ, 3·25 per cent. in the poplar, and 7·09 per cent. in the alder. For the wood of the European and American nuts he gets very nearly the composition of pure cellulose; for mahogany and oak $C_{14}H_{24}O_{11}$ $(=2C_6H_{10}O_5+C_2H_4O)$; for poplar and alder $C_8H_{14}O_6$ $(=C_6H_{10}O_5+C_2H_4O)$.

The woody fibre, after extraction of the gum, gave an average composition of C 45·4, H 5·9, O 48·7 per cent. The proportion of lignin to cellulose he found to be very nearly the same in different woods, and came to the conclusion that the strength or power of resistance of any particular kind of wood does not depend on the relative proportion of these substances, but on their varying molecular constitution.

For lignin Schuppe proposes the approximate formula $C_{19}H_{18}O_8$, nearly corresponding with that of catechin. Assuming the average proportion of lignin and cellulose in wood to be 17·6 per cent. of the former, and 40·7 per cent. of the latter, this gives an approximate formula for woody fibre of $5C_6H_{10}O_5+C_{19}H_{18}O_8$.

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CHEMICAL INDUSTRIES.

THE recent meeting of the Society of Chemical Industry in London, the principal part of the proceedings at which we chronicled last week, furnished an ample justification for the attempt initiated two years ago to carry out the happy thought that there should be established in Great Britain a Society which should afford facilities for the interchange of information between persons interested in the application of chemical principles to manufacturing operations. As the Society has, in this short time, been joined by nearly fourteen hundred members, it may be said to have established a *raison d'être*, and it may be safely predicted that as long as the original object is kept in view, and the sections are preserved from the devices of interested *exploiteurs*, it will not lack ample support. Such stability is indeed very desirable, for the time appears to be approaching fast when, if England is to hold her own amongst other nations, one or more skilled workers in chemistry, or some allied science, will become an indispensable portion of the staff in every large manufactory. In this respect, in fact, this country has much lee-way to make up. Two years ago, at the first meeting of the Society, Professor ROSCOE forcibly pointed out that although almost all the raw material used in the manufacture of the coal-tar colours was produced in this country, England had a very small share in the profit derived from working it up into the finished article, nearly the whole of the coal-tar colours used by her calico printers, dyers and others being imported. And, unfortunately, the same statement could be made with equal truth at the present time. This unsatisfactory state of things is not, however, due to any inferiority in the workmen of this country, as was remarked by a speaker at the dinner last week; but to the fact that whilst our continental neighbours have been keen to perceive the advantage of applying scientific principles in the carrying on of great industries, and have wisely provided facilities for the training of men capable of such work, we have gone on from year to year content to practise the same "rule of thumb" that guided our forefathers. Another instance may be found in the rude shock to England's supremacy in the alkali manufacture which she has lately received at the hands of the makers by the ammonia process on the Continent.

It is important to observe that one fact which is becoming increasingly manifest in the struggle between the great manufacturers of the world is that the greatest amount of success will lie with those who do most towards making "waste" an obsolete term. Take for instance, the subject already referred to, the products of the destructive distillation of coal. The tarry bye-products which a few years ago were got rid of by the gas manufacturers at a great expense now form a source of income to the extent of several millions sterling annually, whilst the future of the LEBLANC soda industry seems almost dependent upon certain modifications of the coking ovens, which, by intercepting the nitrogenous constituents of coal, shall set up a new object to be attained as the principal end in the distillation, and remit what is now known as coal gas to the position of a bye-product, available in the neighbourhood of the works as a source of heat and light at almost a nominal price. Then the past year has seen the application of SCHAFFNER and HELBIG'S process, with promise of success, in the recovery of sulphur from "alkali waste," and those members of the Society of Chemical Industry who availed themselves of the invitation to visit the South Metropolitan Gas Works were privileged to inspect an experimental apparatus which may eventually afford help in the same direction, in which sulphuretted hydrogen removed from the "gas" as an impurity was being decomposed by passing over oxide of iron in the presence of a limited quantity of air, with the formation of water vapour and the deposit of pure sulphur.

Another beautiful illustration of the power of the chemist to transmute the baser elements into gold no doubt interested most of the members who visited the great sugar refinery of Messrs. DUNCAN and Co., where the process was courteously explained by its inventor, Mr. NEWLANDS. It is well known that the crystallization of cane sugar is greatly impeded by the presence of certain bodies derived like it from the cane or beet, which are sometimes capable of retaining in solution in the molasses as much as 50 per cent. of crystallizable sugar. Various plans have been tried to recover this sugar from the molasses, based upon the formation of an insoluble compound, and caustic strontia has been recently largely used for the purpose, it forming with the dissolved sugar an insoluble saccharate of strontium. Mr. NEWLANDS, however, attacks the difficulty from the other side, by removing the potash salts which are the principal impediments to the crystallization of the sugar. So well was this latter fact known that it has long been the custom to make an allowance to refiners for loss on this account in proportion to the amount of ash yielded by a sugar. About two-fifths of the total ash is potash. Mr. NEWLANDS, therefore, takes the liquor from which the cane sugar has been crystallized as far as possible by simple cencentration, estimates the amount of ash, and assuming that two-fifths of it is potash adds an equivalent of sulphate of alumina made from bauxite and another equivalent of sulphuric acid, and in this way obtains a splendid crystallization of potash alum, sometimes amounting to ten per cent. of the weight of the solution treated. The disturbing cause having thus been removed, the crystallization of the cane sugar can then be effected with tolerable completeness.

Adjoining Messrs. Duncan's sugar refinery, in the enormous guano and manure works of Messrs. Ohlendorff and Co., the chief portions of the operations are also based upon the application of the results of chemical investigations. The necessity that mineral and other phosphates before being used as manure should be converted into the soluble form is now well understood, although it proved for a time a stumbling-block in the way even of the great founder of agricultural chemistry. This conversion is effected on a large scale in these works by the ordinary treatment with sulphuric acid, Peruvian guano being the material most used. Some idea of the development that has taken place in this industry may be formed from the fact that in 1840 the total imports of guano into this country amounted to only twenty tons in the twelve months, whilst Messrs. Ohlendorff alone now claim to turn out upwards of a thousand tons of prepared guano and manufactured manures every week. At first the guano was sold as received, but the necessity for a preliminary treatment with sulphuric acid of guano damaged by wet before drying it in kilns suggested an extension of the process, and now the whole of the guano sent out by this firm is thus treated, the advantage claimed being that the ammonia is fixed as sulphate whilst the insoluble phosphates are at the same time rendered soluble. The sulphuric acid used for this purpose is manufactured on the premises, Spanish pyrites from the Tharsis Company's mines being burnt in the kilns and the desulphurized ore being returned to the Company in a better condition for the extraction of the copper than before it was burnt. In Messrs. Knight's works, too, which were also visited, the old chemical operation of soap-making is carried on side by side with the modern one of producing oleomargarine for the "butterine" manufacturers, whilst few of those who visited the new lager beer brewery of the Austro-Bavarian Company were unaware of the extent to which this industry has benefited by the investigations of the chemist. Moreover, in some of the manufactories visited, where other sciences than chemistry play the principal part, the visitors could not but be struck with the fact that—as in the preparation of vacuum capsules for incandescence illumination—manipulations which a few years ago would have been ranked among the impossibilities of physics were being carried on as an ordinary avocation, even by boys.

If a special moral needs to be pointed for the readers of this Journal, surely it is that at a time when the followers of every craft are striving to keep themselves abreast of scientific discovery, so as to be able to profit by it as promptly and as extensively as possible, the pharmacist must not be a laggard in the race. The man who allows himself to fall behind his customer in his acquaintance with the sciences which are supposed to be particularly associated with the practice of his calling can hardly expect to enjoy a large measure of public confidence.

At a recent meeting of the Council of the Liverpool Chemists' Association, the invitation of the Pharmacopœia Committee of the General Medical Council asking the co-operation of the Association in the revision of the British Pharmacopœia was considered, and a resolution was adopted to the effect that the Council could not see its way to act in the matter of the revision of the British Pharmacopœia, pending present legislation.

* * *

On Monday last, Mr. Mundella received two deputations on the subject of the Medical Acts Amendment Bill. The first was from the Medical Alliance Association, and urged that medical practitioners throughout the country should be directly represented upon the various divisional boards, that unregistered persons should not be allowed to practise, that there should be a common title for medical practitioners, and that power should be given to any person to prosecute offenders against the law. Mr. Mundella replied that the object of the Bill was not to impose pains and penalties, but to raise the status of the profession and improve medical education. He denied that it would operate to the detriment of the public by admitting incompetent practitioners, since the existing restrictions as to unregistered persons practising would be continued. The other deputation was from the Brussels Medical Graduates' Association in respect to the position of such persons under the Bill. It is now stated that the Government is prepared to meet the wishes of of the Scotch members who are opposed to the Bill, by giving an additional seat on the Medical Board to the College of Physicians at Edinburgh. The second reading was the sixteenth order of the day on Thursday.

* * *

The *Canadian Pharmaceutical Journal*, the official organ of the Ontario College of Pharmacy, in a sympathetic editorial, speaks in approving terms of the position taken by the Council of the Pharmaceutical Society of Great Britain in respect to the legal representation of pharmacists upon any Committee charged with the revision of the British Pharmacopœia. After describing the views set forth in the memorial to the Privy Council, it adds: "We do not exactly see how Canada and the Colonies come in under this arrangement; perhaps the parent Society thinks we are old enough to look after ourselves. But in any case we hope that the rights of pharmacists will be recognized, and the acknowledgment made that English druggists are at least as good as their neighbours."

* * *

A case involving an interesting point as to the responsibility of pharmacists has recently been before the Appeal Court of the State of New York. A man who had been recommended to take a wine-glassful of "black draught" appears to have taken an equal quantity of "black drops" instead, his death being the natural result. His relatives elected to bring an action for damages against the druggist at whose shop the black drops were purchased, but at the trial the assistant who served swore that he was asked for black drops by deceased and that he specially cautioned him that to take more than ten or twelve drops would be dangerous, though he admitted that he had failed to label the bottle "poison," in compliance with the law. The judge decided in favour of the druggist, on the ground that upon this testimony he was not liable. The Court of Appeal also held that, if the assistant's statement were true, the druggist would not be responsible after the caution had been given; neither would the assistant be civilly liable, though he might be liable to a criminal prosecution for not using a poison label. The Court, however, objected to the dismissal of the plaintiff's case by the judge before the probability as to the truth of the assistant's statement had been determined by a jury, and for this purpose ordered a new trial.

* * *

On Monday, the 2nd inst., a law respecting the tax upon proprietary medicines sold in the United States came into operation. According to the *Weekly Drug News*, the "proprietors" appear to be under the impression that the abolition of the tax had been effected in their interest rather than in that of the public, since there had been few indications of any intention to make a corresponding reduction in the prices. On the contrary, it is roundly asserted that since no alteration in prices was made when the tax was imposed, the public has no claim to profit by its abolition. As the tax amounted to about two million dollars annually, the manufacturers will have good reason to be satisfied if they succeed in maintaining their position.

* * *

According to the Scotch correspondent of the *Medical Press and Circular*, the case of poisoning at Partick, to which reference has already been made in these columns, is now alleged to have been due to a mistake made by a wholesale druggist. The explanation put forward is that tinct. actææ racemosæ was ordered by the prescriber, and that the dispenser used a tincture which had been supplied under this name by a wholesale house, but which was really tinct. aconiti.

* * *

The German Pharmaceutical Association will hold its Twelfth Annual General Meeting in Wiesbaden, commencing on Tuesday, the 4th of September and concluding on Friday, the 7th. In connection with the meeting there will be, as usual, an exhibition of objects of pharmaceutical interest, which will take place in the "Turnhalle" of the Gymnasium. On Wednesday evening there will be a banquet in the "Kurhaus," followed by an adjournment to the Gardens, which will be illuminated and where there will be a display of fireworks. On Friday the Association will make an excursion to the Niederwald.

* * *

The Annual Meeting of the School of Pharmacy Students' Association will be held on Thursday, July 26, when the chair will be taken at 8 p.m. by the President, Professor Attfield, F.R.S., and the annual report of the Executive Committee will be read.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

July, 1883.

Present on each day—Messrs. Ainslie, Baildon, Clark, Gibson, Gilmour, Kinninmont, Nesbit and Stephenson.

Professor Maclagan attended on the 12th on behalf of the Privy Council.

MAJOR EXAMINATION.

11*th.*—*Two* candidates were examined. *One* failed. The undermentioned passed, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Dott, David Brown .... Edinburgh.

MINOR EXAMINATION.

11*th.*—*Nine* candidates were examined. *Four* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Arthur, John ....Chesterfield.
Bowman, Edmund ....Leith.
Clegg, George ....Accrington.
Cochrane, James ....Glenclelland.
Collins, Henry ....Ashton-under-Lyne.

12*th.*—*Eleven* candidates were examined. *Five* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Coull, George ....Edinburgh.
Duncan, William ....Montrose.
Findlater, William Gammie ...Aberdeen.
Harrison, John.....................Lincoln.
Hartley, Walter Edward ......London.
Horsfield, Frank ....Holbeck.

13*th.*—*Ten* candidates were examined. *Six* failed. The undermentioned *four* passed, and were declared qualified to be registered as Chemists and Druggists:—

Lipp, George.......................Elgin.
MacRitchie, David, jun...........Inverness.
Robertson, Charles ....Edinburgh.
Wright, John Leonard ....Liverpool.

MODIFIED EXAMINATION.

13*th.*—*One* candidate was examined, and was declared qualified to be registered as a Chemist and Druggist:—

Bottomley, Lawrence Whinray..Sheffield.

Proceedings of Scientific Societies.

SOCIETY OF CHEMICAL INDUSTRY.

Stassfurt Salts and their Mode of Treatment.*

BY C. NAPIER HAKE.

In bringing before you this evening some details respecting Stassfurt salts and their mode of treatment, I feel that it is a subject which cannot fail to be of interest to the English manufacturer, if only for the reason that one-third of the total produce of the Stassfurt mines finds its way into English markets.

Stassfurt is a small town of some 12,000 inhabitants, about twenty-five miles south-west of the city and fortress of Magdeburg, in Prussia. It lies in a plain, and the river Bode, which takes its rise in the Harz mountains, flows through it. The history of the salt industry in Stassfurt is a very old one, and dates back as far as the year 806. Previous to the year 1839 the salt was produced from brine pumped from wells sunk about 200ft. into the rock. The brine, in the course of time, became so weak, as regards the common salt it contained, that it

* Read at a meeting of the London Section of the Society, April 2.

was impossible to carry on the manufacture from this source without loss. In 1839 the Prussian Government, who were the owners of these saline springs, commenced boring with the object of discovering the whereabouts of the bed of rocksalt from which the brine had been obtained, and in the year 1843 the top of the rocksalt was reached at a depth of 256 metres. The boring was continued through another 325 metres into the rocksalt without reaching the bottom of the layer. At this total depth of 581 metres the boring was suspended. On analysing the brine obtained from the bore-hole, it was found to consist, in 100 parts by weight, of—

Sulphate of calcium	4·01
Chloride of potassium	2·24
Chloride of magnesium	19·43
Chloride of sodium	5·61

A result not only unexpected but disappointing, since the presence of chloride of magnesium in such quantities dispelled for the time all hopes of striking on the pure rocksalt. The Government, however, guided by the opinions expressed by Dr. Karsten and Professor Marchand, namely, that the presence of chloride of magnesium in such quantities was probably due to a deposit lying above the rocksalt, determined to further investigate the matter, and in the year 1852 the first shaft was commenced, which after five years had penetrated, at a depth of 330 metres, into a bed of rocksalt, passing on its way, at a depth of 256 metres, a bed of potash and magnesia salts of a thickness of 25 metres.

The lowest deposit of all consists of rocksalt. The bore-hole was driven 381 metres into it without reaching the bottom of the layer. Its depth is therefore unknown. Occurring in the rocksalt deposit are thin layers of sulphate of calcium 7 millimetres thick, and almost equidistant. At the top of the rocksalt are thin layers of the trisulphate of potash, magnesia, and lime as the mineral polyhallite. The deposit lying immediately on the bed of rocksalt consists chiefly of sulphate of magnesia as the mineral kieserite. Still further towards the surface the deposit consists of the double chloride of potassium and magnesium, known as the mineral carnallite, mixed with sulphate of magnesia and rocksalt. The deposit on the rise of the strata, consists of the double sulphate of potash and magnesia combined with one equivalent of chloride of magnesium, and intermingled with common salt to the extent of 40 per cent. This double sulphate is known as the mineral kainite, and is a secondary formation, resulting from the action of a limited quantity of water on a mixture of sulphate of magnesia and the double chloride of potassium and magnesium, as contained in the uppermost deposit previously spoken of.

The upper bed of the rocksalt, resting on a thick bank of anhydrite, is also a later formation. Almost imperceptible layers of polyhallite are present in this deposit and at greater intervals than in the lower and older deposit. It has, therefore, probably originated from the action of water on the older deposit. This upper bed of rocksalt varies in thickness from 40 to 90 metres, and its extent is comparatively limited. It is worked in preference to the older deposit, where both exist in the same mine, it being of much purer quality, averaging about 98 per cent. in the mines of the New Stassfurt Mining Company and in the Royal Prussian mines.

Sixteen different minerals have as yet been discovered in the Stassfurt deposits. They may be divided into primary and secondary formations. Those of primary formation are rocksalt, anhydrite, polyhallite (K_2SO_4, $MgSO_4$, $2CaSO_4$, $2H_2O$), kieserite ($MgSO_4$, H_2O), carnallite (KCl, $MgCl_2 6H_2O$), boracite ($2(Mg_3B_8O_{15})$,$MgCl_2$), and douglasite (2KCl, $FeCl_2$,$2H_2O$). Those of secondary formation, resulting from the decomposition of the primary minerals, are nine in number, namely:—kainite (K_2SO_4, $MgSO_4$, $MgCl_2 6H_2O$), sylvin (KCl), tachydrite ($CaCl_2$, $2MgCl_2+12H_2O$), bischofite ($MgCl_2$, $6H_2O$), krugite (K_2SO_4, $MgSO_4$, $4CaSO_4$, $2H_2O$), reichardtite ($MgSO_4$, $7H_2O$), glauberite ($CaSO_4$, Na_2SO_4), schönite (K_2SO_4, $MgSO_4$, $6H_2O$), and astrakainite ($MgSO_4$, $4H_2O$). Only four of these minerals have any commercial value, namely:—carnallite, kainite, kieserite and rocksalt. The yield of boracite, which is found in nests in the carnallite region of the mine, is too insignificant to be classed among those just mentioned.

The mine may be divided chemically into four regions, (1) the rocksalt, (2) the kieserite, (3) carnallite, (4) the kainite region.

The rocksalt region has almost the same composition throughout. Its character is crystalline, though in this region well-defined crystals are never met with. In other parts of the mine, especially in the carnallite region, it is found crystallized in three distinct forms—the cube, the four-faced cube, and the octahedron, coloured different shades of red and blue. Specimens have also been found of varied structure, laminated, granular and fibrous.

The rocksalt is ground more or less fine according to requirement. Before passing through the mill it is sorted by hand labour, the purest being utilized as table salt, large quantities of which are exported even to India. The finest quality is sold at about 10*s*. per ton, the second quality, containing about 98 per cent. of chloride of sodium realizing about 5*s*. per ton. The accompanying table shows the output of rocksalt and other minerals, in tons, between the years 1861 and 1881:—

	Rocksalt.	Carnallite and Kieserite.	Kainite.	Various minerals.
1861–1865	44,494	29,603	—	—
1866–1870	58,937	118,099	11,689	—
1871–1875	64,233	433,859	18,039	—
1876–1880	96,856	643,363	55,773	—
*1880	118,105	528,211	137,795	4,100
*1881	149,222	744,722	155,301	5,300

The deposit lying on the top of the rock constitutes the so-called kieserite region. The thickness of this deposit is about 56 metres, and its average composition as follows:—

	Per cent.
Kieserite	17
Rocksalt	66
Carnallite	13
Tachydrite	3
Anhydrite	2
	100

In the pure state kieserite is amorphous and translucent, possessing a specific gravity of 2·517. It contains 87·1 per cent. sulphate of magnesia and 12·9 per cent. water, corresponding to the formula $MgSO_4$,H_2O. Exposed to the air it becomes opaque from the absorption of moisture, and is converted into Epsom salts; 100 parts of water dissolve 40·9 parts of this mineral at 18° C. The solution, however, takes place very slowly at this temperature.

This deposit has not been worked to any great extent. Its composition is interesting as showing the gradual decrease of the proportion of common salt and the commencement of the separation of the more soluble salts.

Each of the two divisions of the mine just described contains only one mineral of importance. The third division, called the carnallite region, contains a variety of minerals, and to this deposit Stassfurt owes its world-wide fame. The average thickness of this

* These quantities were supplied by four mines, namely, Royal Mine, Stassfurt, the Leopoldshall Mine, the New Stassfurt Mine, and the Douglashall Mine, belonging to the Consolidated Alkali Company.

deposit is about 25 metres, and its composition is as follows:—

	Per cent.
Carnallite	60
Kieserite	16
Rocksalt	20
Tachydrite	4

besides small quantities of magnesium bromide. These minerals are deposited in the order given above, in successive layers, varying in thickness from $\frac{1}{100}$ to 1 metre, the different colours of these minerals giving the deposit a remarkable appearance.

The predominating mineral in this region is carnallite, a double chloride of potassium and magnesium, containing 26·76 per cent. chloride of potassium, 34·50 per cent. chloride of magnesium, and 38·74 per cent. water, corresponding to the formula $KCl,MgCl_2,6H_2O$. In the pure state it is colourless and transparent, and possesses a specific gravity of 1·618. It is very hygroscopic, and is easily soluble in water, 100 parts of which dissolve 64·5 parts of the mineral. It may be artificially formed from a solution of chloride of potassium, containing not less that 26 per cent. of chloride of magnesium. The secondary formation, as before mentioned, consists principally of the mineral kainite. This deposit, though limited as compared to the other salt deposits, is yet of vast extent. The average composition of this deposit is:—

	Per cent.
Sulphate of potash	23
Sulphate of magnesia	15·6
Chloride of magnesium	13·0
Chloride of sodium	34·8
Water	13·6
	100·0

In the pure state it is colourless and almost transparent, and possesses a specific gravity of 2·13; 100 parts of water dissolve 79·5 parts of it. Cold water does not decompose it, but from its saturated hot solution the double sulphate of potash and magnesia separates, and chloride of magnesium remains in solution.

This brief explanation of the various strata will, I think, suffice to give you a clear idea of the character of the mines from which the raw materials are drawn, and before describing the chemical treatment of the deposit, I should like to give you, in as few words as possible, the generally-accepted theory of their formation.

The entire deposit is supposed to have resulted from the evaporation of an inland sea in communication with the ocean. The water of this inland sea must have become more and more concentrated as time went on, owing to evaporation, until the point of saturation was reached, when the common salt would begin to separate. This would naturally take place during the hot summer months, while during the winter months, when the temperature was considerably lower, the calcium sulphate deposited from the fresh inflowing water, each gypsum zone marking a new period of precipitation. These zones, like the circular rings in trees, afford us a basis for speculation regarding the period of time during which the deposit was in course of formation. Thus, supposing the rocksalt deposit to be 600 metres thick, 6600 years would have elapsed during the process. Reverting once more to the question of the precipitation of these salts, let us assume that the connection between this inland sea and the ocean had been cut off for some time. The mother liquor, though still containing common salt in large proportions, would also contain all the more soluble potash and magnesia salts which had been accumulating during the previous period. As evaporation went on, the common salt and calcium sulphate would have been still alternately deposited until the point of saturation was reached, when the potash would be thrown down in the form of the trisulphate of potash, magnesia and lime, and in the place of the calcium sulphate. At a higher degree of concentration, and consequently at a later period, sulphate of magnesium was precipitated, accompanied by a small proportion of carnallite, and finally, the most soluble salt of all, the double chloride of potassium and magnesium, separated out with sulphate of magnesium in the proportion of 60 per cent. carnallite to 16 per cent. kieserite. The precipitation of common salt continued to the end, but its proportion to the other salts decreased towards the surface. The deposit, which originally had the shape of a basin, was lifted in the centre by volcanic action, the fault striking S.W. The deposit is protected from the solvent action of water, first, by a layer of clay, and further, by a thick layer of anhydrite, the stratum above consisting to a large extent of the "Bunter" sandstone.

There are eleven mines sunk along the strike of the fault. At Aschersleben the deposit lies almost horizontal. In Stassfurt the dip of the deposit is 40° in the Prussian mine and 60° in the New Stassfurt mine, and at the other end of the fault the deposit is almost vertical. Only one shaft has been sunk on the east border of the fault, the other ten being situated on the west side. The distance from the Aschersleben shaft to the Douglashall shaft is about ten miles.

These potash deposits, instead of being regarded as a source of profit, were looked upon for some time as an incumbrance. When they had to be removed, in order to more economically work the rocksalt, they were carted on to the banks of the river to be washed away during the period of the floods. The first attempt to utilize these deposits as a raw material in Stassfurt was made by Dr. Frank, who established a factory in the year 1860. He was shortly followed by Dr. Gruneberg and Messrs. Leisler and Townsend, and in the year 1863, 13,500 tons of raw material were consumed by eleven factories. At the present time the manufacture of chloride of potassium, etc., is carried on by the following firms:—

Ascania Company Limited, Leopoldshall; Beit and Philippi, in Stassfurt; Concordia Company Limited, Leopoldshall; Harburg-Stassfurt Company Limited, in Stassfurt; N. F. Loefass, in Stassfurt; The Mineral Salts Production and Moorlands Reclamation Company, in Aschersleben;* Consolidated Alkali Company Limited, in Wester Egeln;* Lindeman and Company, in Stassfurt; Maigatter, Green and Company, in Leopoldshall; Müller and Allihn, in Leopoldshall; F. Müller, in Leopoldshall; F. R. Müller and Company, in Schönebeck; C. Nette Faulwasser and Company, in Leopoldshall; Schachnow and Wolff, in Leopoldshall; Stassfurt Chemical Company Limited, in Stassfurt; Stein and Keitz, in Leopoldshall; United Chemical Company Limited, in Leopoldshall; Vorster and Gruneberg, in Leopoldshall; Wüstenhagen and Company, in Hecklingen.

(*To be continued.*)

Parliamentary and Law Proceedings.

Death from an Overdose of Laudanum.

An inquest was held at Exeter, on Saturday, July 7, touching the death of Mary Ann Harriett Southcott, a widow, who had died from the effects of poison on Friday.

Deceased was found by her sister on the bed, apparently asleep. Her sister attempted to arouse her, but was unsuccessful. Two small bottles, both empty, and labelled "laudanum," being noticed in the room, a surgeon was sent for, and promptly administered two emetics, which were both effective. The surgeon left,

* These two companies are owners of mines and work their own raw material.

giving instructions that deceased was to be walked about the room, but after this had been continued for some time she became tired and sat on the edge of the bed, and while in that position she suddenly expired. Deceased had purchased the poison at Mr. Tighe's, chemist, High Street, stating that she knew its nature, and was in the habit of taking it. The deceased's husband had also been in the habit of taking laudanum.

The medical evidence went to show that death was caused by cardiac syncope, resulting from the use of laudanum acting on a circulation enfeebled by age, and a verdict of "Death from misadventure" was returned. —*Western Morning News.*

Poisoning by Sulphuric Acid.

A case of poisoning is reported from Doncaster, in which a child, having been left alone for a time, opened a cupboard and drank some sulphuric acid, which had been kept for disinfecting the stable during the time the horses had the "pink eye." The child was removed to the infirmary, but died soon afterwards.

The Case of Poisoning by Essential Oil of Almonds.

At the Maidstone Assizes on Wednesday, before Mr. Justice Day, the Rev. John Henry Timmins, vicar of West Malling, was placed at the bar to take his trial on a charge of manslaughter in feloniously killing and slaying one Sarah Anne Wright.

Mr. Talfourd Salter, Q.C., and Mr. Eyre Lloyd, instructed on behalf of the Treasury, appeared to conduct the prosecution; and Mr. Edward Clarke, Q.C., and Mr. D. Kingsford were for the defence.

The accused, who has been for about forty years vicar of West Malling, is apparently about seventy years of age, and, as stated by the counsel for the prosecution, had been very much respected, especially for his attention and kindness to the poor. It was also stated that he had in early life attended lectures in St. Thomas's Hospital and so acquired some knowledge of medicines and drugs. The deceased was a young girl about sixteen years of age, the daughter of a labourer, one of his parishioners, whose family he was in the habit of visiting. The girl herself seemed from some cause to be ailing, and for several days the accused had been to see her and had given her medicine. On December 14, he went to see her, and asked her how she was, and she said she was much better. He asked for a glass, took a bottle out of his pocket, and taking something out of the bottle, put it into the glass and asked for some water, but there was none. He gave her what was in the glass. She at first refused to take it, but he said it would do her good, and she took it. She at once got up from the sofa on which she was lying and screamed and said, "Oh, Mr. Timmins, Mr. Timmins!" He asked for water, and meanwhile got her to sit down on a chair and put her head on his shoulder, and said she would get better. She drank some of the water, and then she laid on the sofa for some time. He took the glass and offered it to the girl's mother, who refused it, and he then offered to drink from it himself. After he had gone, she rose up, staggered, and foamed at the mouth, and soon afterwards she vomited. After twenty minutes or half an hour the nurse went for the defendant, who brought some brandy and tried to give the girl some mixed with water, but it could not be got into her mouth. The doctor was then sent for at the vicar's desire, but before he came—in less than two hours from the time of the administration of the drug—the girl died. It turned out that what had been administered was, in fact, the bitter oil of almonds, which had been obtained by the vicar from the chemist some time before, and which it was said was the same as "essential oil" of almonds, and contained a large percentage of prussic acid.

Mr. Salter, in opening the case for the prosecution, said the vicar had administered the "bitter" or "essential" oil of almonds, which he surely must have known contained a large percentage of prussic acid. Indeed, it appeared from the previous correspondence with the chemist that he must have known it. How he came to administer the poison was inexplicable. No one suggested any but a good motive for it. But if he had rashly experimented and out of sheer rashness had given the girl the drug, the jury must convict him of manslaughter.

It appeared that a son of the vicar had for some weeks had a nettle-rash, and he had got from the chemist an ounce of "bitter" or "essential" oil of almonds, which he administered externally. It was obtained by a written order in his handwriting, though not signed by him. The chemist sent a note in these terms:—"Rev. Sir,—I have received the enclosed order for an ounce of essential oil of almonds. It being very poisonous, be good enough to inform me if that is the article you require." To which the vicar sent a written reply, "I require the bitter almond oil for external application, and I will see to its proper use." The chemist stated that the phial had on it a label, "Essential oil of almonds," and also a printed label, "Poison." "Bitter" and "essential" oil of almonds were in reality identical, and contained a proportion of prussic acid. Prussic acid, he said, was volatile, and as it had been in his stock eighteen months, the percentage probably was reduced. He did not know of its been used as a medicine taken internally. In cross-examination, he said there was an oil "expressed" from almonds and an oil expressed from sweet almonds which were harmless. Before this case he had never known the essential oil of almonds used even externally, and poison might be absorbed. It appeared from the *post-mortem* examination and analysis that death had been caused by prussic acid contained in the essential oil of almonds.

The medical man who was sent for, and took part in the *post-mortem* examination, stated that the death was caused by essential oil of almonds. Prisoner told him on the occasion that he had "administered a teaspoonful, which was innocuous," adding that he had tried to give her brandy, but she had died a quarter of an hour before. He offered to send him the bottle which had contained the oil, but he had never done so. In cross-examination, he said a death in an hour and three-quarters from prussic acid was unusual, but there was a case of death in three hours. Death, under certain circumstances, might be delayed. The innocuous oil of almonds was yellow, and the "essential" oil became so when kept for some time.

Professor Heaton, lecturer on chemistry at Charing Cross Hospital, stated that the bitter and "essential" oil of almonds were the same, and contained a variable proportion of prussic acid. In what remained in the chemist's bottle there were 3·5 per cent. of prussic acid, which would give 2 grains in a teaspoonful—sufficient to cause death. He explained the difference between the "expressed" oil of almonds, which was innocuous, and the essential oil, which was poisonous.

This was the case for the prosecution, upon which

Mr. T. Salter, addressing the jury, said the question was whether the prisoner could have reasonably mistaken the nature of the almond oil he was giving to the girl. Even if he supposed what he administered was not the poison, he ought to have taken care to be certain of that, besides which there was the previous correspondence with the chemist, and the fact that the bottle was labelled "Poison."

Mr. Clarke addressed the jury on behalf of the prisoner, characterizing the case as one of the most painful he had ever known. After a career of forty years spent in the discharge of his sacred duties, and the exercise of charity, the prisoner found himself, by one unhappy mistake, placed in this painful position. The prisoner had written for "oil of bitter almonds" for external application, though the chemist had sent essential oil of almonds, which, it appeared, was not used for external application, and the prisoner had supposed the innocuous oil of almonds was sent. The chemist said he had put the poison label on the bottle, but that was only his recollection. The mother had not observed the poison label on the bottle. Besides, even if the label had been on the bottle, the prisoner might have supposed it was not poisonous, though so labelled, and his subsequent conduct showed no suspicion in his mind of poison. He asked the jury, therefore, upon this evidence that his client might be liberated.

Witnesses of high position were called, who gave the prisoner the best character for charity, kindness, and benevolence.

Mr Justice Day, in summing up the case to the jury, said this was a charge of homicide by negligence, and it was clear that the prisoner had caused the death of the deceased by the administration of a poison; the question for them was whether he had done so under circumstances which made him criminally liable. Unless gross negligence was established against the accused, it would be their duty to acquit him. None of the facts of the case were in dispute; it was for them to draw the inferences they deemed just, and the first question was—What did the prisoner send for? That was shown by the written correspondence between the prisoner and the chemist, from which it appeared that he knew he was to receive poison, and the chemist put upon the bottle the label "Essential oil of almonds;" it was also marked "Poison." The question was whether the administration of poison under such circumstances was or was not criminal negligence. A person who took upon himself to administer such a drug was bound to be careful; and in this case it was clear that there had been a want of care.

The Jury retired to consider their verdict at a quarter to four, taking the bottles with them, being cautioned as to which of them contained the poisonous preparation. In five minutes they returned into court with a verdict of "Not Guilty," which was received with some applause, and the prisoner was at once discharged.—*Times.*

Obituary.

Notice has been received of the death of the following:—

On the 16th of June, Mr. George Delves, Pharmaceutical Chemist, High Street, Exeter. Aged 46 years. Mr. Delves had been a Member of the Pharmaceutical Society since 1872.

On the 7th of July, Mr. George Henry Coates, Chemist and Druggist, Church Street, Barlow, Derbyshire. Aged 57 years. Mr. Coates had been a Member of the Pharmaceutical Society since 1871.

BOOKS RECEIVED.

Reports of Trials for Murder by Poisoning, by Prussic Acid, Strychnia, Antimony, Arsenic, and Aconitia. By G. Lathom Browne and C. G. Stewart. London: Stevens and Sons. 1883. From the Publishers.

Medical Guide to the Mineral Waters of France and its Wintering Stations. By A. Vintras, M.D. London: J. and A. Churchill. 1883. From the Publishers.

Correspondence.

Test for Arsenic in Domestic Fabrics.

Sir,—I observe in the "Report of a Committee appointed by the National Health Society," for the purpose of recommending a test for the certain detection of arsenic in domestic fabrics, the following remarks on Reinsch's popular test:—"We were at first of opinion that Reinsch's process, carefully conducted so as to insure uniformity of results, might be employed; but several wall papers and many textile fabrics having been found which gave no arsenical reaction with Reinsch's test, however carefully conducted, but which, nevertheless, were subsequently proved to contain notable quantities of arsenic, this method was proved not to be an absolutely reliable test." On referring to the detailed instructions for performing the test in question, it will be seen that the possibility of the arsenic existing in the higher stage of oxidation has not been provided for. Hence, probably, the occasional failure. Reinsch's process is from its great ease and quickness of execution so general a favourite that it is desirable to point out that in certain cases it is, unless proper precautions be taken, liable to deceive. I unfortunately have not access to Reinsch's original paper, so cannot say whether he was or was not aware of the fact that the mirror is not easily, if at all, produced on the copper foil in the case of the arsenic being present as arsenic acid; but I believe the fact is known and taught in the text books, though not in all of them. I would suggest then that after boiling for half an hour (or half that time) the acid liquid containing the copper foil and the colouring matters without the appearance of the mirror, a few crystals of sodic sulphite be thrown in at intervals of a few minutes and the boiling continued. If arsenic acid be present, its reduction to arsenious acid will take place immediately, and its further reduction to the metallic state forming the arsenical mirror will follow promptly. By thus dividing the boiling into stages the degrees of oxidation may be discriminated and ofttimes the offending colour "spotted." The nascent hydrogen evolved in Marsh's process effects the desire reduction, whatever the degree of oxidation of the arsenic present.

I will venture to add a recommendation as to the treatment of the mirrored copper foil, which I have practised for some years. I think I once mentioned it at a meeting of the British Pharmaceutical Conference, but am not sure it ever appeared in print. It is as follows:—The foil having been carefully washed and dried is doubled up and bent by means of pliers so as to fit pretty accurately the bottom of a small test tube. Into this tube is lowered a second and smaller test tube containing a little cold water. This tube should be just able to slide into the larger tube, and should be held by the finger close to the copper foil lying at the bottom of it. Heat from a very minute gas jet is now cautiously applied to the foil, and after a few seconds a white efflorescence will make its appearance on the cold end surface of the inner tube. The covering quality of arsenious acid is so great that an extremely minute quantity is readily observable. The inner tube being withdrawn, it can be subjected to optical and other tests with great facility. It is, I find, comparatively easy to obtain from half a minim of Fowler's solution all the important arsenic reactions, and doubtless if the mirror and white sublimate only be demanded, the process is capable of further refinement, though I doubt much its capability of satisfactorily indicating the ·001 grm. as required by the Reporters.

Thos. B. Groves.

"Easton's Syrup."

In reply to your correspondent "John," the above syrup, made with sulphate instead of phosphate of quinine, turns out quite satisfactory. By age it gradually acquires a little discoloration, just as most of these syrups do. I have not noted any "milky" appearance when made with Howard's quinine, but if some of the continental brands be used, "guaranteed to stand Pharmacopœia tests," then a syrup becoming milky in the course of six or eight hours is usually the result. This I have attributed—without special examination—to the cinchonidine sulphate nearly always present, in considerable proportions, in foreign quinine sulphate.

8, *The Strand, Torquay.* Edward Smith.

Methylated Iodine Preparations.

Sir,—It is a pity that Mr. W. H. Darling does not give any data for his authoritative statement that the pungency of methylated iodine preparations is due to acetone alone. From experiments which I have made I have found that this is not the case. It should not be forgotten that the pungency referred to in my note is accompanied by a distinctly alliaceous odour, such as characterizes bodies of the allyl series.

I need not say that the existence of allyl alcohol in wood spirit is now an accepted fact, and can be very readily demonstrated.

The whole aspect of the subject, however, I hope to discuss when I have completed the investigation on which I am at present engaged.

Edinburgh. PETER MACEWAN.

A QUERY REQUIRING AN ANSWER.

Sir,—When the present British Pharmacopœia was published I was much struck at the weakness displayed, especially in some of the galenical preparations. Extractum cinchonæ liquidum was one of these. One or two medical men, accustomed to use Battley's bark, asked me if it was a reliable substitute for that preparation. I replied most certainly not, and moreover, at once proved the fact to their entire satisfaction.

There is no disguising the fact that many of our Pharmacopœia preparations are "ghostly enemies" of so-called patent or proprietary medicines, with lawful names, under the plea that we like to know what we are giving; it is so unscientific to use a quack remedy.

Considering the profound knowledge possessed by the faculty of the use and action of such et ceteras as the spleen, thyroid and thymus gland and the suprarenal capsules, the force of the remark is of course evident, at least to persons who cannot perceive incongruities.

In the early years of this century in the city of London there lived, one whom I am pleased to call the Bellini of pharmacy, Richard Battley. Some years ago, when our able pharmacologist, Professor Redwood, was discoursing on the patient long suffering labours of the alchemists, men who watched their stills with astounding patience, while the gentle heat produced by fermentation carried over some hoped-for treasure into the receiver, I mentally drew a picture of that last of the race, Richard Battley.

Accident and experience have perhaps taught me more of the great triumphs of that honest worker than has fallen to the lot of some of my pharmaceutical friends. Mr. Battley, I believe, took the bark and literally pegged away at it with water; he steeped it, he boiled it again and again till there was nothing left but woody fibre and cellulose; he then strained and concentrated his liquor so that by the addition of the necessary spirit to preserve it each pound should contain the kinates of one pound of the finest bark; it was then set aside for several weeks to allow the kinate of lime and other earthy salts to crystallize out; the liquor was then poured off the crop of clear crystals, the proportions re-established, and the extractum cinchonæ liquidum, or as he called it, liquor cinchonæ, was ready for use.

My data for the foregoing hypothesis are these. Mr. Battley says on the label the decoction can be made from it, therefore all that boiling can do has been done. During the Crimean war the unusual demand prevented Messrs. Battley and Watts from allowing the kinate of lime to crystallize out before sending it to their customers; I was a young apprentice in those days and collected some very nice crops of crystals.

The preparation is, as far as my experience goes, unique. Like his liquor opii sedativus, there is nothing equal to it in its physiological action. I regret to believe the real barrier to their more extended use has been their price. I doubt if it is possible to lower it to any great extent, and until we can make preparations of bark and opium equal to them we are morally bound to use them, regardless of cost. Assertion is not fitting for men of science: we must prove our results by specific gravity, by estimation of the alkaloids, by chemical tests, and above all by the microscopical slide.

Mr. Wells says we are really without an extract representing the constituents of bark. For the sake of raising the question, I deny it. I say that Mr. Battley's preparation does fully and completely represent the constituents of this valuable remedy.

When the question of cost is relegated to the public and our good Bloomsbury boys have raised the profession of pharmacy to the level of a fine art, Richard Battley will occupy one of the foremost places on the scroll of pharmaceutical fame.

It is beside the question to say it is a proprietary medicine; that it is "liquor cinchonæ cordifolia, Battley," and should be ordered as such if required; that it is not B.P. May I conclude by answering these quirks, they are nothing more, by daring to alter our great poet's lines?—

"These medicines are kinder to the patients far
Than the two daughters culled from lawful sheets."

GEORGE MEE.

POISONING BY TARTAR EMETIC.

Sir,—In your issue of the 14th inst., you notice a paragraph in the *British Medical Journal* stating a woman had taken at least 7½ grs. of tartar emetic and recovered.

I remember, fifty years ago, a nurse giving a consumptive patient in lieu of a morning draught, a liniment containing ℈j tartar emetic and ℥ij liniment of soap.

On drinking copiously of warm water he recovered with no material ill effects.

56, *Dean Street,* WM. PROCTER, M.P.S.
Newcastle-on-Tyne.

N. D.—The white flocculent precipitate generally left when chloride of zinc is dissolved in water is oxychloride. Hydrochloric acid should not be added to dissolve it; neither does the bottle require a "shake" label.

"*Junior Assistant.*"—Dissolve the potassium iodide and potassium bromide in two thirds of the water, and add the spirit of chloroform to the solution. Rub the quinine with a little mucilage, and having added the remainder of the water, mix this with the solution. Decomposition will gradually take place with formation of hydriodate of quinine.

B. H. E.—Use glycerine of tragacanth as an excipient, after the addition of a very few drops of acid. phosph. dil.

J. S. Shortt.—The excipient ordered is unsuitable for potassium permanganate. See the correspondence on the subject in the last volume of the *Pharmaceutical Journal*, pp. 580, 600, 620, 640, 660.

J. Fingland.—(14) *Carex elongata.* (15) *C. lævigata.* (16) *C. pulicaris.* (17) *C. sylvatica.*

F. Fairweather.—(1) *Hypnum triquetrum.* (2) *H. abretinum.* (3) *H. alopecurum.* (4) *Polytrichum formosum.* (5) *Mnium hornum.* (6) *M. punctatum.*

J. R. M.—*Tragopogon minor.*

R. Roberts.—(1) *Prunella vulgaris.* (2) *Lolium perenne.* (3) *Œnanthe crocata.* (4) *Galium uliginosum.* (5) *Campanula Trachelium.* (6) *Polemonium cœruleum.*

H. Bell.—Dr. Coghill's formula for an antiseptic solution for inhalation (*Lancet*, October 20, 1877) is, "Spirit of creasote, two drachms; carbolic acid, glycerine, of each half an ounce; distilled water to two ounces. Mix. Ten or twelve drops for inhalation." The formulæ for the vapores (1) acidi carbolici, (2) creasoti, and (3) iodi, of the Throat Hospital Pharmacopœia, are respectively: (1) Carbolic acid, 21 drachms; water, 3 fluid drachms. Dissolve. (2) Creasote ½ fl. oz.; light carbonate of magnesia, 90 grs.; water to 3 fluid ounces. Mix. (3) Pour ten drops of tincture of iodine into the apparatus for dry inhalation and inhale the vapour.

A. W. Turpin.—"Cinnabar of antimony" is a synonym for vermilion.

G. Thurlby.—*Hottonia palustris.*

W. H. and S.—The process is described in the British Pharmacopœia (Additions) under the heading "Bismuthi Oxidum."

D. Stewart.—We cannot say with certainty, but we think not.

Mr. Lennox Browne.—We are obliged to you for your letter, which, however, we do not think it advisable to publish. We hope, however, that you will do what you can to enlighten medical opinion on the subject.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Bell, Jobst, Carr, Waldheim, Williams, Alpha, Querens.

"THE MONTH."

The time for recreation and relaxation from work is now fast approaching, and those who have any love left for botanical pursuits will be hastening, vasculum in hand, to visit localities for rare plants, or to explore districts hitherto not thoroughly explored. That there are many such still left is evident from the many plants new to Britain which have recently been discovered. During the last month, the rare orchid, *Sturmia Loeselii*, supposed to be nearly extinct, has been rediscovered in two widely distant parts of Norfolk, one of the localities being a hitherto unrecorded one. *Naias major*, a plant entirely new to the flora of this country, has also been detected, and *Chara stelligera* has been found with antheridia in a new locality in the same county.

At the Botanical Gardens at Regent's Park the squill, *Urginea scilla*, is now in full blossom, and both at these gardens and at Kew the number of medicinal plants is larger perhaps than at any other time of the year. It seems unfortunate that botanical studies in the schools should be completed just when so much floral beauty is in its prime.

On the buckthorn plant may now be found, in damp localities, a pretty yellow fungus distorting the petioles or forming conspicuous spots on the leaves. It belongs to the heterœcismal fungi and is a stage of growth of *Puccinia coronata*. A good deal of discussion has lately been carried on in the columns of the *Gardeners' Chronicle*, with regard to this group of plants, and Mr. C. B. Plowright, of Lynn, failing to convince his opponents by argument, advises them to put the matter to the proof and to place a leaf of coltsfoot affected with the *Æcidium Tussilaginis* on well watered plants of *Poa annua*, which he states in ten or fifteen days will be affected with the *Uredo* and soon after with the *Puccinia poarum* (*Gardeners' Chronicle*, June 30, p. 824).

At the meeting of the Royal Horticultural Society, on June 20, Mr. Loder exhibited a specimen of *Digitalis* in which the terminal flower had assumed a campanulate form by two or three blossoms having combined. Mr. Henslow exhibited a specimen of *Ranunculus aquatilis*, grown on damp soil, which differed from the plant grown in water in the filiform segments having abundance of stomata, which are absent when the plant is submerged (*Garden*, June 30, p. 599).

In the Year-book of the Royal Botanical Gardens at Berlin, Professor Eichler has lately described a singular Brazilian tree, *Anona rhizantha*, which derives its specific name from the fact that the trunk sends out root-like, slender branches devoid of leaves, which bear flowers at their ends, the flowers being thrust into the ground as the branches lengthen, just as in the case of the peduncles of *Arachis hypogœa* (*Gard. Chron.*, June 30, p. 816).

Mr. T. Meehan has demonstrated that the supposition that the expansion of the sap by freezing causes trees to burst is incorrect as regards live wood, and in trees varying from 1 to 3 feet in diameter, and that, on the contrary, there is a contraction which is very marked in succulent plants, the contraction and consequent pressure apparently causing the exudation of the uncongealed sap at the cut surface, where it freezes in the form of icicles. In dead wood, soaked in water, there is an evident expansion.

Starch is generally looked upon as a source of sugar in roots, etc., but Herr Boehm states his belief (*Bot. Zeit.*, x., 41) that the starch found in chlorophyll grains is a direct result of the decomposition of carbon dioxide, and can be formed out of sugar and other organic substances. In order to prove his theory, he exposed leaves and pieces of the stem of the scarlet runner containing no starch to the action of a solution of sugar, when they were found after twenty-four hours to contain an abundance of starch, the quantity depending on the concentration of the saccharine solution. In other experiments with the leaves of *Galanthus*, *Hyacinthus*, *Iris*, etc., starch was produced in the same way in from eight to ten days.

In recent works, published by Messrs. Schimper and A. Meyer, on the development of chlorophyll and colour-bearing granules of plants, it is stated (*Nature*, July 19, p. 267) that instead of these bodies being formed free in the protoplasm of the cell, as hitherto supposed, they arise from distinct structures or "plastidia" present in the young cell from its earliest existence, and that any pigment, starch grains, etc., found in connection with the structure named arise by later changes produced by continuous growth and division of the few minute plastidia found in the young cells. Those which are deeply seated and as not yet coloured are called by Schimper "leucoplastidia;" those which are nearer the light and in which a green colouring matter is developed, "chloroplastidia;" and those which in dividing give rise to needle or spindle-shaped bodies or triangular ones with sharply pointed corners, and pass through various shades from green to carmine red, he calls "chromoplastidia" These forms appear to be due to the crystallization of certain of the proteid contents of the plastidia. All the plastidia of the stem and leaves appear to arise by division of the plastidia in the *punctum vegetationis* of the young stem, and those of the root from the division and differentiation of those of the *punctum vegetationis* of the radicle. As they are found at a very early age of the embryo, even when only eight cells old, as in *Linum austriacum*, Schimper thinks it probable that they arise from primitive plastidia in the oosphere. Starch grains may arise from the leucoplastidia, also, at a very early stage, as they may be observed in the oosphere. The Characeæ would seem to be the earliest plants in which all three forms of these bodies occur, the apical cells containing leucoplastidia and the antheridia owing their colour to chromoplastidia.

At a recent meeting of the Linnean Society, specimens of a myrtle wax obtained from the fruits of *Myrica microcarpa*, Benth., from Jamaica, were exhibited by Mr. W. T. Thiselton Dyer, F.R.S. Judging from a specimen presented to the Museum of the Pharmaceutical Society some months ago by Mr. D. Morris, the wax is superior in quality and appearance to any yet introduced into the market, and as the shrub is abundant it could be procured in large quantities. Its introduction is due to the energy and discrimination of Mr. D. Morris, the director of the Botanical Department, who loses no opportunity of drawing the attention of merchants and others to the botanical resources of the island. Mr. Dyer also exhibited Ngai camphor, but appears to have been unaware of Hanbury's paper on the subject in the *Pharm. Journ.*, [3], iv., p. 709.

Lathyrus tuberosus, a rare plant in Britain although not infrequent on the Continent, and supposed to have been the ἀρακώδης of Theophrastus and the Arachos, Aracueda and Arachorides of Pliny, forms the subject of a paper in the *Zeitsch. oest. Apoth-Verein.* (July 20, p. 328). The botany, chemistry, and histology of the root are fully described, and figures are given of its microscopical structure and of the starch contained in it. The author suggests that in view of its possible use as a coffee, these microscopical details might be of use.

According to *Nature* (June 28, p. 212) a description of all the drugs, mostly plants, used in the popular pharmacies of the Government of Karzan and Peru, has recently been published in the 'Memoirs of the Society of Naturalists,' at the Karzan University.

In a recent communication to the Société Nationale d'Acclimatation de France (*Bulletin*, x., 235), M. Paillieux suggests several plants which in his opinion might enter with advantage into the composition of pickles. The first is the Catawissa onion (*Allium fistulosum* var.), which is said to have been introduced into America from China, and appears to be closely allied to what is known in this country as the Welsh onion or stone-leek. It is said to have a flavour *sui generis,* not being precisely that of the onion or of the eschalot. Another plant recommended is the Angourie cucumber (*Cucumis Anguria*, Linn.), a small kind having soft spines which give to it an appearance of a horse-chestnut. Preserved in vinegar it is said to form a beautiful pickle, which is not to be confounded with the insipid vinegar sponges that are usually associated with the name of gherkins. The plant grows wild in the Antilles and different parts of South America, and presents no difficulties in its cultivation. A third plant, which belongs to the Zingiberaceæ, is the Japanese "miôga" (*Amomum Miôga*, Thunb.). In Japan the young stalks and the flowers are eaten, and the author submitted to the Society a sample of pickles prepared from the bulbs of the Catawissa onion and the flowers of the Angourie and Miôga. The tubercles of the tuberous nasturtium (*Tropæolum tuberosum*, R. et P.) were also mentioned as being very good whan used as a pickle, and as having the property of communicating a perfume to the vinegar.

A large amount of attention has been paid during the last twenty years in the Western and North Western States of America to the cultivation of the so-called "Chinese sugar cane" (*Sorghum saccharatum*) as a source of sugar. Up to the present time, however, the results have hardly come up to the expectations formed. The grass, it is true, has yielded a juice which when concentrated formed a rich saccharine syrup; but considerable difficulty has been experienced in obtaining the sugar from the syrup in the crystalline form and free from a disagreeable odour. No doubt this has been mainly due to the unscientific way in which the industry has been carried on. It is therefore satisfactory to learn from a report on the scientific and economic relations of the sorghum sugar industry, recently presented to the United States Commissioner of Agriculture by a committee of eminent chemists and other experts, that the difficulties are now in a fair way of being removed. The report shows clearly that the two essential points on which success depends are the maturity of the "cane" and the prompt and correct working of it. With these requirements satisfied, it is stated that sugar from a field of sorghum may be as surely and safely expected as from a field of sugar cane, and probably with as great a return.

Another portion of the 'Flora of British India,' has just been published, forming the first part of the fourth volume and comprising the plants of the *Asclepiadaceæ*, *Gentianaceæ*, *Boraginaceæ*, *Convolvulaceæ*, *Solanaceæ*, and a portion of the *Scrophulariaceæ*, the last and first named being treated by Sir Joseph Hooker and the remainder by Mr. C. B. Clarke.

In the 'Shakspere Flora,' recently issued, M. Leo Grindon, brings forward arguments to show that the "cursed hebenon" is the yew tree.

In the *British Medical Journal* (June 30, p. 1282) a case of poisoning by hemlock, at Cardiff, is recorded. The plant grows on the ballast tips to the east of Cardiff and was there gathered by a Greek sailor, who boiled it and ate it for supper. Possibly he mistook it for *Anthriscus sylvestris* or *Torilis anthriscus*, both of which are said to be eaten by the Breton onion boys and when stewed with snails are considered quite a delicacy. It would appear that the Umbelliferæ are much more commonly cooked and eaten in continental countries than in England, and that occasionally serious accidents happen in consequence.

Dr. Quinlan's statements concerning the properties of *Galium aparine* have been corroborated by Mr. C. Boyce, of Maidstone (*Brit. Med. Journal*, July 7, p. 14), who states that in a case of cancer in which he recently employed it locally, it diminished the pain so much, that the patient rebuked him for not telling her of it sooner, and that the *Galium* certainly seems to have the power of arresting ulcerative action and promoting a more healthy one. Mr. Quick, of Coventry, also calls attention to the fact that this property of *Galium* was known more than one hundred years ago, for Culpepper, in the 'English Physician,' edit. 1741, p. 93, says of it: "The juice is also very good to close up the lips of green wounds and the powder of the dried herb strewed thereupon doth the same and likewise helpeth old ulcers."

In view of the great anxiety which has been excited in Eastern Europe by the dreadful outbreak of cholera in Egypt, a circular has been issued by Dr. Burkart and Dr. von Jobst calling attention to the specific action of cotoin upon the bowels. For internal administration they recommend the use of an emulsion containing 1 gram of cotoin in 120, a tablespoonful to be taken every quarter or half an hour; or cotoin may be given as a powder in doses of 0·2 gram every half hour or hour. For subcutaneous injection the cotoin should be dissolved in acetic ether (1 of cotoin to 4 of ether), a Pravas' syringeful (equal to 0·2 gram of cotoin) being injected as deeply as possible, not merely under the skin, every quarter hour to every hour. It is important for dispensers to notice that experiments have shown that acetic ether is the only suitable menstruum for cotoin intended for subcutaneous injection.

In an article in the *Lancet* (July 14, p. 56), on the treatment of malignant (hæmorrhagic) scarlatina, Dr. Hayward mentions a remedy under the name of "crotalus," and as pharmacists may consequently be asked to supply the drug, a few details concerning it may prove of interest. Crotalus is a homœopathic remedy prepared from the venom of one or more species of rattlesnake, preferably *Crotalus horridus* and

C. durissus, and is recommended in Hughes's 'Pharmacodynamics' and other homœopathic works in the treatment of hæmorrhagic forms of several zymotic diseases, such as scarlatina, diphtheria, etc., and also as a possible remedy for yellow fever. Considering the improbability that an article on a remedy homœopathically used would be able to find its way into the columns of the *Lancet*, it has been deemed advisable to make an inquiry of the author of the paper as to the identity, nature and doses of "crotalus," and in reply the following details were kindly communicated by Dr. Hayward. The poison is extracted in this country from full-grown rattlesnakes imported alive, the poison-bags being removed while the animals are under the influence of chloroform. As the poison will not keep in its natural state, it is mixed with glycerine as a preservative, since alcohol precipitates the active principle, crotaline. The preparations of the venom are made in the form of decimal dilutions as used by homœopaths, the menstruum in this case being one part of glycerine and three parts of proof spirit. The first decimal dilution is turbid, and requires shaking; it is used chiefly for subcutaneous injection, three or five drops at a time being the usual dose. The third dilution is the one usually prescribed by Dr. Hayward, three drops being given for a dose in a spoonful of water every three hours. The fact that alcohol precipitates the crotaline indicates that it might possibly be kept in the dried state and dissolved in water when required. Few, however, would probably be willing to run the risk of handling or weighing so powerful a preparation. Dr. Hayward is engaged in writing an essay on the properties and uses of crotalus, and fuller information may therefore be shortly expected of a character to interest the medical profession.

The tendency to administer small doses often repeated, in preference to larger doses three times a day, seems to be gaining ground. Dr. Thorowgood, in the *Medical Times and Gazette* (June 30, p. 725), gives the results of his experience with tincture of aconite and solutions of arsenic and strychnia, stating that he finds a dose of one or two minims of tincture of aconite, given every two hours in commencing inflammation, produces better effects than the Pharmacopœial dose of 5 to 15 minims, which is liable to cause faintness. He never exceeds the dose of 3 minims of either Fowler's solution or liquor sodæ arseniatis three times a day, and has had examples of the sudden development of unpleasant symptoms following the use of doses of 5 minims three times daily. He has found that a fiftieth of a grain of strychnia produces excellent results in promoting the restoration of exhausted nerve function, while larger doses add to irritation and eventually increase the exhaustion.

In the *British Medical Journal* (July 7, p. 5), also, Dr. J. C. Uhthoffe states his belief that the solutions of eserine which have for some years been used for contracting the pupil or stimulating the ciliary muscle have been stronger than requisite for the purpose. He generally prescribes one-fortieth of a grain solution to be used three times a day, and only in some cases has it been necessary to increase the strength of the solution in order to produce the effect.

In the course of researches made on the influence of calomel on digestion, Dr. Vainlieff has found that this drug has no influence on the action of the digestive fluids, but entirely prevents those retrogressive and putrefactive changes by which the products of these fluids are rapidly decomposed and micro-organisms quickly developed in great numbers. Calomel when present in the alimentary canal kills bacteria, prevents the butyric fermentation and the formation of indol, etc., which usually appear as a result of prolonged normal digestion, and hinders the decomposition of biliverdin and bilirubin into hydrobilirubin. It is the unaltered character of the two colouring matters of the bile that gives the peculiar bright green hue to fæces passed by patients who have taken calomel. Tyrosin and leucin are, however, found abundantly, these products of pancreatic digestion being evidently preserved unaltered, although in natural circumstances they are so rapidly decomposed that they cannot be detected in semi-digested food (*Brit. Med. Journ.*, July 7, p. 21).

Dr. U. E. Buck, writing to the *British Medical Journal* (June 30, p. 1281) on disinfectants, strongly recommends the use of hyposulphite of sodium of the strength of a saturated solution of the salt mixed with an equal quantity of water. He states that he has failed with sanitas, terebene, resorcin, creasote, boroglyceride, chloride of zinc, charcoal, etc., in allaying the fœtor of cancerous ulcers and keeping them clean, but that he succeeded in doing so with the hyposulphite of sodium.

The use of medicated gelatine as an application in skin diseases has been reported on very favourably by Messrs. Unna and Beiersdorff (*Pharm. Zeits.*, July 18, p. 456, from *Monatsh. f. prakt. Dermat.*). Various medicines are used, of which the preparation of chrysarobin may be taken as a type. It is made by dissolving 50 parts of dry white gelatine in 100 parts of water in a water-bath, then mixing with diligent stirring 10 parts of chrysarobin. The mixture is set aside until cool and preserved in waxed paper. When required for use a small quantity is melted and spread upon the skin with a camel hair pencil; the gelatine soon hardens, and to prevent it from cracking should be painted with a little glycerine. Applied in this way, after a warm bath, the chrysarobin gelatine dressing requires renewal only two or three times a week, even in serious cases of psoriasis.

Some experiments have been made by Dr. Prollius upon a large number of specimens of isinglass, obtained from various sources, in order to clear up the contradictory statements that have been made with respect to moisture, amount of ash, residue, etc. He reports (*Pharm. Centralh.*, xxiv., 336) that the average of ash in the best sorts of isinglass is fairly represented as 0·5 per cent., and the insoluble portion after boiling in water at not more than 3 per cent. A higher proportion of moisture was found in all the samples than is generally expected, the quantity ranging between 17 and 19 per cent. When tested as to the relative viscosity of the filtered solutions, the Russian samples were found to surpass all the others, with the exception of one from Hamburg. Examined under the microscope, after lying for a few days in water, the better kinds all showed a common structure.

According to *New Remedies*, there are in Buckingham County, Virginia, within an area of 10 to 15 square miles, forty distilleries engaged in making sassafras oil. Each mill employs three men and consumes daily 80,000 lbs. of the root, extracting 50 gallons of the oil, or about ½ per cent.

The extraordinary statement made respecting papain by Professor Rossbach to the effect that when injected into the blood it enabled the proto-organisms there present to multiply rapidly, has been called in question by Mr. G. F. Dowdeswell, who has carefully examined papain of German make, and found it to contain a form of bacillus, superficially somewhat similar to a form of the bacillus of hay, which breaks up in dried preparations into very short segments often not above twice as long as broad, like *B. anthracis*, but differing from that species in having rounded, almost acuminated ends, not distinctly rectangular as in that species. Nevertheless, he was unable to find the bacillus in the blood after the papain had been injected into the veins.

The theory usually accepted as explaining the fermentation which takes place in bread-making is that the starch of the flour undergoes hydration under the influence of diastatic ferments with the ultimate production of two glucoses, dextrose and levulose, which in their turn undergo alcoholic fermentation. The correctness of this theory has been recently challenged by M. Chicandard (*Comptes Rendus*, xcvi., 1586), who gives reasons, based upon experimental observations, for considering that the fermentation consists rather in the conversion of a portion of the insoluble albumenoids of the gluten into soluble albumens and afterwards into peptones, the agent of the fermentation being a bacterium that is developed normally in the paste, the yeast playing no other part than to assist in accelerating its development. One part of M. Chicandard's argument was based upon the presumed failure to detect the presence of alcohol during the fermentation; but in a subsequent communication to the Academy of Sciences (*Comptes Rendus*, xcvi., 1865) M. Moussette states that in 1854 the vapour from a Rolland bread oven, condensed upon the metallic plates, yielded alcohol equal to 1·6 per cent. by volume of the crude liquid, 0·06 per cent. of free acetic acid, as well as some combined with iron, and a minute quantity of ammonia.

Several theories have been put forward as to the determining cause of the red coloration of carbolic acid, but none of them has been accepted as quite satisfactory. The observation that the coloration commences in glass bottles in the acid nearest the glass, induced Herr Meyke to make a series of experiments which led him to the conclusion (*Pharm. Zeit. f. Russl.* xxii., 425) that it is due to the presence of lead dissolved from the glass containing vessels. He has demonstrated that carbolic acid is capable of exercising a solvent action upon glass, and not only were lead and other constituents of glass found in a sample of carbolic acid that had become red, but the addition of silicate of lead to an acid that had remained white during eight or nine months was followed by a commencement of coloration on the third day. A qualitative analysis of the glass from two bottles in which carbolic acid had become coloured, revealed the presence of lead, whilst that from two bottles in which acid had remained uncoloured for a long time showed none, though it contained copper which has been alleged to be a cause of coloration. Herr Meyke found that in tinned vessels carbolic acid remains unaltered for a long time, and he recommends that they should be used for the purpose.

Although nine years have elapsed since Professor Dragendorff described sclerotinic acid, a compound that he had isolated while working in conjunction with Herr Podwissotzky and believed to be the active principle of ergot (*Pharm. Journ.*, [3], vi., 1001), it cannot be said that the acid has come into general use; neither, on the other hand, has it passed into the obscurity which would have been its fate ere this had a decidedly adverse judgment been passed against it. This may be partly due to the unsatisfactory form in which it is usually sent out from chemical manufactories, as a strongly-coloured thick extract containing variable quantities of water and liable to change under the influence of air and light. In order to overcome this disadvantage, Herr Podwissotzky has worked out another method of preparing it (*Pharm. Zeit. f. Russl.*, xxii., 393). This consists in heating 400 grams of powdered ergot for three or four hours with a litre of distilled water and 60 grams of dilute sulphuric acid (1 to 7) in a steam-bath, straining and pressing, extracting the residue for two hours with 500 c.c. more of distilled water, and after straining and pressing, mixing the two liquors, heating the mixture to 70° C., and treating it with neutral lead acetate as long as it gives a precipitate, which is an insoluble violet lead compound of erythrosceretin. After retaining the liquid with the precipitate for another hour in the water-bath, it is filtered, lead removed from the filtrate by treatment with sulphuretted hydrogen and filtering, and the filtrate evaporated in the water-bath, or spontaneously to about 150 c.c., or until a brown colour on the margin indicates the commencement of decomposition. The residue is then vigorously stirred with 1½ litre of absolute alcohol, from which the sclerotic acid separates in ten or twelve hours. This alcohol is separated, and the mass is well kneaded with 500 c.c. of fresh absolute alcohol, and then dried over caustic lime and sulphuric acid; by repeating this process the sclerotinic acid can be obtained as a dry, only slightly coloured, powder, the yield being from ten to fourteen grams. It should be preserved over caustic lime and sulphuric acid, or when fresh it may be kept in absolute alcohol. In aqueous solution sclerotinic acid quickly commences to decompose and Herr Podiwissotzky therefore recommends the use of thymol water (1 in 1000) as a solvent. In combination with alkalies or alkaline earths the acid entirely loses its physiological activity.

In a communication to the *Chemical News* (July 6, p. 4), Messrs. Wood and Barrett furnish further information respecting the compound of quinine and quinidine which gave rise to some controversy about eighteen months since. It is described as being obtained in a crystalline form upon mixing ethereal solutions of the two alkaloids obtained by precipitating solutions of the sulphates in acidulated water with sodic hydrate solution in the presence of ether. The numbers obtained upon analysis of the crystals agreed sufficiently well with the formula for one molecule each of quinine and quinidine and two and a half molecules of water. Prismatic crystals were also obtained upon dissolving equal quantities of the two alkaloids in ten times their joint weight of weak spirit with the aid of heat and leaving the solution to crystallize. At first these crystals appeared to contain more than three molecules of water, but after drying over sulphuric acid they approximated closely in composition to those obtained from an ethereal solution. When solutions of the two alkaloids in pure benzene, prepared similarly to the ethereal solutions, were mixed, crystals were obtained which after being exposed in a loosely covered vessel for three days gave results upon analysis that appeared to correspond pretty closely with the formula—

$$C_{20}H_{24}N_2O_2 . C_{20}H_{24}N_2O . 2H_2O + C_6H_6$$

or, one molecule each of quinine and quinidine, two molecules of water and one molecule of benzene. From the fact that the crystals contained water, whether crystallized from ether, weak spirit or benzene, and also because when rendered anhydrous the compound absorbed water from the air, it is inferred that the compound is a hydrate of the two alkaloids. The authors also describe some other analogous compounds. When a warm benzene solution of quinine hydrate alone, prepared by precipitating a warm solution in acidulated water with excess of sodic hydrate in the presence of benzene, was allowed to cool, crystals, at first rhombic, but afterwards tending to become prismatic, were obtained, which appeared to lose benzene by exposure, but when analysed after some weeks gave results that are represented by the formula—

$$2C_{20}H_{24}N_2O_2 . 2H_2O + C_6H_6$$

agreeing therefore in general composition with the compound of quinine and quinidine hydrate crystallized from the same menstruum. When the crystals of quinine hydrate from benzene were redissolved by the aid of heat in pure well-dried benzene, the solution deposited upon cooling, together with the rhombs as before, acicular crystals, which appeared to be a compound of anhydrous quinine, and after exposure gave upon analysis figures corresponding with the formula $C_{20}H_{24}N_2O_2 + C_6H_6$. An analogous compound in acicular crystals was obtained by dissolving 1 part of cinchonidine in 60 parts of benzene at the boiling temperature, and allowing the solution to cool, and the same result was obtained when cinchonidine was precipitated from acidulated water in the presence of benzene. Upon this difference in the behaviour of quinine and cinchonidine when so precipitated, the one crystallizing in rhombs containing the alkaloid, water and benzene, and the other in feathery groups of delicate needles containing only the alkaloid and benzene, the authors have based a test which they state will reveal an admixture of cinchonidine with quinine sulphate, if present to the extent of 1 per cent., after three or four hours, and smaller proportions even than this become perceptible after some days, as the benzene evaporates.

In a preliminary communication (*Pharm. Centralh.*, iv., 325) Herr Beckurts states that salts of strychnine in aqueous solution give with potassium ferrocyanide fine white crystals of ferrocyanide of strychnine, very sparingly soluble in cold water, and with potassium ferricyanide a beautifully crystalline yellow compound, sparingly soluble in cold and more easily soluble in hot water. Upon exposure to air the white ferrocyanide turns yellow, and is eventually completely decomposed, ferricyanide being formed, and a new base which can be extracted with alcohol and has been named "oxystrychnine." The decomposition is represented by the equation—

$$2(C_{21}H_{22}N_2O_2)_4FeCN_6 + O_2 = (C_{21}H_{22}N_2O_2)_6FeCN_{12} + 2C_{21}H_{22}N_2O_3.$$

The same base is formed, together with the ferricyanide, by the action of bromine upon the ferrocyanide of strychnine. Oxystrychnine is soluble in spirit, from which it crystallizes in a hard crust composed of fine needles. Both the hydrochlorate and the hydrobromate of oxystrychnine crystallize in needles, and are more soluble in water than the corresponding salt of strychnine.

Dr. A. R. Leeds (*Phil. Mag.*, xvi., 9) describes a new method for the determination of organic matter in potable water based upon the reducing action of certain organic compounds upon the salts of silver. Some preliminary experiments were made in which (1) 100 cubic centimetres of distilled water free from ammonia were taken and 5 cubic centimetres of a decinormal solution of silver nitrate added; (2) the same as the preceding, but ammonium hydrate added in quantity just sufficient to redissolve the precipitate at first formed; (3) the same as (1) but the silver precipitated as chloride and redissolved by ammonium hydrate; (4) the same as (1) but the silver precipitated as cyanide and redissolved by potassium cyanide; (5) same as (1) but precipitated and redissolved by sodium hyposulphite. These solutions were exposed to sunlight for forty-eight hours and no precipitation was found to result. The above experiments were now repeated, substituting water from the river Schuylkill, which constitutes the water supply of Philadelphia, but which recently had become polluted and possessed an offensive odour and taste. After exposing the solutions made with this water to the light for five hours it was found that the ammonio-argentic oxide was slightly affected, the cyanide of silver and potassium not at all, while the solution of hyposulphite of silver and sodium yielded the largest amount of precipitate, the ammonio-argentic chloride a precipitate nearly as great, and the neutral solution of silver nitrate the smallest quantity. These experiments indicate that the hyposulphite of sodium and silver is the most delicate as an actinic indicator in presence of organic matter, but subsequent experiment showed that a neutral solution of silver nitrate is quite sufficiently delicate. The method proposed for the examination of waters is as follows:—250 cubic centimetres of the water is treated with 10 cubic centimetres of decinormal silver nitrate solution in a stoppered bottle and exposed to light. As soon as the turbidity has aggregated into a precipitate and settled to the bottom, which occupies a time at the most not exceeding two days, it is filtered off, washed with ammonia to remove chloride and the silver weighed, or better, dissolved in nitric acid and the silver estimated by Pisani's method. Dr. Leeds notices many substances that produce similar effects, but believes from his own experience and from that of others that the method is likely to prove serviceable as a process for the determination of organic matter in potable waters. A number of determinations comparing this process with the permanganate method are recorded in the paper.

Dr. Fleming (*Phil. Mag.*, xvi., 48) notices a peculiar phenomenon in connection with the working of incandescent lamps. The Edison lamp, as is well known, consists of a carbon filament bent in horseshoe form, the two extremities of which are held by copper clamps that are connected with the platinum wires sealed through the tube. The ends of the carbon filaments, where they are connected with the copper clamps, are electroplated with copper, in order to ensure a good contact. Should any part of the filament be thinner than another, greater resistance is offered at the thin part and there is consequently here greater generation of heat, by which, Dr. Fleming says, carbon is volatilized and condenses upon the sides of the glass case in a fairly uniform coating. If the point of greatest resistance occurs on the copper clamp, metallic copper is volatilized and deposited upon the glass. In this case, upon examining the glass capsule, it is noticed that there is a narrow line along which no deposition of copper has occurred, which is not the case with carbon. This line of no deposit is found on the side of the glass capsule which is opposite the point from which volatilization has started and is in fact a shadow of the filament. This phenomenon closely resembles similar facts observed by Mr. Crookes in his radiant matter tubes, for the molecules of copper have evidently been discharged in straight lines; but the character of the carbon deposit is rather suggestive of vaporization and subsequent condensation. The copper deposited in the above manner is transparent, and its colour by transmitted light is like that of transparent gold.

The volatilization of carbon, thus once more alleged to take place at a high temperature, is not improbable in itself. Indeed, according to a theory recently put forward by M. Berthelot, who is of opinion that the true carbon is not yet known, if the pure element could be isolated it would be found to be gaseous at ordinary temperatures. On the other hand, it should be remembered that some experiments made by Messrs. Swan and Proctor to determine the nature and cause of the deposit which is sometimes found on the sides of a vessel in which carbon is heated to incandescence by the electric current (*Pharm. Journ.*, [3], x., 605) led them to believe that it consists of particles of carbon that have been mechanically transported by the minute residuum of air in the globe.

Mr. J. Munro (*Phil. Mag.*, xvi., 23) has made some experiments with a metal microphone and also upon its mode of action in a vacuum. The microphone consisted of fine iron wire gauze, one piece of which was stretched between two platinum electrodes sealed in a glass tube, a second piece of wire gauze being hung upon a third electrode and resting lightly against the other piece of gauze. The tube was then fixed upon a base board. When circuit was made with a battery and telephone and a watch placed upon the base board, the ticking was heard in the telephone. The sensitiveness of such a microphone was found to be heightened by bringing a magnet in front of the movable wire gauze, so that by attraction it is drawn slightly away from the piece upon which it rests. When the magnet is brought a short distance from the front of the movable gauze, the ticking of the watch becomes louder, and as the magnet is brought closer, the loudness increases until a certain point is reached, when it ceases and a sharp click in the telephone announces that contact has been broken. If the pole of the magnet be brought up behind the fixed wire gauze the opposite effect it produced, the sounds becoming faint, due to the closer contact of the movable wire gauze with the fixed piece. When the tube was exhausted to the extent of about the millionth of an atmosphere the indications were very marked; in fact, a vacuum microphone of this kind seems to be exceptionally delicate.

GERMS AND EPIDEMICS.

BY JOHN S. BILLINGS.

(*Concluded from page* 52.)

If we consider the diseases caused by minute animals, we find that the one which has the closest analogies with some of the specific diseases is that which is now known by the name of the parasite which produces it, the *Filaria sanguinis*. This parasite, which is found especially in China, India, and some parts of South America, is now supposed to be the cause of that peculiar disease known as elephantiasis, which by older writers was often confounded with true leprosy, and the cycle of its change is a curious one. The mature animal is a worm about the thickness of a hair and from 2 to 3 inches long, which lives in the water. When this gains admission to the human body, usually by being swallowed with drinking water, it seems to penetrate to the lymphatic system, and there to produce eggs from which are developed thousands of microscopic filaria, which swim freely about in the lymph and blood. Under ordinary circumstances they are only found in the blood at night, in the daytime they seem to collect in the lungs and lymph channels, but if the patient be kept awake at night and sleeps in the daytime, this habit is reversed and they are then found in the blood in the daytime only. So long as the microscopic filaria remain in the body of man they do not develop into the perfect animal; for this purpose it is necessary that they should find another habitation, and this is furnished by the mosquito. Having been swallowed by the mosquito with the blood, the embryo assumes a sort of chrysalis state, and at the end of three or four days escapes from its host, which is then dead or dying and has usually fallen into water. You will perceive that there seems to be a very nice adaptation between the nocturnal habits of the parasite and those of the mosquito. Dr. Manson, to whom we are indebted for most of our knowledge of this filaria, estimates that it is to be found in about 10 per cent. of the inhabitants of Amoy, China, its presence causing elephantiasis and various disorders of the lymphatics. Last year a man affected with this disease, which he had contracted in the West Indies, was for six months a patient in the New York Hospital. If any of the celebrated New Jersey mosquitoes got access to him at night and then returned to die in the scenes of their youth, you can see how a new endemic disease might be developed whose progress would be a terrible puzzle if we knew nothing of the filaria. It is also claimed by some observers that malaria and yellow fever are carried and inoculated by the mosquito, but this is yet to be proved. Keeping in mind the limitations of our present knowledge with regard to the causation of disease by minute organisms, and particulate contagion, let us consider briefly some of these acute diseases of communities and nations which are so commonly known as epidemics.

In the popular sense of this word, "epidemic" means that which is prevalent, affecting a large number of people, but it also implies something unusual and temporary. For example, the most widely spread and fatal disease in the United States is consumption, which in the year 1880 caused over 95,000 deaths, or 124·7 per 1000, yet we do not think of consumption as an epidemic disease. Epidemics are commonly divided into the great epidemics or pestilences and the small, local, common epidemics of familiar diseases, but the two forms shade into each other so that it is very difficult to draw any clear distinction. From the earliest times, in all nations of which we have authentic records, there have, from time to time, appeared forms of disease causing widespread desolation and death, when the land seems to rest in the shadow of a destroying angel, who leaves no house in which there is not one dead. There is always a certain element of strangeness about these visitations, which seem to depend on no known causes, and to have been beyond the limits of human power to foresee or prevent. Not that all such epidemic diseases are of ancient origin; new forms occur, and old ones disappear for centuries, but in every generation there comes a time when the sickle of the skeleton reaper seems to have a keener edge, and to take on a wider reach.

Such, for example, was the great outbreak of the plague which began in Egypt in the year 542 of our era, and which spread throughout the Roman Empire, being known as the Justinian Pest. At intervals of one and two centuries this disease reappeared, following nearly the old track, until at last, in the fourteenth century, after a long absence it seemed to have gathered strength, and starting from China, overran Asia, Europe and Africa, or the whole of the then known world, destroying in Europe alone 25,000,000 of people and well meriting its common name of the Black Death, or the Great Mortality. Truly, if this Oriental pest, the sparks of which still linger in the Valley of the Euphrates, be caused by minute organisms, this outbreak is one of the most striking examples in existence of the power of the small things of this world to confound the great. It is impossible for us to realize the scenes which were then enacted in Europe in the frenzied terror which was universal. Hecker's vivid description is no doubt familiar to many of you. "Merchants, whose possessions were unbounded, coldly and willingly renounced their earthly goods. They carried their treasures to monasteries and churches and laid them at the foot of the altar; but gold had no charms for the monks, for it brought them death. They shut their gates, yet still it was cast to them over the convent walls. In Avignon the Pope found it necessary to consecrate the Rhone, that bodies might be thrown into the river, as the churchyards would no longer hold them. The grass grew in the market places, the rooks and ravens came into the towns and built in the belfries, and silence was universal." It is incidentally noted that when the plague had passed away "the great increase of lawyers was astonishing to whom the endless disputes regarding inheritances offered a rich harvest. Then, came also, moral and mental outbreaks, the processions of the Flagellants, the fanatical persecuting of the Jews, and a little later the epidemic mania of the dance of St. John in Germany and the Tarantula dance in Italy."

But I have no time for even the briefest outline of the exceedingly interesting history of the epidemics of the middle ages, and will only refer to one other outbreak, which presents many singularities, namely, the sweating sickness. This disease appeared in England just after the battle of Bosworth Field, in 1483, and rapidly spread over the kingdom. It was a violent fever, followed by a profuse and fetid perspiration, the whole crisis being over in a day and a night. It attacked especially strong and robust men, killing them in a few hours. The whole outbreak lasted about five weeks, and it passed away as suddenly as it came. One attack gave no security against another. The disease again appeared in a mild form in 1506, in a severe form in 1517, and again in 1527 when it spread over Northern Europe. It then entirely disappeared for twenty-three years, when it broke out again in England with its old malignancy, four and twenty hours being decisive of the event. Since the autumn of 1551 the sweating sickness has but once appeared in its rapid and malignant form, and then it was in a very limited area. This was in Roettingen, a small town of Franconia, in the fall of 1802. The visitation was quite characteristic, but it lasted only ten days and ceased with the advent of clear, frosty weather. It is exceedingly doubtful whether the various fevers accompanied by profuse perspiration, which many physicians seek to identify with this disease, such as the Picardy sweat or miliary fever, which first appeared in 1718 and has since that time been frequently observed in France and Northern Italy, have really had any relation to the English disease. One of the peculiarities of the sweating sickness was that it began in Western Europe and spread eastward, whereas almost all the great plagues came from the East—from Egypt and far Cathay—for which there was supposed to be some mysterious reason connected with the birthplace of the human race. When, however, we remember that until within a very recent period the civilized world, which alone preserves intelligible records, was confined to the West of Europe, so that epidemics of external origin must almost necessarily have come from the East, and, moreover, that in that East was a swarming population, poor, overcrowded, filthy, and specially liable to famine, which is the great forerunner of pestilence, there seems nothing remarkable in the course taken by epidemics, which, as a rule, follow the lines of travel. This portability of the cause of epidemics, its "portagiousness," as Dr. Gibbs proposed to call it, is a very striking feature of many of the spreading diseases, and is a strong argument in favour of the proposition that this cause must be something which is material and which is not a gas. It is, in fact, extremely difficult to explain the well-authenticated instances which we have of the introduction of yellow fever into a place by means of infected bedding or clothing and its steady spread thereafter, in some instances keeping on one side of the street and passing from house to house with the regularity of a postman, at the rate of about 40 feet a day, unless we assume that this poison is not only material and solid, but living, that it may grow and increase outside the body. The old farmer's remark that "Yellow Jack can't go anywhere unless you tote him" is quite true for distances of a few miles, but for a few squares only he seems to be able to get along without assistance.

The sudden development and cessation of some epidemics, such as the sweating sickness, are sometimes urged as being opposed to the idea that living organisms can be the cause of such phenomena, but we have some well-observed facts in relation to the sudden development in large numbers of rare and remarkable fungi, or of certain insects, such as the potato bug, the grasshopper, or the phylloxera of the French vineyards, to prove that this is not an unprecedented thing. It is, however, by no means true that all epidemics can be supposed to spread in this manner. Take, for instance, influenza, of which more than ninety epidemics have occurred since its first accurately recorded appearance in 1510. Usually the epidemic wave of this disease travels with great rapidity from the North and East towards the West and South, affecting the great majority of the population in its path. It does not follow the lines of travel; when it reaches a place it strikes the whole at once, and there is nothing about it which would indicate that it is in any way dependent upon germs; on the contrary it would seem that its cause must be either gaseous or some form or variation of force.

Cerebro-spinal meningitis, which is one of the new epidemic diseases of the century, also approaches influenza in its pandemic character and in the difficulty of explaining its phenomena by any form of the germ theory.

Twice it has broken out simultaneously in this country and in Europe, it is certainly not contagious, and we are almost totally ignorant of the conditions under which it appears, spreads, or disappears. The only theory which will fit influenza and crebro-spinal fever is the famous one of epidemicity, or the epidemic constitution, which, as given by most writers, has a painful resemblance to the explanation given by the bachelor in *Le Malade Imaginaire*, who, when asked how opium produces sleep, replied that it is by a certain sleep-making faculty which it possesses.

An improvement on the epidemic constitution is the theory of Dr. Robert Lawson, who supposes that in connection with periodical variations in the magnetism of the earth there are formed on the Southern hemisphere what he calls pandemic waves, which pass from South to North occupying four or five years in travelling from the Cape of Good Hope to the Irish coast. The passage of this wave gives rise to malarial fever in India, the pest in

Asia, yellow fever on the tropical Atlantic coasts, typhus in Germany, typhoid in France, and relapsing fever in Ireland. This idea is varied and improved upon by Mr. Cushing, who, in a paper published in the *International Review* in 1880, supposes that famines and epidemics depend on changes in the sun, indicated by the so-called sun-spots which have a cycle of a little over eleven years. It is probable that there is some truth in this idea, which is quite compatible with the germ theory, but the table which he gives to show the concidences of maximum sun-spots and epidemics is something like one of Mr. Vennor's almanacs, it being usually possible to find some kind of an epidemic at some point of the earth's surface within any period of two years. The resemblance to Canadian meteorological prophecies is also seen in the fact that Mr. Cushing predicted epidemics in 1882 to accompany the maximum sun-spot period of that year, and that the said epidemics failed to appear. The great objection to all theories of this kind is that they lead the persons who uphold them to overlook or deny the existence of causes much more comprehensible and which can be practically dealt with. First of all there is the influence of contagion, which is almost always denied by these theorists. Then there is the influence of the seasons, of uncleanliness, of famine, of poverty and misery in a thousand ways. It is true that none of these will explain the phenomena of some epidemics; why it is that cholera or yellow fever will sometimes spread like a fire in the dry grass, and again are stamped out with ease; why scarlet fever is the English pest, and typhoid that of Paris; or why small-pox should at times show a special virulence. But at all events we gain nothing by giving up the problem as insolvable or referring it to an epidemic constitution or a pandemic wave.

Each epidemic is a problem by itself, and when carefully studied it is usually possible to determine some of its causes at least, if not all of them. The recent discoveries in the life history of some of the micro-organisms to which I have called your attention, the fact that variations in nutriment, temperature, air supply, and stage of growth at which propagation takes place, may convert one of the most harmless of microphytes into one of the most deadly, seem to give us a clue to the explanation of many phenomena in epidemiology heretofore deemed most mysterious.

We must also bear in mind the powers of natural selection, not only as it affects the germ but the recipient of that germ, if we are to understand the periodicity of these affections.

Even in the midst of the most terrible epidemic there are always some who resist its influence, and when it has passed away these are the survivors who transmit some of this power of resistance, with other peculiarities, to their descendants. Where one attack of the disease confers, in case of survival, protection against the second attack, it is easy to see why there should be long intervals of absence of such diseases from a community; but the same follows in a less degree by the laws of natural selection and heredity, even when the disease is one which may recur.

Small-pox still causes great alarm when it appears amongst us, but we can hardly realize the feelings with which it was viewed in the last century throughout Europe. There were published last year some extracts from a register kept from 1728 to 1764 in Kilmarnock, Scotland, a town at that time of between four and five thousand inhabitants.

From this it appears that small-pox came round regularly about once in five years. Each epidemic affected all or nearly all who were not disease proof, and therefore its victims were almost entirely children under five years of age, who had come into existence since its last visit.

Those who recovered were disfigured for life. There were, in fact, says Dr. McVail, three Kilmarnocks. One had no fear of small-pox, for its people had already met it. Some were blind, some were deaf, most were scarred and disfigured. The second Kilmarnock was under the green sod of the churchyard. The third Kilmarnock consisted of a band of about five hundred little children, which had yet to face the most terrible enemy it would ever meet. "One can barely imagine what must have been the feelings of a mother during these visitations. Even when the town was free from pestilence there would be the constant foreboding of its all too certain coming, and when at last the first case occurred, when the doctor was called in and pronounced the disease to be small-pox, his words would be heard as a sentence of death to some member of almost every family containing little ones." One of the peculiarities of the great epidemics is that they are often preceded by an unusual prevalence of diseases having somewhat similar symptoms, although quite distinct from the true pestilential affection; thus bowel affections precede cholera, malarial diseases yellow fever, and typhus the true plague; and it is for this reason sometimes extremely difficult to discover the first cases of the epidemic, and to fix the precise date of its commencement.

It is important to remember also that the mere introduction of germs into the living organism does not ensure their multiplication, or the production of disease. The condition of the organism itself has much influence on the result. Some persons cannot be vaccinated successfully; many persons can be vaccinated successfully at one time and not at another; some persons do not contract diphtheria or scarlatina or yellow or malarial fevers, although fully exposed to their causes. Pasteur has certainly made a hasty generalization in declaring that the only condition which determines an epidemic is the greater or less abundance of germs.

I hope that as I have indicated a few of the many points upon which our knowledge with regard to these disease germs is still imperfect, it has occurred to you that some of these could be settled by experiment; and that you have felt a certain degree of impatience on learning that these experiments have not yet been made, and that we must still suspend judgment.

I hope also that you may appreciate the importance of having these researches made, that they should be made for the benefit of the world, and when I tell you that the governments of England, France and Germany are employing the best talent they can get and furnishing money for this purpose, while your own country has stopped a series of most promising investigations of this kind, which were being carried on by some of our most competent scientfic men, and has deliberately resolved to confine national public health work to paying bills of quarantine inspectors *after* the epidemic has made its appearance, I think you will feel a certain sense of—well, never mind what it is a sense of—but I think you will feel it all the same. I find, however, that I am on the verge of making some "practical" remarks which I wish carefully to avoid.

At all events we have learned enough to know that the life which is born of, and nourished in, death and corruption may become the cause of disease and death in higher organisms, and that, too, to an extent in comparison with which the ravages of war sink into insignificance.

The possibilities which exist in one of these tiny crystal rods or spheres we have as yet only begun to comprehend, but as we come to understand them, the wonder seems to be, not that so many die, but that so many of us are left alive.

Yet, if we turn from limited localities and consider the life of the great races of the earth, we find that everywhere the gain is greater than the loss, though nowhere is it so great as in our country.

If we suppose that each of the little crimson discs which keep up a ceaseless waltz through the blood vessels of the growing boy has individual consciousness, we can imagine that their views of their environment and its probable future might be by no means clear. They see new corpuscles entering the dance every moment—from whence they know not—and, in a little time, they are disintegrating and passing away. It seems like an enormous waste of generative and formative force, but by and through this apparent waste the boy becomes a man. In his turn he plays his little part in the development of the race and goes over to the majority.

In the words of the 'Rubayat'—

"'Tis but a tent where takes his one day's rest
A Sultan to the realm of Death addrest;
The Sultan rises, and the dark Ferrash
Strikes and prepares it for another guest.

"And fear not lest Existence, closing your
Account and mine, should know the like no more.
The Eternal Sâki from that Bowl has poured
Millions of Bubbles like us, and will pour."

CEYLON GAMBOGE.

A correspondent of the *Weekly Ceylon Observer* inquires why gamboge should not be collected in Ceylon. He points out that fifty years ago Dr. Pereira described the colour of Ceylon gamboge as excellent and its medicinal effect as precisely the same as that of Siam. Dr. Pereira speaks of two kinds, the goraka and the *kana* (Sinh. "eating") groaka, and says further that "there seems to be no difficulty in obtaining the gamboge in a pure state, and if so it might become an article of commerce from Ceylon." Although this was stated in 1832, Ceylon gamboge has not yet become an article of commerce. The correspondent adds that Pereira's statement that there are two kinds of goraka is a mistake. There are as many varieties as regards shape of leaf, colour of flower and fruit, and shape, size and flavour of fruit, as there are af mangoes, plantains and all other fruit. The varieties hardly deserve botanical distinctions. The coarse gamboge sold in the bazaars is not what is collected in Ceylon, but is imported from Southern India. What is collected in the island is never sold. It is used sometimes by the Buddhist priests to dye their robes, a mixture with sapan dye, giving thus brownish yellow or yellowy brown which distinguishes the robes of the Amarapura sect of priests. It is used also to colour mats, for painting walking sticks, spears and bones, doors and walls of temples, etc. The mangosteen (*Mangostana cambogia*) belongs to the same or similar family, and from the rind of the green fruit, particularly, the gamboge flows abundantly on mere pressure. There are some of the Ceylon gorakas yielding fruit quite as delicious for eating as the mangosteen. The half-ripe rind of some of the Ceylon varieties is dried and sold in the bazaars for pickling fish with. It has a peculiar sharp acid flavour. There is a variety grown in fruit gardens known as the *rata* (foreign) goraka. The fruit is quite yellow when ripe and like the mangosteen round with a smooth surface, but the rind is soft, not leathery or rough. The seeds of this kind are, like the mangosteen and goraka, covered with a pulp, not white but yellow in colour, and, though sweet, quite different in flavour from that of the mangosteen or goraka. The tree resembles the mangosteen but is smaller in size. The leaves are as large but of a darker green and with a greater droop. Can this be the *Garcinia Hanburii* of Siam? It is not a favourite fruit. When ripening it is picked and pickled in vinegar, the seeds being removed and the fruit stuffed with other pickled fruit, etc., finely chopped. It seems that the goraka was considered of such little value that immense numbers have been felled from private and Crown lands and supplied to the railway as fuel. Measures should be taken to stop this wasteful destruction. As regards the mode of collection, the writer thinks it is very doubtful if the stick gamboge is collected by bamboos being placed below incisions in the tree for the liquid to flow into. The liquid exudes very slowly and dries too soon to flow. The peculiar marks in the stick gamboge are usually attributed to the inner formation of the bamboo in which it is collected, but he is inclined to think it is the result of the daily additions of the semi-dried liquid put in as soon as it is *scraped* off from the tree. The few natives who gather it do exactly as was described by Colonel and Mrs. Walker in 1839. A piece of bark from the trunk, about the size of the palm of the hand, is cut off and the resin scraped off it next morning. By boiling the leaves, the rind of the green fruit, etc., a gamboge, inferior only as a colouring matter, is obtained, but with care and using the scraped and clean bark only, gamboge as a dye-pigment ought to be obtained in this way too. The goraka tree is now scarce in the Central Province owing to its destruction when the forests were felled for coffee. But countless numbers yet remain in the island along the western coast from north to south. It would, however, be difficult for Europeans to set about collecting the gamboge, as the trees are so scattered over the country. A group of five to ten trees together in a plot is rarely found.

CHRYSOPHANIC ACID.*

The substance usually called chrysophanic acid, which has played a considerable *rôle* during the last few years as a local remedy in certain skin diseases, is more correctly called *chrysarobin.* It is a substance separated by certain solvents from goa powder, a substance found deposited in the wood of the trunk of *Andira araroba*, Aguiar. This commercial chrysarobin may be converted, by oxidizing agents, into true chrysophanic acid, and it frequently contains traces of the latter body, but it should *not* be designated by the name "chrysophanic acid."

True chrysophanic acid was discovered in 1819 by Schrader, in a lichen, namely, *Parmelia parietina*, Ach. It was first prepared pure by Rochleder and Heldt in 1843, and was subsequently met with in another lichen, viz., *Squamaria elegans*; also in the roots of various species of Rheum, particularly the officinal rhubarb, and in the leaves of various species of Rumex and Cassia.

According to Kubly, rhubarb contains only a small quantity of the acid ready formed; a larger amount is obtained by treating rhubarb so as to split up the glucoside chrysophan.

It may be prepared in the following manner. Powdered rhubarb is exhausted with very dilute alcohol containing some potash in solution, and the expressed and filtered liquid saturated with carbonic acid gas; the resulting precipitate is redissolved in 50 per cent. alcohol containing some potash, and, after filtration, precipitated by acetic acid. The last precipitate is dissolved in boiling alcohol (strong), the solution filtered hot and then mixed with water. This causes the separation of chrysophanic acid in yellow flakes. It may be purified by repeated crystallization from alcohol, or more completely, by precipitating the alcoholic solution with acetate of lead, depriving the filtrate of lead by means of sulphuric acid, and precipitating it by the addition of water. In this case it should also be further purified by recrystallizing it several times from alcohol.

Warren de la Rue and Müller recommend exhaustion of powdered rhubarb, which has been soaked in cold water and again dried, with benzol, in a displacement apparatus. On distilling off the benzol from the percolate, the residue congeals, on cooling, to a crystalline magma, which is pressed and again dissolved in boiling benzol, while an accompanying reddish-yellow substance (emodin) remains partly undissolved, partly separates from the solution during the cooling. The filtrate is evaporated to the crystallizing point, and the crystals purified by repeated crystallization, first from benzol, then from glacial acetic acid or alcohol.

Concerning the *therapeutic* effects of chrysophanic acid, the statements are quite contradictory. According to Schlossberger (*Ann. Chem. and Pharm.*, 66, 83), the acid prepared from *Parmelia parietina* has no purgative action, and that prepared from rhubarb was found to be inert,

* From *New Remedies.*

even in doses of ½ gram, according to Buchheim. On the other hand, Schroff noticed, after a dose of ½ gram of the pure acid from *Parmelia*, eructations and slimy stools, which latter commenced about twenty-four hours after taking the dose and continued to the fifth day, accompanied by want of appetite, oppression of the head, dizziness and lassitude. Schlossberger denies the transition of the acid into the urine, and ascribes the yellow colour of the latter, after rhubarb has been taken, to phæoretin and erythroretin. Schroff and Buchheim, however, noticed yellowness of urine regularly after each administration of the acid, even up to the eighth day, and Meykow asserts that the rhubarb-resins colour the urine only if contaminated with chrysophanic acid. The purgative effect of rhubarb can evidently not be ascribed to the small quantity of chrysophanic acid present, and only in part to phæoretin (which purges only in larger doses).

All other therapeutic statements, which have appeared in late years, concerning chrysophanic acid, refer to chrysarobin from goa powder.

INDIARUBBER COLLECTION IN BRAZIL.*

In the early morning, men and women come with baskets of clay cups on their backs, and little hatchets to gash the trees. Where the white milk drips down from the gash they stick their cups on the trunk with daubs of clay, moulded so as to catch the whole flow. If the tree is a large one, four or five gashes may be cut in a circle around the trunk. On the next day other gashes are made a little below these, and so on until the rows reach the ground. By eleven o'clock the flow of milk has ceased and the *seringueiros* come to collect the contents of the cups in calabash jugs. A gill or so is the utmost yield from each tree, and a single gatherer may attend to a hundred and twenty trees or more, wading always through these dark marshes, and paying dearly for his profit in fever and weakness. Our *mameluca* hostess has brought in her day's gathering—a calabash full of the white liquid, in appearance precisely like milk. If left in this condition it coagulates after a while, and forms an inferior whitish gum. To make the black rubber of commerce, the milk must go through a peculiar process of manufacture, for which our guide has been preparing. Over a smouldering fire, fed with hard nuts of the *tucuma* palm he places a kind of clay chimney, like a wide-mouthed, bottomless jug; through this *boiao* the thick smoke pours in a constant stream. Now he takes his mould—in this case a wooden one, like a round-bladed paddle—washes it with the milk, and holds it over the smoke until the liquid coagulates. Then another coat is added, only now as the wood is heated, the milk coagulates faster. It may take the gatherings of two or three days to cover the mould thickly enough. Then the rubber is still dull white, but in a short time it turns brown and finally almost black, as it is sent to the market. The mass is cut from the paddle and sold to traders in the village. Bottles are sometimes made by moulding the rubber over a clay ball, which is then broken up and removed. Our old-fashioned rubber shoes used to be made in this way. Twenty million pounds of rubber, valued at 6,000,000 dollars, are annually exported from Pará in the dry season; many thousand people are engaged in gathering it. But the business altogether is a ruinous one for the province, as Brazilians themselves are fully aware. The *seringueiro*, who gains two or three dollars for a single day's gathering, has enough, as life goes here, to keep him in idleness for a week; and when his money is spent, he can draw again on his ever-ready bank.

The present wasteful system is spoken of as follows:—The half-wild *seringueiros* will go on submitting to impositions and dying here in the swamps, until Brazilians learn that by purchasing this land from the Government, and planting it in rubber trees, they can insure vastly larger profits, and do away with the evils of the present system. It is what must eventually be done. The rubber gatherers, in their eagerness to secure large harvests, have already killed an immense number of trees about the Pará estuary; they have been obliged to penetrate farther and farther into the forest, to the Tocantins, Madeira, Purus, Rio Negro, and eventually even these regions must be exhausted, unless they are protected in some way. The trees, properly planted and cared for, will yield well in fifteen years, and, of course, the cost of gathering would be vastly reduced in a compact plantation; half the present labour of the rubber collector consists in his long tramps through the swampy forest.

* From the *Dominica Dial*.

INLAND PARCELS POST.

The Inland Parcels Post will commence on Wednesday the 1st of August, on and from which day parcels *not exceeding 7 lbs. in weight* will be received at any post office for transmission between places in the United Kingdom.

In order that a packet may go by Parcels Post it must be tendered for transmission as a parcel, and should bear the words "Parcels Post,"—which should be clearly written in the left-hand top corner.

Every post office will be open to the public for Parcels Post business on week days during the same hours as for general postal business. No Parcels Post business will, as a rule, be transacted in England or Ireland on Sundays, Christmas Days, and Good Fridays; nor in Scotland on Sundays and Sacramental Fast-days.

The following are the principal conditions and regulations:—

The size allowed for an inland postal parcel will be—

Greatest length	3 ft. 6 in.
Greatest length and girth combined	6 ft. 0 in.

For example—

A parcel measuring 3 ft. 6 in. in its longest dimension may measure as much as 2 ft. 6 in. in girth, *i.e.* round its thickest part; or—

A shorter parcel may be thicker; thus,—if it measure no more than 3 feet in length, it may measure as much as 3 feet in girth, *i.e.*—round its thickest part.

The most convenient mode of measuring will be by means of a tape 6 feet long, having the length of 3 ft. 6 in. marked thereon. So much of the tape as is not used in measuring the length will be the measure of the maximum girth permissible. Such a tape, if provided by stationers, might conveniently be marked in one colour up to 3 ft. 6 in., and the remaining portion in another colour.

The rates of postage will be,—for a parcel:—

Not exceeding 1 lb. in weight.	3*d.*
Exceeding 1 lb. and not exceeding 3 lbs. .	6*d.*
,, 3 lbs. ,, ,, 5 lbs. .	9*d.*
,, 5 lbs. ,, ,, 7 lbs.	1*s.* 0*d.*

No parcel will be accepted which weighs more than 7 lbs., or is not sufficiently paid. The postage must, in all cases, *be paid in advance*, and by ordinary postage stamps, which must be affixed by the sender before tendering a parcel for transmission by Parcels Post at a post office.

Posting of Parcels.—Parcels must not be posted in a letter box, but must be taken into a post office and handed over the counter. Care must be taken that every parcel bears a clear address.

If a parcel be posted in a letter box it will not be forwarded by Parcels Post, but will be treated as a letter, or as a book packet if it can pass under Book Post regulations.

The address of a parcel must be clearly written, either on the outer wrapper or on a separate address label securely fastened to the parcel; and the necessary stamp or stamps, to prepay the postage, must in all cases be placed (as in the case of letters) close above the address.

Forbidden Articles; Treatment of Perishable and

Dangerous Articles; and Parcels which must be refused.—Parcels which bear on the outside any writing or drawing of an indecent or offensive nature, or within which any contents of a like nature may be observed, and parcels containing gunpowder, cartridges, lucifer matches, or anything explosive or liable to sudden combustion, bladders containing liquid, live animals, grossly offensive or filthy matter, and anything in a condition likely to injure other parcels, or any officer of the Post Office, are prohibited.

If any such parcel be tendered for posting, it will be refused, or, if detected in transit, it will be detained.

Parcels containing fish, game, meat, eggs, etc., or razors, scissors, needles, knives, forks, or other sharp instruments, will not be accepted unless securely packed so as to guard against risk of injury to other parcels. Liquids, or semi-liquids, such as jellies, pickles, paint, varnish, etc., will not be accepted unless in bottles or cans securely stoppered; nor powders unless so packed that they cannot escape in transmission. Bottles, or glass in any form, will be accepted only when so packed as to be secure from breakage. If a parcel be tendered in a damaged or insecure condition, or in a condition likely to injure other parcels or any officer of the Post Office it will be refused. If a parcel in such condition should be observed in transit it will, if possible, be made secure and sent forward; but, if it cannot be so secured, it will be detained.

Parcels known to contain a letter, packet, or parcel intended for delivery at an address other than that borne on the parcel itself, are prohibited.

Parcels to and from the Channel Islands and the Isle of Man.—Parcels addressed to the Channel Islands (Jersey, Guernsey, Alderney, Sark, and the adjacent inhabited islets) will be received from the public under the same general conditions with regard to weight and size, and at the same rates of postage, as parcels for all other portions of the United Kingdom; but as the Channel Islands, in relation to the Customs laws of the United Kingdom, are subject to the same restrictions as foreign countries, such parcels will be liable to Customs examination at the port of arrival, and the sender will be required to make a declaration of contents upon a special form provided for the purpose at the office where the parcel may be posted.

Goods intended to be warehoused in the Channel Islands, or on which it is intended to claim "drawback" of duty on subsequent exportation from the Channel Islands, will not be accepted for transmission by Parcels Post.

Parcels for the Isle of Man will be treated in all respects in the same way as parcels for places in the United Kingdom generally. They will be liable to examination by the officers of Customs; but the sender is not (as in the case of the Channel Islands) called upon to furnish a declaration of contents.

☞ The Customs laws of the United Kingdom do not admit of the use of the Parcels Post for the introduction into Great Britain of tobacco in any form.

Parcels addressed to a Post Office to be called for.—To those post offices to which letters may be addressed to be called for, parcels may also be addressed to be called for.

There is no private box delivery of parcels, but parcels may be obtained, as follows, on application at a post office, provided the postmaster is satisfied of the identity of the applicant:—

1. By persons having parcels addressed to a post office.
2. By persons not residing within a free delivery.
3. By persons residing within the free delivery of a head office, or of any rural post, so far as regards parcels for which there is no immediate delivery by the usual means.
4. By members of the military, naval, constabulary, and coast guard services, under the same rule as applies to the delivery of their letters.

Parcels addressed to a post office to be called for, or to a person residing beyond the free postal delivery, will be kept three weeks.

Parcels addressed to a ship will be kept one month.

If, however, such a parcel contains perishable matter it will be kept only forty-eight hours; and should it become offensive it may be disposed of at any time as the Postmaster-General may direct.

Parcels liable to Demurrage.—Parcels addressed to a post office "to be called for," and only such parcels, are liable to a demurrage (detention) charge, if not called for within a certain time, at the rate of 1*d.* a day after they have remained in the office one clear day, counting as a day the period during which the office is ordinarily open to the public.

Thus a parcel arriving after the opening of the office on a Monday becomes liable to demurrage if not called for before the closing of the office on Tuesday night, and if delivered on Wednesday the charge will be 1*d.*: one penny being added for each succeeding day, or part of a day.

No charge will be made in respect of Sundays, Christmas Days, Good Fridays, or Bank Holidays, in England or Ireland; nor in respect of Sundays, Bank Holidays, and Sacramental Fast-days in Scotland.

No demurrage will be charged on parcels addressed to persons residing outside the limits of the free delivery, or to persons on board ship.

Re-direction of Parcels.—On receipt of a properly signed authority, a parcel may be re-directed under the following regulations:—

If the re-direction be from one place to another within the same delivery, the parcel, not having been delivered, and being re-directed by an officer of the department, is liable to no charge for re-direction; but if re-directed by any person other than an officer of the department, or to an address in another delivery, it is liable to additional postage at the full prepaid rate for each re-direction. If it has not been delivered and is re-directed by an officer of the department, prepayment for re-direction is not compulsory, but a parcel which has been delivered as addressed will not be accepted for re-transmission unless the postage for re-direction be prepaid.

Returned Parcels.—In order to facilitate the return of parcels which cannot be delivered it is most desirable that the name and address of the sender should appear on the outside of every parcel.

If a parcel which cannot be delivered bears on the cover the name and address of the sender a printed notice will be sent to him by post informing him that the parcel (if not claimed in the meantime by the addressee) will be given up to him or to to any person whom he may direct to call for it or will be returned to him by post.

If the parcel should be called for by the sender or his agent, or if it should be returned to him by post, it will be liable to a charge of one penny for each day or part of a day after the expiration of two clear days following that on which the notice has been sent.

If the sender should elect to have the parcel sent back to him by post he must return the printed notice with stamps sufficient to cover new postage at the full rate and also to cover any other charges to which the parcel may be liable, including the charge of one penny a day described above. The parcel will then be forwarded to him prepaid by stamps affixed thereon.

If no reply be received within six days after the date of the notice, or if the postmaster should have reason to believe that application is made for the parcel by a person who is neither the sender nor the addressee nor duly authorized by either, or if the sender fail to pay the charges due on the parcel, the parcel will be sent to the Returned Letter Office.

If a parcel which cannot be delivered does not bear on the cover the name and address of the sender it will be sent to the Returned Letter Office where it will be opened and examined.

If upon such examination the name and address of the sender are ascertained a printed notice such as is described above will be sent to him, and the parcel will be treated in the same manner as a parcel upon the cover of which the name and address of the sender appears.

If the name and address of the sender cannot be ascertained from the examination of the parcel the name of the addressee of such parcel and the post office at which it was posted will be entered on a list, which will be exhibited in a conspicuous position at the Returned Letter Office of the district for inspection by the public.

Personal applications for parcels entered on such lists will be entertained for three months from the date of entry, after which the parcels will be finally disposed of.

Parcels without Address.—Parcels found without addresses will be sent at once to the proper Returned Letter Office.

Parcels found to contain dangerous or offensive matter will be detained.

Rural Carriers forbidden to collect Parcels from the Public.—Rural letter carriers on foot are forbidden to collect parcels from the public. Mounted rural carriers are also forbidden to collect parcels from the public except under special authority.

Delivery of Local Parcels by Mounted Rural Carriers.—A parcel handed by the public to a mounted rural carrier authorized to collect parcels will be delivered either on his outward or inward route, provided it shall first be taken to a sub-office in order that the stamps may be defaced.

Parcels above Weight or Size, or Insufficiently Paid.—Should a parcel exceeding the prescribed limits of weight and dimensions be accepted by a mounted rural carrier or mail driver authorized to collect, it will be stopped at the office at which he hands it in and returned to the sender by the person who accepted it. Should a parcel be accepted with insufficient postage, stamps for the amount of the deficient postage will be affixed to the parcel, which will be sent on to its destination, and the amount will be charged against the person who so accepted it and who will have to collect it from the sender.

Parcels not to be Accepted near a Post Office.—Mounted rural carriers or mail drivers, even when authorized to collect, may refuse to accept parcels tendered to them close to a post office.

Rural Letter Carriers not to carry Parcels on their own Account.—Rural letter carriers or parcels carriers, on foot, are forbidden to carry parcels of any kind on their own account. In certain exceptional cases, in which special permission has been given to carry newspaper parcels, this rule will not be enforced as regards such parcels.

Newspaper Parcels carried by Horse Posts.—Mail cart contractors or their drivers and mounted rural carriers may carry on their own account parcels of newly published newspapers, addressed to a newsagent, without restriction of weight, so long as the carrying of such parcels does not interfere in any way with the due performance of the mail service; but they are not allowed to carry on their own account parcels of any other description except in cases where they hold a special authority to do so, and such authority will in no case include parcels which are within the limit of weight prescribed for postal parcels.

Parcels by Passenger Conveyances.—Contractors for the carriage of mails by passenger conveyance are not subject to any restriction as to the parcels they may convey.

Detention of Parcels under Special Circumstances.—The Postmaster-General has power to delay parcels when it is necessary to do so in order to secure the due despatch of the letter mails, or when it is expedient for the safety and protection of parcels mails. When, therefore, a postmaster is satisfied that the despatch or delivery of letters would be delayed by the despatch or delivery of parcels, such parcels, or any of them, may be detained until the following despatch or delivery; or if it be necessary for the safety and protection of parcels that any of them should be forwarded or delivered by a later despatch or delivery than that for which they were intended a postmaster may delay such parcels, or may make some special arrangement for the despatch or delivery thereof, such as he may deem necessary or expedient in the circumstances of the case. In no case, however, must the delay exceed twenty-four hours.

Private Bags.—Postmasters are not prohibited from enclosing parcels in private bags, but under no circumstances will the restriction as to the weight of a private bag when empty be relaxed

A Parcel not to be given back to the Sender.—The rule forbidding that a letter should be handed back to the sender applies equally to a parcel.

Bankrupts' Parcels.—The Post Office rules which apply to bankrupts' letters apply equally to bankrupts' parcels.

Deception as to Place of Posting.—Postmasters are forbidden to be parties to deceiving the addressee of a parcel in regard to the place of posting.

If a parcel reaches a post office under cover with a request that it may be posted it will be endorsed according to the rule applicable to a letter similarly received. If the parcel bears the necessary postage it will be forwarded as addressed. Should the postage not be prepaid the parcel will be sent to the Returned Letter Office.

Damaged Parcels.—A parcel found open or in a torn or injured condition will be re-fastened as carefully as possible and secured with an official seal, or by means of a label similar to those provided for securing torn letters, and initialled by the responsible officers.

Non-Liability of Postmaster-General.—The Postmaster-General is not liable to make good any claim in respect of lost or damaged parcels.

Gratuities.—The Post Office regulations which apply to the solicitation of gratuities from the public by persons employed in the postal service applies to persons engaged in parcels work.

Suggestions.—(*a*) Mercantile firms and others who may have to post a large number of parcels at one time will facilitate the despatch of the parcels by sending them to the Post Office in batches, and as early as possible.

(*b*) The risk of delay in the transmission of parcels will be largely obviated if senders of parcels in large quantities (whether it be the intention to post the parcels daily or at regular or irregular intervals) will so far as possible notify their intentions to the nearest postmaster or sub-postmaster as early beforehand as convenient. It is not essential that the number and weight of the parcels and the frequency of posting should be specified with absolute precision: it will be sufficient if a general idea be given so that some provision over and above the ordinary means available may be arranged for in advance.

(*c*) The public will greatly assist the work of the Post Office and help towards the safe delivery of parcels by taking care that they are in all cases strongly and securely packed, especially those with fragile or perishable contents. It must be borne in mind, although of course every care will be taken by the officers, that such a parcel must be several times handled before it reaches its destination, and will probably have to be packed with many others of a different kind and shape, or more weighty and bulky.

(*d*) It is not intended to apply to postal parcels the practice which obtains of adding to the address in the case of letters for the Metropolitan district the postal district initials, and such initials should not be used in addressing a parcel to London or the suburbs.

By command of the Postmaster-General,

S. A. Blackwood, *Secretary.*

General Post Office,
July, 1883.

The Pharmaceutical Journal.

SATURDAY, JULY 28, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

PATENTS AND TRADE MARKS.

ONE very important measure which has passed the ordeal of the Standing Committee on Trade, and now awaits the consideration of the House of Commons, is the Government Bill to amend and consolidate the law relating to patents for inventions, trade marks, and registration of designs. Many previous attempts have been made to legislate upon these matters by independent members without success, but in the present Bill the subject appears to have been dealt with comprehensively, and on the whole acceptably, by the President of the Board of Trade, and as there is a prospect that it will pass into law during the present session, it may be useful to give an outline of its provisions.

The main responsibility for carrying out the provisions of the Bill is to be entrusted to an officer appointed by the Board of Trade, and called the "Comptroller-General of Patents, Designs and Trade Marks." The Bill deals in the first place with the law relating to patents. It provides that any person or persons may make application to the Comptroller for the grant of a patent in a form set forth in the Schedule, which must contain a declaration as to the invention for which a patent is sought, accompanied by at least a provisional specification; but if a complete specification is not furnished within nine months the application is to be deemed abandoned. This application is to be referred to an examiner, and upon his reporting in favour of the acceptance of the specification, the fact is to be advertised by the comptroller and the application and specification, with drawings, if any, are to be open to public inspection. Notice of objection may be lodged at any time within two months of the date of the advertisement, but in the event of there being no opposition the patent is then to be sealed and issued. During the whole period between the date of the application and the sealing of a patent provisional protection is to be given, but between the acceptance of the complete specification and the sealing of the patent the applicant will enjoy the same privileges as if the patent were already granted. Every patent is to be in force for the term of fourteen years, provided that the prescribed payments are made. These are £1 on application for provisional protection, £3 on filing a complete specification, £50 more on a certificate of renewal before the end of four years from the date of the patent and another £100 on a certificate of renewal before the end of seven years from date of payment. Fees in respect to other matters under this part of the Act are to be fixed by the Board of Trade with the sanction of the Treasury. It would, however, appear probable that in ordinary unopposed cases the patentee would have protection during nearly four years before he would be called upon to pay any very large sum of money. Another arrangement by which the payment of fees is spread over all the years up to the thirteenth seems to be still more favourable. Power is reserved to the Board of Trade, under certain conditions, to compel a patentee to grant licences on reasonable terms. Petitions for the extension of terms of patents are to be presented to the Queen in Council.

The next part of the Bill provides for the registration of designs, such registration to confer upon the registered proprietor of a design a copyright in it for a term of five years. The fees to be paid for this registration are to be fixed by the Board of Trade, with the sanction of the Treasury.

But the portion of the Bill which relates to the registration of trade-marks is probably that which will be of most interest to the readers of this Journal, since it proposes to repeal all the existing Acts upon the subject and replace them by provisions which vary to some extent as to the details. If the Bill passes in its present state all applications for the registration of trade marks will in future have to be made to the "Comptroller-General of Patents, Designs, and Trade Marks," on a prescribed form, which is to contain one representation of the trade mark sought to be registered and be accompanied by two other representations of it affixed to separate sheets of foolscap, and is to state the class in which registration is desired to be effected. Each application will also have to be accompanied by a statutory declaration to the effect that the trade mark in question is not, to the best of the applicant's knowledge and belief, in use by any other person for the goods in respect of which registration is sought, and stating how long it has been in use by the applicant. A trade mark will have to consist of or contain at least one of the following essential particulars: (*a*) a name of an individual or firm printed, impressed or woven in some particular and distinctive manner; or (*b*) a written signature or copy of a written signature of the individual or firm applying for registration thereof as a trade mark; or (*c*) a distinctive device, mark, brand, heading, label, ticket, or fancy words not in common use; and to any one or more of these particulars may be added any letters, words or figures, or combination of the same. But special and distinctive words, letters, figures, or combinations of them that were in use as trade marks before the 13th of August, 1875, are to be eligible for registration by themselves. The introduction of the words "or fancy words not in common use," would appear to be intended to provide for the registration of names as trade marks, which it has been decided could not be done under the existing Act. The word "brand" has also been introduced. Each trade mark will have to be registered for particular goods or classes of goods. In the case, however, of an application by one person to register several trade marks, resembling each other in the material particulars, but with variations indicating differences in quality, price, etc., it will be permissible to register them as a series in one registration, the sole drawback being that the series will only be transferable as a whole. The rules as to classification, fees, etc., existing at the time of the passing of the Act are to continue in force until formally modified by the Board of Trade, unless they are inconsistent with the provisions of the new law. The comptroller may, if he think fit, refuse to register a trade mark; the applicant will then be at liberty to appeal to the Board of Trade, who may refer the appeal for decision to the law courts. Otherwise, every application is to be advertised as soon as possible after its receipt, and within the next two months notice of opposition, in duplicate, may be given at the Patent Office. A copy of such notice if received is to be sent to the applicant, who will have to send in his counter statement within two months or be deemed to have abandoned his application. Should the opposition be continued, the case will be set down for trial upon the objector giving security for costs. Curiously enough there is no explicit provision in any part of the Bill for the registration of a trade mark at any particular stage, although of course this is implied.

Registration of a trade mark under this Act is to be deemed equivalent to the public use of it, and the registration of a person as first proprietor of a trade mark is to be *primâ facie* evidence, and after the expiration of five years from the date of registration is to be held conclusive evidence of his exclusive right to the use of it in connection with the class of goods for which it is registered. A book is to be kept at the Patent Office in which are to be entered the names and addresses of proprietors of registered trade marks and notifications of assignments and transmissions of them. At a time not less than two months or more than three months before the expiration of fourteen years from the date of registration, and of each successive fourteen years, the comptroller is to send a notice to the registered proprietor of a trade mark, notifying the date of the approaching expiration, and that unless a prescribed fee be paid before that time, the trade mark will be removed from the register. In the event of the fee not being paid within a month a second notice is to be sent, and should the fourteen years run out before payment is made, the comptroller will be empowered to remove the trade mark from the register. After removal, however, it may be restored within a limited time upon payment of an extra fee, and under any circumstances for a period of five years after removal it is to be deemed a trade mark already registered. The latter provisions are practically identical with the existing law on the subject. Authority will be given to the Company of Cutlers in Hallamshire to establish and keep, under certain supervision by the comptroller, a new register, to be called the "Sheffield Register," for cutlery and steel goods, and an arrangement is made for the closing of the present corporate register at the end of five years. It is worthy of note that no analogous provision is made giving authority for the registration of names or designs by the Stationers' Company. Certain provisions are also made in anticipation of any international arrangements as to patents that may be negotiated at a future time.

One offence under the Act will be the representation that an article is patented or that a trade mark is registered when it is not; and the representation will be deemed to have been made if the article or trade mark bear the word "patent," "patented," or "registered." Offenders are to be liable for every such offence, on summary conviction, to a fine not exceeding five pounds. Another offence is that to which attention was called at the last meeting of the Council by Dr. SYMES, which makes every person who, without due authority, assumes or uses in connection with any trade, business, calling or profession, the royal arms, or any arms so nearly resembling the same as to be calculated to deceive, liable on summary conviction to a fine not exceeding twenty pounds. Although this provision may be strictly in keeping with the spirit of the Bill the time is not ripe, in our opinion, for so stringent a restriction, and we doubt whether it would be found practicable to carry it into effect immediately even if passed. We have no particular sympathy with the custom of wearing borrowed plumes; but in respect to the use of the royal arms we cannot help thinking that the practice has now become so universal that it will require many months simply for the knowledge that it has been made illegal to permeate through all the classes that will be concerned. Almost all tradesmen, chemists and druggists not excepted, have long been in the habit of displaying the royal arms as an ornament on shop-fronts, goods, advertisements, invoices, labels, bags, carts, and in every conceivable way, and any attempt summarily to put a stop to the practice by the imposition of penalties will give rise to ill-feeling and inconvenience exceedingly disproportionate in importance to any useful object that can be thereby attained.

These are the principal provisions of the Bill, which, however, in one hundred and fourteen clauses contains a large number of details relating to certain contingencies that may arise. Subject to necessary modifications it is proposed that its operations shall extend also to Scotland, Ireland, the Isle of Man and the Channel Islands, and the time fixed for it to come into operation is the first day of next year.

THE INLAND PARCELS POST.

The Inland Parcels Post, which is to be commenced in this country on Wednesday next, promises to be so important an addition to public convenience, although not much in advance of what has been enjoyed on the Continent for many years past, that we have thought it desirable to publish *in extenso* in the present number the official regulations under which it is to be conducted. We hope that in doing so we shall not only be placing useful information before the readers of the Journal, but shall be also rendering some slight assistance to the Post Office authorities who, in perfecting the organization necessary for starting and carrying on satisfactorily what will probably prove to be an important augmentation of the already enormous business of the Department, have a task set before them that will try to the full the business capabilities with which they are so generally credited. The rules appear to be simple and easy to understand; the limits as to weight and measurement are distinct and present no difficulty. Evidently with proper care the parcels post will be available for the transmission of medicine. It will be seen that liquids and semi-liquids will not be accepted unless in bottles or cans securely stoppered, and that bottles or glass in any form must be so packed as to be secure from breakage; powders also will have o be so packed that they cannot escape during transmission. We notice that the Postmaster-General proposes to contract himself out of any liability to make good any claim in respect of lost or damaged parcels. We doubt, however, whether such a provision would stand good, for in undertaking the charge of goods for the purpose of transit it is implied that a reasonable amount of care will be exercised, which it might be assumed should, as a rule, be sufficient to prevent any of the parcels from going astray. It is important to observe that in order to bring parcels within the terms of the parcels post they must be taken into a post office and handed over the counter, and not posted in a letter box.

The second reading of the Medical Acts Amendment Bill was the ninth order of the day in the House of Commons, on Tuesday.

* * *

Notwithstanding the late period of the session and the great pressure of business in Parliament, a Petroleum Bill was introduced into the House of Lords by Earl Granville last week, and was set down for second reading on Thursday. As the object of the Bill is to consolidate and amend the whole of the existing law relating to petroleum, we propose to give an epitome of it next week.

* * *

The Thirty-Second Annual General Meeting of the General Austrian Pharmaceutical Association is to be held in Vienna, on Monday and Tuesday, the 20th and 21st of August. As the International Pharmaceutical Exhibition will be open in Vienna at the same time, as well as the Electric Exhibition, it is expected that the meeting will be unusually well attended.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

July 11, 1883.

Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Brady, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Southall, Tanner, Taylor and Thresh.

Dr. Greenhow attended on behalf of the Privy Council

MAJOR EXAMINATION.

Seven candidates were examined. *Three* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Bessell, James Walter............Ludlow.
Corder, Walter Shewell ....Sunderland.
Gulliver, Walter Frederick......London.
Hopkins, William Richard ......Aberystwith.

MINOR EXAMINATION.

Twenty-three candidates were examined. *Eleven* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Acton, Samuel ....Liverpool.
Adams, Charles Mansley ......Bath.
Adamson, Joseph William ......Epworth.
Atkinson, Richard ....Penrith.
Badcock, Henry Southgate R....South Petherton.
Beale, William Scott ....London.
Beck, Nathan George ....Lyme Regis.
Brown, Joseph ....Walker-on-Tyne.
Burnett, Joseph Fearon ....Hyde.
Charge, Arthur William ....Chichester.
Haddock, James ....Bedford, Leigh.
Jones, David.........................Carnarvon.

July 12, 1883.

Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Brady, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Southall, Tanner, Taylor and Thresh.

Dr. Greenhow attended on behalf of the Privy Council.

MAJOR EXAMINATION.

Eight candidates were examined. *One* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Baily, Edward ....Ramsgate.
Barnes, James Burden............Knightsbridge.
Crow, William Edward ....Louth.
Houfe, Robert William ....York.
Ivatt, Albert..........................Cottingham.
Johns, Henry Benj. Jeffery ...Southampton.
King, Arthur ....Norwich.

MINOR EXAMINATION.

Twenty-three candidates were examined. *Eleven* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Beck, Percy Charles ....Norwich.
Crofts, John Ernest..............Leicester.
Crompton, William ....Bury.
Davies, Edward Charles James.London.
Denham, Albert Shaw............Preston.
Dewes, George ....Wolverhampton.
Dickie, John..........................Whitehaven.
Dickson, John ....Dumfries.
Edmunds, Henry Herbert ......Mere.
Reynolds, Richard Freshfield...Leeds.
Scupham, Herbert ....Ulceby.
Wilson, David Wm. Richd. ...Thirsk.

July 13, 1883.

Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Southall, Tanner, Taylor and Thresh.

MINOR EXAMINATION.

Thirty candidates were examined. *Twenty-three* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Elliott, Stephen James ....Preston.
Hague, William ....Sheffield.
Hart, Frederick Charles ....Tongham.
Heath, Walter Edwin ....Coleshill.
Hordley, Henry Clement........Stoke-on-Trent.
Hudson, Alfred Wickens........London.
King, Frederick Herbert........Market Drayton.

July 18, 1883.

Present—Mr. Carteighe, President: Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Southall, Tanner, Taylor and Thresh.

MAJOR EXAMINATION.

Six candidates were examined. *Three* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Corder, Edward ....Norwich.
Presbury, Herbert Henry ....London.
Ranken, Charles ....Sunderland.

MINOR EXAMINATION.

Twenty five candidates were examined. *Fifteen* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Barnes, William Robert ....Plaistow.
Capper, Henry ....Liverpool.
Inger, George Edward........Nottingham.
Kay, Thomas Wilkinson........Manchester.
Keeling, Arthur Gadsby........Walthamstow.
Kelly, John George ....Leicester.
Lambert, Oliver ....Hull.
Lees, James ....Leighton Buzzard.
Metcalf, Rowland Alfred ....Uxbridge.
Sergeant, Furlow Ross ....Goxhill.

July 19, 1883.

Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Southall, Tanner, Taylor and Thresh.

Dr. Greenhow attended on behalf of the Privy Council.

MAJOR EXAMINATION.

Seven candidates were examined. *Five* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Rees, David ....Newcastle Emlyn.
Williams, William Lloyd ....Buckley.

MINOR EXAMINATION.

Twenty-five candidates were examined. *Seventeen* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Milton, William Edwin ....Chew Magna.
Mowatt, John Rodman ....London.
Munkman, Robert Allen ....Boston.
Palmer, Harvey ....Wingham.
Parker, Edmund Lloyd Philips..Nottingham.
Peck, Henry Frederick ....London.
Pottage, Edwin........Beverley.
Walker, George Edward........Royston.

July 20, 1883.

Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Southall, Tanner, Taylor and Thresh.

Dr. Greenhow attended on behalf of the Privy Council.

MINOR EXAMINATION.

Thirty candidates were examined. *Twenty-four* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Roberts, Edmund........Upper Norwood.
Rowland, Langshaw ....Wrexham.
Shepard, William........Newport, I. W.
Stafford, Robert ....Nottingham.
Weller, James Mills........Chichester.
Wiggin, John Chinery........Ipswich.

MODIFIED EXAMINATION.

One candidate was examined, but failed to pass.

PRELIMINARY EXAMINATION.

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

Certificates of the College of Preceptors.

Jones, Edward Owen ....Llangollen.
Leonard, Charles Edward ....Lewes.

Certificate of the Faculty of Physicians and Surgeons of Glasgow.

Baldwin, Aquila ....Birmingham.

Certificates of the University of Oxford.

Davis, Henry Baker ....Swansea.
Hulland, James ....Bath.

PRELIMINARY EXAMINATION.

The report of the College of Preceptors on the Preliminary examination, held on July 3, was received.

Four hundred and fifty-one candidates had presented themselves for examination, of whom *two hundred and twenty-five* had failed. The following *two hundred and twenty-six* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

Anderson, Frederick Ernest ...Thorne.
Andrews, Dormer Frederick ...Chatham.
Aspden, Edwin........Blackburn.
Atkinson, Joseph Andrew ....Spilsby.
Austin, James ....Birmingham.
Baker, Alfred Henry Sauzen...Gateshead.
Bambridge, Lewis Thomas........London.
Bamforth, Alan ....Slaithwaite.
Barclay, James Christian ....Aberdeen.
Barker, James Herbert Bond...Mold.
Bates, Frederick ....Allendale.
Batty, Thomas ....Southampton.
Bennett, Arthur ....Widnes.
Billing, George Alfred........Bodmin.
Billyard, William Frederick .. Boston.
Bird, Frederick William........Coventry.
Birkett, George........Morecambe.
Black, John Frank ....Aberdeen.
Black, Robert ....Aberdeen.
Bond, Ernest Greensill ....Liverpool.
Bonnett, Frederick ....Doncaster.
Boole, Lucy Everest ....London.
Boulton, Ernest Henry Charles.Market Rasen.
Bourne, Henry Fred ....Louth.
Bowen, Frederic Tamerlane ...Rye.
Bowron, Henry Edward........Liverpool.
Bradbrook, Walter Young........London.
Bradley, Nathaniel Lade........Margate.
Bray, John ....Lochmaben.
Brennan, James ....Pendleton.

Broomhead, James ....Aberdeen.
Buchan, George ....Peterhead.
Burgess, Arthur Leland ....Guernsey.
Camm, Charles Percy ....Wolverley.
Carter, Samuel ....Newlyn.
Chalmers, William ....Dundee.
Charles, Thomas Watkin.........Castletown.
Clarke, Charles Henry ....London.
Clifford, Raymond Alfred ......Evesham.
Clough, Joseph.....................Bramley.
Clowser, David William.........Winchester.
Cobham, George William ......Gravesend.
Connochie, James ....Selkirk.
Coombes, George John, Jun. ...Nottingham.
Cooper, Charles Henry ....Kettering.
Courtis, Terrell......................London.
Cousins, Alexander ....Weston-super-Mare.
Cowan, Joseph......................Annan.
Cowin, William Stephen.........Union Mills.
Cox, James Augustus ....Bath.
Cripps, Frank Alt..................Devizes.
Curtis, George ....Aberdeen.
Davidson, Joshua...................Lancaster.
Davy, Percy ....Rotherham.
Day, Charles Frederick ....Maidstone.
Dickie, Adam ....Glasgow.
Dickson, James Stewart.........Dumfries.
Drinkwater, Weston ....Patricroft.
Dudderidge, Frank Rawlinson..Blandford.
Dugan, Hugh Mathieson ......Aberdeen.
Duncan, John Glendinning B...Gainsborough.
Dwelly, Hedley Egbert ....Maidstone.
Edwards, Edward Price ....Mold.
Emberton, Frederick Charles...Silverdale.
Evans, Griffith ....Machynlleth.
Evans, Maurice ....Welshpool.
Evans, Rees ....Llanybyther.
Ewens, Francis Leonard.........Crewkerne.
Fechtner, Arthur Louis Wm....Hull.
Fleming, Howard ....Titchfield.
Forster, James ....Carlisle.
Fullerton, Robert...................Dumbarton.
Furness, Walter ....Accrington.
Gamble, Arthur George ....Yarmouth.
Gates, Colvin ....Moffat.
Gelston, Percival John Neill ...Derby.
George, David ....Cardigan.
Gibbs, Arthur ....Blackheath.
Gibson, Horton John ....Grantham.
Gilmour, James Parlane.........Burntisland.
Gilmour, John ....Burntisland.
Godber, James ....Alfreton.
Good, John Thomas................Barton-on-Humber.
Gordon, Robert ....Glasgow.
Grant, James ....Elgin.
Gregory, Bromly George.........Weymouth.
Greensit, John William ....Masham.
Grimshaw, Charles Roger ......Preston.
Guest, William Joseph ....Walsall.
Hanson, Arthur ....Queensbury.
Harbord, Richard Hutchinson...London.
Harden, Arthur George ....Ash-next-Sandwich.
Harries, Howell ....St. Clears.
Harris, George William ....Nottingham.
Haslam, George Thomas.........Skegness.
Haywood, William Henry ......Liverpool.
Heap, Arthur ....Coventry.
Hearnden, Frederick ....London.
Hemstead, William ....Tunbridge Wells.
Henstock, Thomas ....Hanley.
Herbert, Herbert.....................Bath.
Hetherington, John.................Moffat.
Hider, Francis ....London.
Hillman, Charles Edward ......Westbury.
Hilton, Albert ....Hurst.
Hobbs, Thomas Auther ....Worcester.
Hooper, Charles Reginald ......Dowlais.
Hordle, Arthur George ....Clevedon.
Horry, William Thomas ....Boston.
Hutchinson, James Sutcliffe ...Rochdale.
Ingram, George Thomas ....Louth.
Jacks, Frederick ....Longton.
Jeffcoat, Joseph George ....London.
Jenkins, William Thomas ......Kidwelly.
Johnson, John Richard ....Sheffield.
Johnston, George Henry.........Barnstaple.
Johnstone, John ....Selkirk.
Jones, David..........................Llandilo.
Jones, David Alban.................Aberayron.
Jones, Evan ....Bryngwran.
Jones, John Hughes ....Carmarthen.
Keyzor, Alfred Abraham ......London.
Kilpatrick, Robert ....Edinburgh.
Kirkby, John George ....Algarkirk.
Kirkup, George John ....Newcastle-on-Tyne.
Knapp, Edward Thomas..........London.
Lamont, William ....Forfar.
Lawrenson, John....................Radcliffe.
Lawson, Robert Murray ....Dumfries.
Lee, John George....................Alfreton.
Lewis, Phillip Reynolds ....Carmarthen.
Lewis, Thomas ....Wednesbury.
Lindsay, Robert Alex ....Montrose.
Lord, William Butler ....Lancaster.
Lothian, John ....Coldstream.
Lovatt, Harry Percy Perrin ...Wem.
McAllister, Robert D. S. ......Helensburgh.
McKenzie, James....................Cullen.
Macaulay, Robert Symington...Dumfries.
Macdonald, William ....Appin.
Macdougal, David Grierson ..Kilmarnock.
Mackie, Arthur Chadwick ......Blackpool.
Macqueen, Andrew Stewart ...Glasgow.
Maddock, Herbert ....Manchester.
Manson, William Mackenzie ...Edinburgh.
Marr, John Charles.................Hull.
Marshall, David Woolley ......Machynlleth.
Marshall, Lawton Parry.........Machynlleth.
Martin, William Morley.........Redruth.
Maxwell, John ....Kilmarnock.
Melvin, Andrew Gray.............Aberdeen.
Melrose, John ....Kelso.
Miller, William Gow ....Wick.
Mitchell, Patrick ....Kingussie.
Mitchell, Robert Harry ....Rutherglen.
Moore, Leopold Frank ....Leicester.
Morley, William John.............Jersey.
Murdoch, John Thomson ......Edinburgh.
Murray, John ....Crieff.
Neve, William Howard ....Prescot.
Northcott, John Squire ....Devonport.
Nosworthy, Allan Percy.........Yeovil.
Nunn, Arthur William ....Colchester.
Oatway, Sydney Richard ......Bideford.
Osborn, James Ernest.............Middlesborough.
Parkinson, Cecil Henry ....Louth.
Parry, John ....London.
Patchett, John ....Halifax.
Paterson, Henry ....Edinburgh.
Paton, George ....Dumfries.
Pearce, Seymour D..................London.
Plato, John Mason ....Hereford.
Price, Walter William ....Worcester.
Priddey, Henry Ernest ....London.
Prior, John ....Darlington.
Ralph, Frank Horatio.............Devonport.
Raper, Edward ....London.
Richards, Harry ....Blandford.
Richards, Richard Henry ......Ivybridge.
Riding, William John.............Ormskirk.
Riley, Thomas Herbert ....Chapel Allerton.
Rogers, Charles Henry ....Ipswich.

Rogers, Oswald.....................Northwich.
Robinson, William Albert ......Carlisle.
Sargent, Joseph Albert ....Louth.
Sawbridge, Ernest Edward......Foleshill.
Scarr, Stansfield ....Todmorden.
Shaw, John ....Bradford.
Simpson, James William ......Maidstone.
Smith, Field Evans ....Montrose.
Smith, James Duncan Audley...Edinburgh.
Smith, John ....Aberdeen.
Smith, William.........................Aberavon.
Spencer, John Christopher ......Manningham.
Squire, George ....Barnsley.
Stenhouse, Robert ....Dalkeith.
Stevenson, Robert ....Edinburgh.
Stewart, John Armstrong ......Dalkeith.
Stothert, Robert ....Blackburn.
Styles, Arthur .... Warwick.
Tatherly, Robert ....Newcastle-on-Tyne.
Teasdale, John.........................Bramley.
Tomkins, William ....Sheffield.
Towers, Wm. Londesborough...Barrow-on-Humber.
Turner, Harold Strange ....Winchester.
Walker, George Stewart.........Greenock.
Wallace, William John .... Plympton.
Warren, Thomas ....Hingham.
Watson, John ....Maxwelltown.
Watkinson, Edward Wade......Bradford.
Walter, John Albert ....Ampleforth.
Watts, John William ....Finchley.
Webber, Ernest Distin ....Tunbridge Wells.
Webster, John ....Buckie.
West, George William............Stokesley.
Whitfield, George... ....Scarborough.
Wilkerson, Albert Henry ....Epsom.
Wilkinson, William Arthur ...Colne.
Williams, George Whitfield ...Cardiff.
Williams, Richard ....Llangefni.
Willson, John Wherry ....Peterborough.
Wilson, Abel Ernest ....Stockport.
Wilson, Alexander George ....Elgin.
Wilson, Alexander W. ....Aberdeen.
Wilson, Arthur Edward ....Settle.
Wilson, John William............Harrogate.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates. Exam-ined.	Passed.	Failed.		Candidates. Exam-ined.	Passed.	Failed.
Aberdeen	16	13	3	Jersey	1	1	0
Birmingham	15	8	7	Lancaster	6	4	2
Brighton	7	1	6	Leeds	23	11	12
Bristol	9	5	4	Lincoln	13	9	4
Cambridge	4	1	3	Liverpool	21	9	12
Canterbury	5	3	2	London	63	26	37
Cardiff	12	4	8	Manchester	33	15	18
Carlisle	9	8	1	Newcastle-on-T.	7	4	3
Carmarthen	16	8	8	Northampton	3	1	2
Carnarvon	7	2	5	Norwich	9	2	7
Cheltenham	2	0	2	Nottingham	13	6	7
Darlington	6	3	3	Oxford	1	0	1
Douglas	3	1	2	Peterborough	4	3	1
Dundee	6	4	2	Sheffield	10	4	6
Edinburgh	29	16	13	Shrewsbury	11	7	4
Exeter	13	6	7	Southampton	10	8	2
Glasgow	22	11	11	Truro	7	4	3
Guernsey	3	1	2	Worcester	7	5	2
Hull	9	4	5	York	9	4	5
Inverness	7	4	3				

The questions set for examination were as follows —

Time allowed: Three hours for the three subjects.

I. LATIN.

1. Translate into English:—

(i.) Pro multitudine autem hominum, et pro gloria belli atque fortitudinis, angustos se fines *habere* arbitrabantur. (ii.) Caesar suos a proelio continebat, ac satis habebat in praesentia, hostem rapinis, pabulationibus, populationibusque *prohibere.* (iii.) Sese tamen et amore fraterno, et existimatione vulgi commoveri. (iv.) Hic locus ab hoste circiter passus sexcentos, uti dictum est, aberat. (v.) Quum hostium acies a sinistro cornu pulsa, atque in fugam conversa esset, a dextro cornu vehementer multitudine suorum nostram aciem premebant. Id quum *animadvertisset* Publius Crassus adolescens, qui equitatui praeerat, quod expeditior erat, quam ii, qui inter aciem versabantur, tertiam aciem laborantibus nostris subsidio *misit.*

2. Account for the moods of the verbs in italics, and give the principal parts of these verbs.

3. Decline in full—*hic locus, dextro cornu.*

4. Translate into Latin:—

(i.) Two days afterwards, Ariovistus sends ambassadors to Cæsar. (ii.) It seemed most convenient to send to him a son of Caius Valerius. (iii.) This was the kind of battle in which the Germans had exercised themselves. (iv.) A good citizen sides-with (*adsum*) his native country in the time of danger.

II. ARITHMETIC.

[The working of these examples, as well as the answers, must be written out in full.]

1. A grocer buys a chest of tea containing 432 lbs. at 3*s.* 8½*d.* per lb. He sells 360 lbs. at 4*s.* 3¼*d.* per lb., and the remainder, which is injured, at half the cost price per lb. Find his gain.

2. Simplify $\dfrac{\frac{1}{2}+\frac{1}{3}+\frac{1}{4}}{\dfrac{1}{2\frac{1}{2}}+\dfrac{1}{3\frac{1}{2}}+\dfrac{1}{4\frac{1}{2}}}$

3. Find the value of ·6 of £1 + ·3125 of a shilling + $\cdot\dot{2}$ of a guinea.

4. If a pound of sugar cost ·0703125 of 16*s.*, what is the value of ·0625 cwt.?.

5. What sum of money will amount to £256 10*s.* in 4 years at 3½ per cent. simple interest?

III. ENGLISH.

1. Define *preposition.* What are the principal relations expressed by prepositions?

2. Give four of the rules of English syntax which you deem most important.

3. Parse fully—"What means this heaviness that hangs upon me?"

4. Write a short composition on *one* of the following subjects:—

(i.) The advantages derivable from a knowledge of Latin.
(ii.) The history of some medical or scientific discovery.
(iii.) Emigration.
(iv.) The cultivation of plants and flowers.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, on Thursday, July 19, at 4.30 p.m.

Present:—Professor Attfield, F.R.S., etc., President, in the chair; Messrs Carteighe, Ekin, Naylor, Southall, Taylor, and Dr. Thresh; Messrs. Benger and Plowman (Hon. Secs.) and Mr. Ashton (Local Secretary for Southport).

Letters of apology for non-attendance were read from Messrs. Groves, Kinninmont, Payne and Young.

Mr. Ashton (Southport) reported that the preparations of the Local Committee were nearly complete. The proprietor of the Prince of Wales Hotel had guaranteed forty beds for members of the Conference, and he was of opinion that more could be obtained if required. Arrangements had been made for a visit on the Thursday morning to the Plate Glass Company's Works and the Sutton Alkali Works at St. Helen's. On the Thursday afternoon there would be a Garden Party in the Botanical Gardens.

The Secretaries reported that, acting on instructions received at the last meeting of the Executive Committee, they had communicated with a number of gentlemen residing abroad with a view to the appointment of Colonial Local Secretaries in Canada, Cape Colony, India, New South Wales, New Zealand, Queensland, South Australia, Tasmania, Victoria, and the West Indies. A sufficient time had not yet elapsed for any replies to reach England.

They also reported that circulars had been issued to all registered chemists in Great Britain and Ireland not already members, inviting them to membership of the Conference. The number sent was 11,567, and the total cost would be approximately £91.

The following grants were made:—£5 to Messrs. Dunstan and Short to investigate the pharmaceutical preparations of nux vomica, principally in regard to their alkaloidal value; £10 to Messrs. Dunstan and Ransom to further extend the method of alkaloidal extraction with the chloroform-alcohol mixture; £2 2*s.* to Mr. W. Elborne to purchase material for determining the comparative pharmaceutical value of commercial rhubarb.

The place of meeting for 1884 was considered.

The Honorary Secretaries reported that reports and papers had been promised for the Southport meeting by Mr. A. H. Jackson, B.Sc., Dr. Quinlan, and Messrs. Barnes, Dunstan, Elborne, Greenish, Groves, Mason, Naylor, Stanford, Willmott and Woodland.

With regard to the Bell and Hills gift of books, Mr. Ashton said that no association of chemists existed at Southport, but he thought it probable that an arrangement could be made to place the books in the public library for the use of the pharmacists of the town, reserving the power to take them away at a future time, if an association should be formed. It was decided that the matter should be left in the hands of the President and Honorary Secretaries.

A letter of thanks for a copy of the Year-Book was read from the Pharmaceutical Society of Victoria.

The thanks of the Conference were accorded to the Pharmaceutical Society of Great Britain for the gift of a copy of the 'Register of Chemists and Druggists for 1883,' and to the Pharmaceutical Society of Ireland for two copies of the 'Calendar of the Pharmaceutical Society of Ireland for 1883.'

Parliamentary and Law Proceedings.

Action respecting the Use of a Title.—"Sweet Essence of Rennet."

Important Injunction Motion.

In the Chancery Division of the Court of Justice, Dublin, on Tuesday, July 17, an application was made on behalf of the plaintiffs, M'Master, Hodgson and Co., a firm of wholesale druggists and oil merchants in Capel Street, against the defendants, William Hayes and Co., who carry on business at 12, Grafton Street, as druggists, for an injunction restraining them from affixing on bottles or other vessels a label with the words "Warren's sweet essence of rennet for making curds and whey," or any other label, so as to be a colourable imitation of the label under which the plaintiffs sell that preparation.

Mr. Holmes, Q.C., in support of the application, relied on an affidavit by Mr. E. M. Hodgson, senior partner, stating that the sweet essence of rennet was a composition free from salt or mineral acid, and so more nutritious and easy of digestion than the ordinary rennet. When it was first manufactured by his firm John Vanston Warren was the clerk in charge of the perfumery and essence department, and his name was adopted as the trade label, viz., "Warren's sweet essence of rennet for making curds and whey." The firm were sole proprietors of the formula for the manufacture of the article, and Mr. Warren witnessed the signature of the firm to the certificate of registration of the label as a trade mark in 1870. The preparation became very popular, and the firm obtained a prize medal for it at the Dublin Exhibition of 1872. Dr. Cameron, city analyst, recommended it in his lectures, and it was recommended by the *Lancet*, the *British Medical Journal*, the *Medical Press*, the *Medical Times*, the *Dublin Journal of Medical Science* and other public journals. The defendants had adopted these certificates. In 1874 Mr. Warren left the employment of the firm, and entered into partnership successively with Mr. Burnside as Warren and Co., and on Mr. Burnside's retirement with Mr. Stokes, and sold the sweet essence of rennet as their manufacture. An action was commenced against Warren and Co., but the company was wound up before the proceedings came to an issue. In August last it came to the knowledge of the firm that the defendants were selling a preparation called "Warren's sweet essence of rennet;" and on cautioning them against doing so, Mr. William Hayes replied claiming the formula and label as assignee of Mr. Warren. It appeared that when Mr. Warren left the employment of the firm he took a book containing the secret of that and other preparations, and that that book was purchased by Mr. Hayes, as part of the goodwill of Warren and Co.'s business. Counsel submitted that a case had been made for an *ad interim* injunction

Mr. Jellett, Q.C., in opposing the application as most untenable, said Mr. Warren was the inventor of the essence, and on leaving the firm he took with him his books containing the recipes for it and other preparations. On March 18, 1875, finding that Messrs. M'Master, Hodgson and Co., were still manufacturing the preparation he cautioned them against doing so. They then registered a new label "Sweet essence of rennet," under which they continued to sell until 1882, when they re-registered the old label and instituted the present action. In the meantime Mr. Hayes had purchased Warren's rights and registered the label. When his right was challenged he alone asserted it and put the plaintiffs at arm's length. The motion was one that ought not to be granted on the eve of the long vacation.

The Master of the Rolls, in refusing the application with costs, observed that *primâ facie* Mr. Warren or his assignees could proceed against the plaintiffs for piracy if they continued to vend the preparation as "Warren's." The defendants' trade mark which had as a device a globe surmounted by a phœnix was different from the plaintiffs' which had a cow and calf; but the bottles were similar in shape. He could not understand why the plaintiffs, a very eminent and well known firm, had not the word "Hodgson" or "M'Master" instead of "Warren" applied to the essence, except on the intelligible hypothesis that Warren was its inventor.

Mr. Holmes said it was perfectly clear on the affidavits that Mr. Warren was not the inventor, but a former *employé*, Mr. Thomas Deegan.—*Dublin Evening Mail.*

Correspondence.

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

Battley's Liq. Cinchonæ.

Sir,—Mr. Mee, in his letter in your last week's issue, says, "Mr. Wells says we are really without an extract representing the constituents of bark. For the sake of raising the question, I deny it, I say that Mr. Battley's preparation does fully and completely represent the constituents of this valuable remedy." And he precedes this statement by the further one, "Assertion is not fitting for men of science; we must prove our results by specific gravity, by estimation of the alkoloids, by chemical tests, and above all by the microscopical slide."

Mr. Mee, however, hardly follows on his own lines for he gives no data with respect to the estimation of the alkaloids, etc., and his position after all is mainly grounded on mere assertion.

Some years ago (*vide* 'Pharmaceutical Conference Proceedings,' for 1878) I examined a sample of Battley's liquor and found that each fluid drachm, which the label stated was equal to one ounce of the finest bark, contained only 2·05 grains of total alkaloids.

As a bark containing only 0·46 per cent. of total alkaloids can hardly be said to be of the finest quality, one is forced to the conclusion that the bark operated on was either of very poor quality or that it was very far from being exhausted, or again that in the process of "pegging away at it with water, of steeping it, of boiling it again and again," the alkaloids were degraded and lost. If a bark of average quality be taken and the exhaustion by Battley's process, as Mr. Mee asserts, be complete, there ought to be at least four times the amount of alkaloid in the resulting liquor. I believe, with Mr. Mee, that Battley's liquor is an excellent one, but the question is whether by Battley's or any other process it is possible to exhaust bark and concentrate to the extent claimed. It is in no captious spirit that I venture to refer to Mr. Mee's communication and I sympathize with his desire to break a lance in Mr. Battley's favour. After all, these assertions and counter assertions are not very satisfactory, nor do they redound to the credit of pharmacists as a body and it would not be a bad thing if a commission of three or four pharmacists were appointed, by the Pharmaceutical Conference or some other body, to go into the whole question. Manifestly trade considerations come in which might be troublesome to deal with, but this difficulty need hardly be insuperable.

C. Ekin.

Sir,—I have carefully looked through the column occupied by Mr. Mee under this heading in last week's Journal, but have failed to find the "query," unless it be the one with which he concludes his communication.

There is, however, one very striking statement contained therein.

Mr. Mee states that one pound of "Battley's liquor" contains the kinates of one pound of bark. Battley on his label states that "one fluid drachm is equivalent to one ounce of the finest bark," or in other words that two fluid ounces are equal to a pound.

Surely Mr. Mee can find a more effectual method of lauding his favourite "patent" than by describing its strength as one-eighth of that stated on the label.

With regard to the deposit he will find that the "liquor" has by no means lost this distinctive character, nor was it confined to the Crimean era. I have a bottle now before me with quite a gram of this crystalline matter at the bottom.

I think if Mr. Mee will try the experiment on some assayed bark he will find that it will require something more than "pegging away with water" to leave "nothing but woody fibre and cellulose."

Perhaps he will withdraw his theorem and work out the problem instead.

J. O. Braithwaite.

Assistants in India.

Sir,—A letter appeared in the *Pharmaceutical Journal* of April 28, which I think likely to be misleading as to the propects of an assistant's life in this country. Allow me to describe the colour of the shield on my side. I came out seventeen years ago, and at first was as pleased and favourably impressed as your correspondent. In my third year the malarious fever incidental to the country found me out and did not leave me for twenty-one months, and when it did leave it left me a very different man to what it found me. A firm here has lost eight assistants in sixteen years, three from heat apoplexy, one from abcess of the liver, the remainder from cholera and other causes. I have been in a man's company one evening, and heard the next day that three hours after leaving me the previous night he had been attacked with cholera. I went to see him, attended to him, and in an hour or two after laid him out a corpse, almost black, and in another twelve hours I helped to lower him into his grave. I helped to bury three friends in two days out of one house. This is not by any means exceptional, and is only what anyone must experience during a long residence in India.

Now for the work. I am in sole charge of the dispensing part of a mixed business in the Mofussil, and up at six in the morning and in business till 7 p.m., with the thermometer at 90° to 94°, streaming with perspiration like a Turkish bath. It is no uncommon thing to be called up once or twice a night, and during a cholera epidemic five or six times.

There is no Pharmacy Act here, and free trade in physic is rampant, and any person can, without asking leave or licence, dub himself "Pharmaceutical Chemist," or his place of business "Medical Hall." Any code of professional ethics is unknown, and to speak of such would be of as much use as speaking of the Greek articles or integral calculus to them. We are all cutting one another's throats, and selling Mrs. Allen's Hair Restorer, and such like, at a less profit than a London chemist who buys in one street and sells in another. Besides this there is one common enemy we all have to fight against, and that is the natives, who open a "Medical Hall" in the native part of the town, and get a native compounder, dismissed from some regimental hospital for some fault or other, to do the dispensing, and I am sorry to add some of the *patriotic medical men* recommend them in preference to their fellow countrymen, under the impression that they are cheaper (a false impression). The fact is, we, the non-official Europeans, are looked upon as interlopers, and the medical men are all Government officials. There is also the native practitioner, who in some instances are part-owners of the native druggist's shop, and in others levy a black mail of from 12½ to 25 per cent. I fancy substitution is not an unknown art amongst them either; at all events, I know enough of them and their dirty ways, that if I were a physic taker instead of a physic maker nothing would induce me to take physic from a native druggist. Summing up, I have only regretted coming out but once, and that has been *ever since* my third year out.

A Chemist of Twenty-six Years Standing.

Essential Oil of Almonds.

Sir, — The recent painful trial, at Maidstone, of a clergyman for the manslaugter of a girl at West Malling, by the administration of essential oil of bitter almonds, suggests the propriety of an alteration in the law relative to the sale of that dangerous substance.

Probably neither physicians nor pharmacists would object to its sale being prohibited altogether; but whilst it is permitted to be sold, it would be a boon to chemists, a safeguard to the public, and a definite and indisputable proof in cases of poisoning, if it were placed on Part 1 of the Schedule of Poisons, instead of on Part 2, as now.

In common with every chemist I have spoken to on the subject, I never could understand why a substance which usually contains from four to six times more prussic acid than the dilute hydrocyanic acid of the Pharmacopœia should not be subject to the same law. Is not this an anomaly which ought no longer to exist?

Maidstone. Wm. Rogers.

Communications, Letters, etc., have been received from Messrs. Cook, Hickings, Christie, Turpin, Gaubert, Wood, Williams, Giles, Cymro, T. F. T.

NOTES ON CINCHONA BARK.

BY DAVID HOWARD.

A curious evidence of the singular scientific acumen shown by the late Mr. McIvor in working out his process for renewing cinchona bark is given by some of the samples of "renewed" *C. succirubra* bark which reach us from Ceylon.

As is well known, in Mr. McIvor's process, alternate strips of the bark were removed down to the cambium, and the tree wrapped round with moss. The bark then renews over the whole surface, the new bark consisting almost entirely of cellular tissue, the total alkaloid being increased, and the cinchonidine giving place to quinine.

The "renewed" bark to which I call attention, on the other hand, shows a totally different structure; there is a mere skin of cellular tissue, the remainder being remarkably fibrous.

The explanation is not far to seek, the shaving process recommended by M. Moens as a substitute for Mr. McIvor's process gives good results just in proportion as it imitates the latter process. If the cut is sufficiently deep to cause the effusion of new bark, if I may so call it, the result both in quantity and quality of the renewed bark closely resembles that yielded by the stripping process.

But if, as is often now the case, the shaving is merely superficial and carried all round the tree the result is entirely different; in this case there is little or no formation of cellular tissue to replace that removed, a fresh epidermis forms, but apparently the circulation is carried on in the remaining fibrous tissue, which in fact seems to be developed further. The alteration in the composition of the alkaloid which is so characteristic of the true renewal does not take place in this case; if there is any change it is rather in the direction of an increase of the cinchonidine instead of quinine.

The subject is not merely interesting from the light it throws upon McIvor's process, but is one of great commercial importance. Unless the shaving process is so carried on as to produce, at least in part, the beneficial results of the older process of renewal it will lead to grievous disappointment, for the trees seem to suffer more from the wrong treatment than from the right.

It is to be feared that in many cases the temptation to get a quick return from the plantation by over-frequent and unskilful shaving is risking not only the quality of the crop but the health of the trees. Some planters are even advocating a return to the barbarous system of coppicing; but it is difficult to believe that this will generally be the case, with the strong evidence before their eyes of the benefits to be obtained by the more scientific system of treatment.

I do not venture into the vexed questions of hybrids and species in red bark; but when I find that "red bark" can be obtained yielding up to 4 and 5 per cent. of quinine from natural bark, I am very sure that there is a great field for skill in the selection or cultivation of cinchonas. There is much to be learnt in these matters. In the last drug sales, some samples of bark marked "hybrid" gave 4 per cent. of quinine, while others, also "hybrid," gave only 1 per cent. of quinine.

It is evidently no easy matter to distinguish by the eye the different varieties of trees which produce red bark of widely different quality. Some time ago I analysed a number of samples of bark from individual trees, sent me by J. A. Campbell, Esq., from Ceylon. They were renewed bark from trees giving red bark of very fine quality; the plants were all from the same nurseries, and were supposed to be of identical quality.

I found, however, that they varied very widely in the richness of the bark, as will be seen from the following table :—

	Quinine.	Cinchonidine.	Cinchonine.	Quinidine.
No. 1 . . .	6·2	0·3	0·3	0·1
" 2 . . .	2·6	0·6	trace	0·4
" 3 . . .	2·0	1·6	1·2	0·2
" 4 . . .	4·0	0·2	0·2	0·1
" 5 . . .	4·0	0·2	0·7	0·7
" 6 . . .	2·3	0·5	1·2	0·8
" 7 . . .	2·3	0·9	1·7	0·0
" 8 . . .	2·8	0·3	1·3	0·1
" 9 . . .	4·1	0·1	0·2	0·1
" 10 . . .	3·9	0·1	0·2	0·2

Mr. Campbell tells me that "notwithstanding the extraordinary difference in the analysis there is little difference to be seen between the most of the trees. Some are pubescent, however, and some are glabrous; some have rounder leaves than others and in some the flower is white, except in the centre of the corolla tube which is pink. Others, again, have pink flowers. Nos. 1, 2, 4, 9 and 10 are what we used to call hybrids; of these 4, 9 and 10 are much like officinalis in leaf and bark. No. 2 is subpubescent in leaf and only a moderate grower, the leaf being rounder than 4, 9 and 10, and lighter in colour. No. 1 is exactly what we would imagine, from Mr. Cross and Colonel Beddome's description, to be a true Pâta de Gallinazo. Leaf glabrous shiny on upper surface, soft, flat, and pointed at end; a fine grower considering the soil it is in." It is evident, therefore, that no general description will suffice to guide a planter in selecting the best sorts, but that the subject requires a minute study of individual trees of which the bark has been analysed.

Calisaya bark shows equal variations between different trees. I have found individual trees growing together in Ceylon to vary from 3·1 per cent. to 9·2 per cent. of quinine, and individual trees similarly growing together in the Wynaad to vary from 7·6 per cent. to 0·7 per cent. of quinine.

These variations can hardly be attributed to soil; the red barks were all growing in similar soil and under similar circumstances, and the Ceylon calisayas were also apparently growing under similar conditions.

No doubt soil does influence the richness of the bark to a very great extent; samples of bark from trees grown on poor soils, as far as my experience goes, always test below similar barks on rich soils. The richest bark, both succirubra and calisaya, that I have tested from Ceylon has been from land richly manured for coffee.

I think I have given instances enough to show how great are the possibilities of advantage in selection of the richest varieties of bark, while the study of soils, and the best mode of manuring and of preserving the bark, offer a wide field for profit to the intelligent planter. It is evident that if an 8 per cent. bark can be obtained from a tree giving an equal crop to those yielding 1 per cent. bark the increased value of the crop must be out of all proportion to the extra care in selection. Whether planters will have to adopt grafting or propagation by layers or cuttings, or whether it will prove practicable to obtain certain results from selection of seed or plants, is a matter of experience. Everything points to a great over-production of inferior bark, but there is little fear of the better qualities bringing remunerative prices if wisely cultivated.

SYRUP OF IODIDE OF IRON.

BY PERCY WELLS.

Many months ago I tried the effect of glycerine on a concentrated solution of protoiodide of iron, and had reason to be satisfied with the result, but when I mixed the compound with syrup the old difficulties met me. To overcome these was my object, and I think I have accomplished it. My process is briefly this:—I put ½ troy ounce of resublimed iodine into a N. M. flask with 80 grs. of iron wire or filings and f ℥vi of distilled water. After the action has ceased and the pale green solution is formed I add f ℥j of glycerine and heat the mixture to about 212°. It is now filtered *on to* 3 fluid ounces of cold viscid pale glucose syrup, put into a 10 ounce measure and then thoroughly mixed with a spatula, and if the product is less than 5 fluid ounces it is made up to that quantity by washing the filter with distilled water. The product will be slightly turbid for an hour or so, but afterwards becomes perfectly bright and of a very pale green colour and unaffected by time or temperature.

The value of the mixture of glycerine and glucose will some day be recognized, and I believe eventually it is destined to supersede sugar in pharmacy.

I recently sent to the Journal a formula for unalterable syrup of squills made with glycerine and glucose, and I hope the Pharmacopœia Revision Committee will make experiments so as to exclude cane sugar in the manufacture of syrups and substitute the articles I have named.

THE NEW PHARMACOPŒIAS FOR THE UNITED STATES AND GERMANY.

(*Continued from p.* 24.)

Acidum Hydrobromicum Dilutum, U.S.P. (new).—Sp. gr. 1·077, contains 10 per cent. of HBr. "A clear, colourless liquid, odourless, having a strongly acid taste and an acid reaction. By heat it is completely volatilized." No process is given; but the characters evidently exclude the rough and ready methods of Wade and Fothergill. The tests given are the liberation of bromine by chlorine or nitric acid, the formation of a white precipitate of silver bromide when solution of silver nitrate is added, and for the absence of sulphuric acid. This acid has not been included in the new German Pharmacopœia.

Acidum Hydrochloricum, U.S.P., P.G.—In the U.S.P. the name "muriatic acid" has been given up, but the acid remains the same sp. gr. (1·160) as that in the B.P., though it is said to contain 31·9 per cent. of HCl, instead of 31·8. The P.G. "acidum hydrochloricum" is weaker, having a sp. gr. of 1·124 and containing only 25 per cent. of HCl.

Acidum Hydrochloricum Crudum, P.G.—A clear or opalescent more or less yellow liquid, fuming in air, sp. gr. not less than 1·158, and containing no less than 29 per cent. of HCl. The impurities permitted by the P.G., 1872, were traces of sulphuric and sulphurous acids, alumina and iron; but it was to be rejected if contaminated with arsenious acid as indicated by becoming brown through liberation of metallic arsenic after being heated with stannous chloride. Nothing is now said as to limit of impurities. The crude acid is used in Germany in the preparation of baths.

Acidum Hydrochloricum Dilutum. U.S.P., P.G.—The U.S.P. dilute acid, which is stronger than that in the U.S.P. of 1870 (sp. gr. 1·038), and slightly weaker than that in the B.P., is made by mixing 6 parts of hydrochloric acid and 13 of water; its sp. gr. is 1·049 and it contains 10 per cent. of HCl. The P.G. dilute acid is made by mixing equal parts by weight of hydrochloric acid and water; its sp. gr. is 1·061, and it contains 12·5 per cent. of HCl. The increase in strength of the U.S.P. dilute hydrochloric acid to 10 per cent. appears to be a decided improvement. In the Danish Pharmacopœia this strength had previously been adopted, and but little alteration would be required to bring those of the B.P. (10·58 per cent.) and the Dutch Pharmacopœia (10·50 per cent.) to the same standard. In the Austrian Pharmacopœia, on the other hand, it is close to that of the P.G., viz., 12·4 per cent.

Acidum Hydrocyanicum Dilutum, U.S.P.—Contains 2 per cent. of HCN. Two processes are given: one resembling that of the B.P., but in which the distillate from 20 parts of ferrocyanide is collected in 60 parts of dilute alcohol, and diluted to proper strength with distilled water; the other consists in decomposing 6 parts of cyanide of silver by a mixture of 5 parts of hydrochloric acid and 55 of water and decanting. The U.S.P. official method of assaying the strength of the solution in HCN, based upon Pappenheim's process (*Archiv*, 1878, 408), and the error vitiating it, have recently formed the subject of a paper by Cripps (*Pharm. Journ.*, [3], xiii., 917). A simple solution of hydrocyanic acid has not yet been included in the P.G., and the aqua lauro-cerasi has now been omitted; when this latter preparation is ordered aqua amygdalarum amararum, containing 0·01 per cent. of HCN is to be dispensed.

Acidum Lacticum, U.S.P., P.G.—In the U.S.P. this acid is described as a nearly colourless, syrupy liquid, sp. gr. 1·212, containing 75 per cent. of $HC_3H_5O_3$, odourless and having a very acid taste and acid reaction, freely miscible with water, alcohol and ether, but nearly insoluble in chloroform; not vaporized by a heat below 320° F. Tests are added to prove the absence of hydrochloric, sulphuric and sarcolactic acids, lead, iron, sugar, glycerin and organic impurities. In the P.G. the percentage strength is not indicated, but the sp. gr. has been decreased from 1·24 to 1·21–1·22, or equal to at least 10 per cent. Treatment with an equal volume of strong sulphuric acid is given in both works as a test for the presence of organic impurities (sugar, etc.); but whilst the U.S.P. implies that the mixture should be kept cold and allows a pale yellow colour the P.G. merely says that the mixture should remain colourless. The U.S.P. sp. gr., (1·212) is said to represent 75 per cent. of $HC_3H_5O_3$, but according to Hager (*Commentar*, p. 134) it would be 80 per cent.

Acidum Nitricum, U.S.P., P.G.—The acid described in the U.S.P. remains practically the same as the nitric acid, B.P., sp. gr. 1·420 and containing 69·4 per cent. of HNO_3; but tests have been added for the absence of arsenic acid, free iodine and hydriodic acid, the latter probably in consequence of the more extended use of Chili saltpetre in the manufacture of nitric acid. The P.G. acid under this name is much weaker, being of sp. gr. 1·185, and containing only 30 per cent. of acid. The P.G. also gives a test for the absence of hydriodic acid.

Acidum Nitricum Dilutum, U.S.P.—This has been reduced in strength in order to bring it into the category of 10 per cent. dilute acids. Its sp. gr. is 1·059; it is, therefore, considerably weaker than the B.P. "dilute" acid, which contains 17·44 per cent. A dilute acid (sp. gr. 1·086 to 1·089) has now been omitted from the P.G. Of the other European pharmacopœias, the Austrian has a dilute nitric acid containing 21·42 per cent. of HNO_3; the Russian and Swiss order 15 per cent. and the Dutch 17 to 17·5 per cent.

Acidum Nitricum Fumans, P.G.—This has been substituted in the P.G. for "acidum nitricum crudum," sp. gr. 1·323 to 1·331. It is described as a clear red-brown liquid, sp. gr. 1·45 to 1·50, giving off yellow-red suffocating vapour. Diluted with 150 parts of water, it must not be rendered turbid in five minutes by barium nitrate or silver nitrate. Notwithstanding this requirement the principal medicinal use of this acid in Germany is as a caustic.

Acidum Nitrohydrochloricum, U.S.P.—Nitric acid, 4; hydrochloric acid, 15. The relative proportion of hydrochloric acid in this and the dilute form is much larger than in U.S.P., 1870, where in the dilute acid it was then larger than in the B.P. Sp. gr. not given. There was an acidum chloronitrosum in the P.G., 1872, which was "non nisi ad dispensationem paretur," but this acid has now been omitted.

Acidum Nitrohydrochloricum Dilutum, U.S.P.—Nitric acid, 4; hydrochloric acid, 15; water, 76. The water to be added when effervescence has ceased.

Acidum Oleicum, U.S.P. (new).—The increasing use of the oleates has been recognized by the introduction of "oleic acid" into the U.S.P., but it is not in the P.G. It is described as: "A yellowish, oily liquid, gradually becoming brown, rancid and acid when exposed to the air; odourless or nearly so, tasteless, and when pure of a neutral reaction. Sp. gr. 0·800 to 0·810." Insoluble in water, completely soluble in alcohol, chloroform, benzol, benzin, oil of turpentine and fixed oils. Semisolid at 59·2° F., and when cooled to 39·2° it becomes a whitish mass of crystals. It should be completely saponified by potassium carbonate at a gentle heat, and the soap dissolved in water and exactly neutralized with acetic acid should give a precipitate with solution of acetate of lead which after twice washing in boiling water is almost entirely soluble in ether (absence of more than traces of palmitic and stearic acids). Equal volumes of the acid and alcohol, at 77° F., should give a clear solution, without separation of oil drops.

Acidum Phosphoricum, U.S.P. (new); P.G.—From the U.S.P. "glacial phosphoric acid" is now omitted, and its place is taken by an acid of sp. gr. 1·347, containing 50 per cent. of H_3PO_4. A recommendation of the Committee in favour of a stronger acid, sp. gr. 1·700, was not adopted. A process is given similar to that of the B.P. The finished product is specially directed to be tested for nitric, phosphorous and arsenic acids. If it be found to contain nitric acid, it is to be heated until the reaction disappears and then re-made up with water to 100 parts. If phosphorous acid be present, a mixture of 6 parts of nitric acid and 6 parts of water is added, the product evaporated until it no longer gives a reaction for phosphorous or nitric acids, and then again brought up to 100 parts with water. If arsenic acid be present this is to be removed by means of sulphuretted hydrogen, after diluting the product with 150 parts of water. The "acidum phosphoricum," P.G., for which no process is given, is of sp. gr. 1·120, and contains 20 per cent. of H_3PO_4.

Acidum Phosphoricum Dilutum, U.S.P.—Phosphoric acid, sp. gr. 1·347, 20; water, 80. It has a sp. gr. 1·057, and contains 10 per cent. of H_3PO_4. In the U.S.P., 1873, the sp. gr. was 1·056, and, besides the process of preparing it direct from phosphorus, there was an alternative one of preparing it from glacial phosphoric acid.

Acidum Pyrogallicum, P.G. (new).—Pyrogallol, or pyrogallic acid, which is a product of the action of heat on gallic acid, though largely used in photography, is not much used in medicine. It is reputed to have anti-fermentative and anti-putrefactive properties and has been recommended for the external treatment of psoriasis and other skin diseases, but the danger arising from its poisonous properties would appear to be a great drawback to its use. According to Hager a prescription ordering more than 0·25 gram in a single dose, or 1 gram in the day, ought not to be dispensed without special authorization. An alcoholic solution of pyrogallic acid is sometimes used as a brown hair dye.

Acidum Salicylicum, U.S.P. (new); P.G. (new). —In the U.S.P. the characters given for this acid are "Fine, light, white, prismatic, needle-shaped crystals, permanent in the air, free from odour of carbolic acid, but sometimes having an aromatic odour, of a sweetish and slightly acrid taste and an acid reaction." Solubilities: in water at 59° F., 1 in 450; in alcohol, 1 in 2½; in absolute alcohol and in ether, 1 in 2; in amylic alcohol, 1 in 3½; in chloroform, 1 in 80; in boiling water, 1 in 14; very soluble in boiling alcohol. Heated to about 347° F. (175° C.) the crystals melt, and at about 392° they sublime; at a higher temperature they are decomposed. The tests given are for hydrochloric acid, iron, carbolic acid and organic impurities. The test given for the presence of carbolic acid is that when 5 c.c. of an aqueous saturated solution is poured into a test-tube containing a crystal of potassium chlorate and 2 c.c. of hydrochloric acid, and solution of ammonia carefully poured on the top, the latter should assume a reddish or brownish tint.

It is interesting to note that in some respects these characters differ from those given for salicylic acid in the new German Pharmacopœia, into which it has also been introduced. The German work does not restrict the official acid to "fine" crystals, although according to Mr. Williams (*Pharm. Journ.*, [3], viii., 785), that form of crystallization is a distinctive mark of the pure natural acid; but it says:—"Crystalla levia, alba, aucubus similia vel *pulvis laxus, albus, crystallinus.*" Then the melting point is given as 15° C. lower, whilst with respect to the solubility in cold water there seems to be great diversity of opinion. The United States Committee had under its notice a statement of the German Committee, made in a preliminary report, similar to what has frequently appeared elsewhere, that salicylic acid is soluble in 300 parts of cold water; it preferred, however, to adopt 1 in 450. But the new German Pharmacopœia now says, "in aquæ frigidæ partibus quingentis triginta octo solvuntur;" whilst, as if to increase the confusion, in an appendix in the same work, giving the solubilities of chemicals in "numeris rotundatis," the solubility is given as 1 in 600. As it may be assumed that salicylic acid will be included in the forthcoming edition of the British Pharmacopœia it is to be hoped that these apparent discrepancies will soon be cleared up.

Acidum Sulphuricum, U.S.P., P.G.—In the U.S.P. the strength of this acid has been decreased from "sp. gr. 1·843" to "sp. gr. not below 1·840;" it contains not less than 96 per cent. of H_2SO_4. Tests are now given for freedom from lead, arsenic, copper, iron, and nitric, hydrochloric and sulphurous acids. In the P.G. also the character has been altered from "sp. gr. 1·840, answering to 98·5 per cent. of H_2SO_4" to "sp. gr. 1·836 to 1·840, containing in 100 parts 94 to 97 parts of H_2SO_4."

Acidum Sulphuricum Aromaticum, U.S.P.—Tincture of ginger and oil of cinnamon have been substituted in the formula for the corresponding powders. The preparation is of sp. gr. 0·955, and contains about 20 per cent. of official sulphuric acid. It is therefore nearly 7 per cent. stronger in acid than the B.P. preparation. Under the name of "*Mixtura sulfurica acida*," the P.G. has a simple solution of sulphuric acid in alcohol, without aromatics, sp. gr. 0·993 to 0·997, containing 25 per cent. of acid.

Acidum Sulphuricum Crudum is still retained in the P.G. It is an oil of vitriol of sp. gr. not less than 1·830, and containing not less than 91 per cent. of H_2SO_4. An "*Acidum sulfuricum fumans*" has been omitted.

Acidum Sulphuricum Dilutum.—The formula for the U.S.P. dilute acid is, sulphuric acid 1; water, 9. Its sp. gr. is 1·067 nearly, and it contains 10 per cent. of official sulphuric acid. It is therefore weaker than in U.S.P., 1870, or the B.P. The P.G. dilute sulphuric acid is the strongest of the four, having a sp. gr. of 1·11 to 1·114, which would correspond to about 16 per cent. of H_2SO_4.

Acidum Sulphurosum.—In the U.S.P. the trength of this aqueous solution has been considerably reduced; the sp. gr. of the 1870 preparation was 1·035, corresponding to 6·4 per cent. of SO_2, whilst that now ordered has a sp. gr. 1·022 to 1·023 and contains about 3·5 per cent. of SO_2. Several years ago (*Pharm. Journ.*, [2], x., 516) Mr. Umney called attention to the practical difficulties attending the preparation by the charcoal process of an aqueous solution of sulphurous acid containing more than about 5 or 6 per cent. of SO_2, and suggested that a solution of 1·027 sp. gr., containing 5 per cent. by weight of SO_2, should be substituted for the B.P. official preparation, which should contain 9·2 per cent. But the compilers of the U.S.P. have thought it convenient to go below even that standard. No attempt appears to have yet been made to introduce a solution in alcohol, which is said to be capable of taking up 300 times its bulk of sulphurous acid gas (*Pharm. Journ.*, [3], i., 465).

Acidum Tannicum, U.S.P., P.G.—The process has been omitted from the U.S.P. where the acid is described as in "light yellowish scales, permanent in the air, having a faint, peculiar odour, a strongly astringent taste and an acid reaction." Solubilities: in water at 59°, 1 in 6; in alcohol, 1 in 0·6; very soluble in boiling water and boiling alcohol; in glycerin, 1 in 6; sparingly soluble in absolute alcohol, freely in dilute alcohol, moderately in washed ether, and almost insoluble in absolute ether, chloroform, benzol and benzin. The P.G. describes tannic acid as "pulvis albus vel subflavus vel massa laxa, nitida, coloris pæne expers."

Acidum Tartaricum, U.S.P., P.G.—In the U.S.P. the solubilities given are—in water at 59°, 1 in 0·7; in alcohol, 1 in 2·5; in absolute alcohol, 1 in 36; in boiling water, 1 in 0·5; in boiling alcohol, 1 in 0·2; in ether, 1 in 23; in absolute ether, 1 in 250; nearly insoluble in chloroform, benzol and benzin.

Acidum Valerianicum has been wisely dismissed from both the U.S.P. and the P.G.

The following is a list of the acids included in the U.S.P. for 1870 and 1880, the P.G. for 1872 and 1882, and the B.P. for 1867, showing the representative percentage strengths so far as they are indicated. The sign o signifies that the acid is absent from the Pharmacopœia under which the sign is placed.

	U.S.P.		P.G.		B.P.
	1870. p. c.	1880. p. c.	1872. p. c.	1882. p. c.	1867. p. c.
Acid. Aceticum . . .	35	36	—	96	33
Acid. Aceticum Arom.	o	o	—	o	o
Acid. Aceticum Dil. .	4·5	6	30	30	4·27
Acid. Aceticum Glac.	o	99	o	o	98·8
Acid. Arsenicum . .	—	—	—	—	—
Acid. Benzoicum . .	—	—	—	—	—
Acid. Boricum . . .	o	—	—	—	o
Acid. Carbolicum . .	—	—	—	—	—
Acid. Carbolic. Crud. .	—	—	50	—	o
Acid. Carbol. Liquef. .	o	o	o	91	o
Acid. Chromicum . .	—	—	—	—	o
Acid. Citricum . . .	—	—	—	—	—
Acid. Formicium . .	o	o	o	25	o
Acid. Gallicum . . .	—	—	o	o	—
Acid. Hydrobromicum	o	10	o	o	o
Acid. Hydrochloricum	31·9	31·9	25	25	31·8
Acid. Hydrochl. Crud.	o	o	30-33	29	o
Acid. Hydrochl. Dil. .	7·8	10	12·0	12·5	10·58
Acid. Hydrocyan. Dil.	2	2	o	o	2
Acid. Lacticum . .	75	75	86	85	o
Acid. Nitricum . . .	69·4	69·4	30	30	70
Acid. Nitricum Crud.	o	o	50·52	o	o
Acid. Nitricum Dil. .	11·6	10	15	o	17·44
Acid. Nitricum Fum. .	o	o	o	—	o
Acid. Nitrohydrochlor.	—	—	—	o	—
Acid. Nitrohydro. Dil.	—	—	o	o	—
Acid. Oleicum . . .	o	—	o	o	o
Acid. Oxalicum . .	—	o	o	o	o
Acid. Phosphoricum .	Glac.	50	20	20	o
Acid. Phosphoric. Dil.	9·8	10	o	o	13·8
Acid. Pyrogallicum .	o	o	o	—	o
Acid. Salicylicum . .	o	—	o	—	o
Acid. Succinicum . .	o	o	—	o	o
Acid. Sulphuricum .	100	96	98·5	97	96·8
Acid. Sulphuric. Arom.	—	20	o	o	13·36
Acid. Sulphuric. Crud.	o	o	93·1	91	o
Acid. Sulphuricum Dil.	12·1	10	16	15·5	13·68
Acid. Sulphuric. Fum.	o	o	—	o	o
Acid. Sulphurosum .	6·4	3·5	o	o	9·2
Acid. Tannicum . .	—	—	—	—	—
Acid. Tartaricum . .	—	—	—	—	—
Acid. Valerianicum .	—	o	—	o	o

(*To be continued.*)

COMPARATIVE LIST OF POPULAR AND SCIENTIFIC NAMES OF THE ECONOMIC PLANTS OF BRAZIL.*

BY DR. T. PECKOLT.

Popular Name.	Systematic Name.
Abacateiro	Persea gratissima, Gaertn.
Abacaxi	*vide* Ananaz.
Abiu	Lucuma Caimito, Röm. et Sch.
Abobreira	Cúcurbita maxima, Duch.
Abobreira jerimú	Cucurbita Melopepo, L.
Abricoteiro	Mammea americana, L.
Abricoteiro de Brasil	Mimusops coriacea, Mart.
Abutua	Botryopsis platyphylla, Miers.
Acafrao da India	Crocus sativus, L.
Acelga	Beta Cicla, L.
Afiou	Arracacha esculenta, D.C.
Agoniada	Plumieria lancifolia, Müll.
Agriao	Sisymbrium pumilum, St. Hil.
Agriao da horta	Nasturtium officinale, R. Br.
Aipim	*vide* Mandioca.
Aipo	Apium graveolens, L.
Alcachofra	Cynara Scolymus, L.
Alface	Lactuca sativa, L.
Algarrobeira	Prosopis dulcis, H. B. K.
Algodoeiro	Gossypium vitifolium, Lam.
Alho	Allium sativum, L.
Alho grosso	Allium Scorodoprasum, L.
Alho porró	Allium Porrum, L.
Almacegueirà	Amyris ambrosiaca, Vellos.
Ambauba mansa	Pourouma cecropiæfolia, Mart.
Ameixeira de Canada	Eriobotrya japonica, Lindl.
Ameixeira da India	Eriobotrya japonica, Lindl.
Ameixeira preta	Prunus paranaense.
Ameixeira da terra	Ximenia americana, L.
Amendoim	Arachis hypogæa, L.
Amoreira	Morus nigra, L.
Amoreira da silva	Rubus brasiliensis, Mart.
Ananaz	Ananassa sativa, Lindl.
Anda-assú	Anda Gomesii, Juss.
Anil	Indigofera Anil, L.
Aniz estrellado	Illicium anisatum, L.
Araçazeiro	Psidium Araça, Radd.
Araçazeiro pera	Psidium variabile, Bg.
Arariba	Nossolia robusta, Vell.
Araríbá	Arariba rubra, Mart.
Ararixá (Rio)	Sterculia Chicha, St. Hil.
Arapoca	Raputia alba, Nees.
Araticum	Rollinia exalbida, Mart.
Araticum-Assú	Anona dioica, St. Hil.
Araticum mangue	Anona rhizantha, Eichl.
Arco de pipa	Erythroxylon utilissimum, Fr. All.
Aroeira	Schinus terebinthifolius, Radd.
Aroeira vajado	Schinus antiarthriticus, Mart.
Arroz	Oryza sativa, Linn.
Arruda do mato	Xanthoxylum Peckoltianum, ~~Eichl.~~ Engl.
Arvore do longa vida	Graphyria.
Atta	Anona squamosa, L.
Aveia	Avena sativa, L.
Bacaba	Œnocarpus Bacaba, Mart.
Bacupari	Gardenia suaveolens, Vell.
Bacuri	Platonia insignis, Mart.
Banana de macaco	Philodendron bipinnatifidum, Sch.
Banana de Madagascar	Ravenala madagascariensis, Poir.
Banana S. Thomé	Musa paradisiaca, L.
Banana da terra	Musa sapientum, L.
Barauna	Melanoxylon Brauna, Schott.
Barbatimao	Stryphnodendron polyphyllum, Mart.
Batata doce	Batatas edulis, Chois.
Batata ingleza	Solanum tuberosum, L.
Batatinha	Ipomœa Peckoltii, ~~Mass.~~
Baunilha	Vanilla aromatica, Sw.
Beldroega	Portulaca radicans, Mart.
Beringela	Solanum ovigerum, L.
Bicuiba	Myristica Bicuhyba, Schott.
Borracha	Siphonia brasiliensis, Willd.
Broccoli	Brassica pompejana asparagoides, L.
Buranhem	Lucuma glycyphlœum, Mart.
Butua	Abuta rufescens, Aubl.
Cabelluda	Eugenia tomentosa, Mart.
Cacaozeiro	Theobroma Cacao, L.
Càfézeiro	Coffea arabica, Linn.
Càfé do diabo	Cesaria ramiflora, Vahl.
Càfé do mato	Swartzia apetala, Raddi.
Càfé de Sudan	Cola acuminata, Sch. et Endl.
Càjazeiro	Spondias purpurea, L.
Càjazeiro do mato	Tapiria Peckoltiana, Engl.
Càjueiro	Anacardium occidentale, L.
Càjueiro do mato	Ouratea salicifolia, St. Hil.
Cámbucá	Myrciaria plicato-costata, Bg.
Cámbucá do mato	Rubachia glomerata, Bg.
Camboim	Eugenia Vellosiana, Bg.
Canella do brejo (Rio)	Talauma ovata, St. Hil.
Canellà do brejo (St. Catharina	Nectandra leucothyrsa, Mss.
Canella de funcho	Mespilodaphne Sassafras, Mss.
Canella de Ceylon	Cinnamomum zeylanicum, N. ab E.
Canella do mato	Linaria aromatica, Arrud.
Canella mulatinha	Nectandra amara, Meiss.
Canella foedorenta	Nectandra myriantba, Meiss.
Canella preta	Nectandra mollis, Nees.
Canella parda	Agathophyllum aromaticum, L.
Canella sassafraz	Mespilodaphne indecora, Mss.
Canella de veado	Actinostemum lanceolatum, Fr. Allem.
Cànjerana	Cabralia Canjerana, Mart.
Canjerana grande	Cabralea pilosa, DC., var β. glaber.
Cánna de assuvar	Saccharum officinarum, L.
Canna fistula	Cassia brasiliana, Lam.
Cánna de macaco	Dichorisandra thyrsifolia, Mik.
Capim gordura	Tristegis glutinosa, Nees.
Cápororoca	Myrsine ovalifolia, Miq.
Cará	Dioscorea sativa, L.
Cará pé d'anta	Dioscorea aculeata, R.
Cará branca	Dioscorea tuberosa hastata Vell.
Cárá de Guiné	Dioscorea vulgaris, Miq.
Cará mimosa	Dioscorea cinnamomifolia, Hook.
Cará do mato	Bomarea spectabilis, Mart.
Cará sapateiro	Helmia (Dioscorea) bulbifera, F.
Càratinga	Dioscorea piperifolia β triangularis, Willd.
Cardamomo	Amomum Cardamomum, L.
Cardamomo do mato	Amomum sylvestre, Mart.
Carnaubeira	Copernicia cerifera, Mart.
Carurú	Amaranthus viridis, L.
Carurú-assú	Phytolacca decandra, L.
Carurú azedo	Hibiscus Sabdariffa, L.
Caruru amargoso	Senecio palustris, Vellos.
Cáruru amarello	Amaranthus flavus, Linn.
Carurú da Bahia	Corchorus olitorius, L.
Carurú bravo	Siphocampylus longepedunculatus, Pohl.
Carurú miudo	Euxolus oleraceus, Moy.
Carurú de sapo	Oxalis Martiana, Juss.
Carurúselvagem	Phytolacca thyrsiflora, Fenzl.
Carurú verde	Euxolus caudatus, Moq.
Carurú vermelho	Amaranthus melancholicus, L.
Castanha	Castanea vesca, Gaertn.
Càstanha de Ceará	Pourretia tuberculata, M.

* From the *Zeitschrift d. allg. österr. Apotheker-Vereines*, xxi., 182, 197, 214.

Popular Name.	Systematic Name.
Càstanheiro de Pará	Bertholletia excelsa, H. et B.
Cátagoá	Trichtrilia Catigua, M.
Cátaiá	Drymis Winteri, Mart.
Càtinga de porco	Caesalpinia porcina, M.
Cebola	Allium Cepa, L.
Cèbola branca	Allium ascalonicum, L.
Cebolinha	Allium Schoenoprasum, L.
Cèdro	Cedrela brasiliensis, Mart.
Cèdro vermelho	Cedrela Vellosiana, Roem.
Cenoura	Daucus Carota, L.
Centeio	Secale cereale, L.
Chá dos Apalachos	Ilex vomitoria, Art.
Chá de frade	Lippia Pseudo-thea, Sch.
Chá cravo	Pseudocaryophyllus sericeus, Bg.
Chá de pedestre	*vide* Chá frade.
Chá da terra	Turnera frutescens, Aubl.
Chuchú	Sechium edule, Sw.
Cipó de S. Joao	Bignonia ignea, Vell.
Cipó timbó	Paullinia pinnata, L.
Cóbió	Solanum sessiliflorum, M.
Cóca	Erythroxylon Cóca, Lam.
Cóngonha	Ilex ginabensis, Reiss.
Congonha grande	Maytenus communis, Reiss.
Congonha grande bravo	Symplocos variabilis, M.
Congonha mansa Minas	Ilex theezans, Mart.
Congonha mansa Rio	Ilex paraguariensis, St. Hil.
Congonha S. Paulo	Ilex medica, Mart.
Congonha miuda	Ilex Macoucoua, Mart.
Congonha miuda bravo	Maytenus ligustrina, Reiss.
Congonha de Minas	Villarsia mucronata, Ruiz.
Còqueiro da Bahia	Cocos nucifera, L.
Cópaiba de Amazonas	Copaifera multijuga, Hayn.
Cópaiba de Bahia	Copaifera coriacea, Mart.
Cópaiba de Gogaz	Copaifera marginata, Benth.
Cópaiba de Matto grosso	Copaifera elliptica, Mart.
Cópaiba de Paraná	Copaifera oblongifolia, Mart.
Cópaiba de S. Paulo	Copaifera trapezifolia, Hayn.
Cópaiba de Piauhy	Copaifera confertiflora, Benth.
Còrindiba	Sponia micrantha.
Còrindiúba	Colletia?
Craveira da terra	Calyptranthes aromatica, St. Hil.
Craveira do mato	Pseudocaryophyllus sericeus, Bg.
Cúieté	Crescentia Cujete, L.
Cúmarú	Dipteryx odorata, Willd.
Cúmary	Dipteryx odorata, Willd.
Cùmarú-rana	Dipteryx oppositifolia, Willd.
Cùpuaçu	Deltonea lactea, M.
Cùpauba-rana	Eperua purpurea, Brown.
Cùramari	Bignonia inæqualis, DC.
Cúrititiba	Lucuma Rivicóa, Gaertn.
Diconroque	Trophis brasiliensis, M.
Embira (Amazonas)	Schœnobiblus daphnoides, Mart.
Embira (Minàs)	Daphnopsis brasiliensis, Mart.
Embira (Rio)	Daphnopsis Martii, Meiss.
Embira branca	Funifera fasciculata. Meiss.
Espiga de sangue	Helosis brasiliensis, Schott.
Espinha de manca	Mimosa sepiaria, Benth.
Espinha miuda	Calliandra Peckoltii, Benth.
Espinha roya	Piptadenia polyptera, Benth.
Esponja da terra	Scybalium fungosum, Schott.
Esponja de rede	Dictyophora campanulata, Nees.
Fava contra	Canavalia gladiata, DC.
Fava St. Ignacio	Feuillea cordifolia, Vellos.
Faveira do mato	Pithecolobium multiflorum, Benth.
Fedegoso	Cassia affinis, Benth.
Fedegoso do mato	Cassia pubescens, Jacq.
Fedegoso do matovirgem	Cassia speciosa, Schrad.
Feijao branco	Phaseolus vulgaris, L.
Feijao carrapato	Dolichos sphaerospermus, DC.

Popular Name.	Systematic Name.
Feijao fradinho	Dolichos monachalis, Brot.
Feijao da India	Lablab vulgaris, Savi.
Feijao mirim	Clitoria ternatea, L.
Feijao preto	Phaseolus derasus, Schrck.
Fel da terra	Lophophytum mirabile, Sch.
Fruta de conde	Anona obtusiflora, Juss.
Fruta de condessa	Anona squamosa, L.
Fruta de Jacu	Duranta Plumieri, Jacq.
Fruta de macúco	Licania glabra, Mart.
Fruta de pomba	Erythoxylum subrotundum, St. Hil.
Fruta de pao	Artocarpus incisa, L.
Fruta de sabai	Sapindus divaricatus, St. Hil.
Fruta de tucano	Erythroxylum campestre, St. Hil.
Garapa	Apuleia polygama, Fr. All.
Genipapeiro	Genista brasiliensis, Mart.
Giló	Solanum digitatum.
Giló do reino	Campomanesia reticulata, Bg.
Guabiroba	Campomanesia reticulata, Bg.
Guabirob-assú	Campomanesia crenata, Bg.
Guabiroba de cachorro	Campomanesia virescens, Bg.
Guabiroba do campo	Abbevillea Guabiroba, Bg.
Guabiroba felpuda	Campomanesia discolor, Bg.
Guabiroba lesa	Campomanesia obscura, Bg.
Guabiroba do mato	Campomanesia xanthocarpa, Bg.
Guabiroba mirim	Campomanesia aprica, Bg.
Guabira guacu	Eugenia Guabijú, Bg.
Guaça-assú	Protium macrophyllum, H. B. Kth.
Guaiabita	Combretum frangulifolium, H. B. Kth.
Guaiabeira	Psidium Guaiava, Raddi.
Guaiabeira do mato	Psidium densicomum, Bg.
Guaiabeirana	Psidium acutangulum, DC.
Guando	Cajanus Indicus, Spr.
Guapebeira	Lucuma laurifolia, DC.
Guapuronga	Marlieria tomentosa, Camb.
Guarabú	Peltogyne Guarabu, Fr. Allem.
Guarabú amarello	Peltogyne confertiflora, Benth.
Guaracahy	Moldenhauera floribunda, Schrad.
Guáraná	Paullinia sorbillis, Mart.
Guarema	Seguiera alliacea, Mart.
Guaranhem	Chrysophyllum glycyphloeum, M.
Grumixameira	Stenocalyx brasiliensis, Bg.
Guingombó	Abelmoschus esculentus, Gllet. Per.
Gurataia-poca	Galipea dicotoma, Fr. All.
Herva de Juhambú	Cotula Piper, Vell.
Herva de S. Joao	Ageratum conyzoides, L.
Herva moura	Solanum nigrum, L.
Herva de Santa Maria	Chenopodium anthelminthicum, L.
Herva de passarinho	Struthanthus marginatus, Blum.
Humiri	Humiria balsamifera, Aubl.
Ibabiraba	Britoa triflora, Bg.
Ibiribá-rana	Lecythis angustifolia, Endl.
Imbé	Philodendron Imbé, Schott.
Imbira	Xylopia brasiliensis, Spr.
Imbir-assú	Carolinea macrocarpa, Schl.
Imbuzeiro	Spondias venulosa, Mart.
Ingá	Inga edulis, Mart.
Ipé	Tecoma Ipé, Mart.
Ipecacuanha	Cephaelis Ipecacuanha, W.
Ipadú	*vide* Cóca.
Jaboticabeira	Myrciaria Jaboticaba, Bg.
Jacarandá-rosa	Drepannocarpus microphyllus, Merger.
Jacarandá-tau	Machaerium firmum, Fr. Allem.
Javarandá-macho	Platypodium elegans, Vog.
Jacutupé	Pachyrrhizus angulatus, Benth., var. integrifolia.

Popular Name.	Systematic Name.
Jambeiro	Jambosa vulgaris, DC.
Jaqueira	Artocarpus brasiliensis, Gomez.
Jaracathiá	Carica dodecaphylla, Vell.
Jararacá	Dracontium asperum, C. Koch.
Jatobá	Hymenæa stilbocarpa, Hayn.
Jiquitibá brancha	Couratari legalis, Mart.
Jiquitibá vermelho	Couratari estrellensis, Radd.
Jiquitiba	Couratari domestica, Mart.
Jissará	Euterpe edulis, Mart.
Jôa	Lycopersicum cerasiforme, Dun.
Joazeiro	Zizyphus Joazeiro, Mart.
Joao molle	Pisonia tomentosa, Casar.
Lagrimas de N. Senhora.	Coix Lacryma, L.
Laranjeiro	Citrus Aurantium, Risso.
Laranjeiro brava	Xanthoxylum monogynum, St. Hil.
Laranjeira boceta	Citrus deliciosa, Ten.
Laranjeira de China	Citrus Aurant. Sinense, Risso.
Laranjeira tangerina	Citrus margarita, Lour.
Laranjeira da terra	Citrus vulgaris, Risso.
Laranjeira turanja	Citrus decumana, Sieb.
Laranjeiro do mato	Evodia febrifuga, St. Hil.
Laranjeiro do mato	Gardenia suaveolens, Vell.
Limoeiro azedo	Citrus Limonum Bignetta, Riss.
Limoeiro dove	Citrus Lumia, Risso.
Limoeiro de embigo	Citrus Limetta minor, Risso.
Limoeiro grande	Citrus medica, Risso.
Limoeiro do mato	Citrus medica spinosissima, Mey.
Limoeiro de mato	Metrodorea pubescens, St. Hil.
Limaosinho	Acanthocladus brasiliensis, Klotsch.
Loireiro	Laurus nobilis, L.
Loireiro de folha larga	Nectandra polyphylla, Nees.
Loireiro do mato	Nectandra myriantha, Meiss.
Loireiro de Paranā	Oreodaphne acutifolia, Nees.
Lupulo	Humulus Lupulus, L.
Macambira	Bromelia laciniosa, Mart.
Machicha	Cucumis Anguria, L.
Mamma-coca	Erythroxylum Mammacoca, Mart.
Mamma de porco	Xanthoxylum latespinosum, Engl.
Mamoeiro	Carica Papaya, L.
Mamono	Ricinus communis, L.
Mamono de mato	Micrandra elata, Muell. Arg.
Manaca	Brunsfelsia Hopeana, Benth.
Manaca-rana	Paypayrola grandiflora, Tul.
Mandioca	Manihot utilissima, Pohl.
Mandioca brava branca (cultivirte)	Manihot utilissima, Pohl.
Mandioca brava do mato	Manihot Pohlii, Wawra.
Mandioca do mato roya	Manihot paviæfolia, Pohl.
Mandioca doce	Manihot Jatropha, Pohl.
Mandioca Aypim	Manihot Aipi, Pohl.
Mandioco selvagem	Cleome pedunculata, Vellos.
Mangabeira	Hancornia speciosa, Gomes.
Mangarito	Xanthosoma sagittifolium, Schott.
Mangaraz	Caladium Poecile, Schott.
Mangueira	Mangifera indica, L.
Mangueira do mato	Ouratea castaneæfolia, DC.
Maracuja	Passiflora alata, Art.
Meracuja-assú	Passiflora quadrangularis, L.
Meracuja-assú	Passiflora maliformis, L.
Maracuja branco	Passiflora mucronata, Lam.
Maracuja mamao	Passiflora macrocarpa, Mart.
Maracujá miudo	Passiflora capsularis, L.
Maracujá de suspiro	Passiflora edulis, Sims.
Maracujá-rana	Maripa passifloroides, Benth.
Marianeira	Acnotinus cauliflorus, M.
Maria preta	Vitex polygama, Cham.
Marmeleiro	Cydonia vulgaris, Pers.
Marmeleiro do campo	Plenckia populnea, Reiss.
Marmeleira do mato	Casearia Cambessideii, Eichl.
Massambará	Trachypogon avenaceus, Mart.
Massaranduba	Mimusops elata, Fr. Allem.
Massaranduba do Norte	Massarandiba emarginata, Lac.
Massaranduba branca	Lucuma procera, Mart.
Mate	Ilex paraguariensis, St. Hil.
Melancia	Citrullus vulgaris, Schr.
Melao	Cucumis Melo, A.
Merendiba	Terminalia januariensis, DC.
Mexerica	Leucothoe breviflora, Meiss.
Milho	Zea Mays, L.
Milho cozido	Lycania incana, Aubl.
Monjólo	Enterolobium Monjollo, Mart.
Morango	Fragaria vesca, L.
Morango do campo	Ephedra Americana, Willd.
Mureci	Byrsonima speciosa, M.
Mureci-guassú	Byrsonima verbascifolia, H. B. Kth.
Mureci-pinima	Byrsonima chrysophylla, H. et B.
Mureci-pitanga	Byrsonima crassifolia, DC.
Mulungú	Erythrina Mulungu, Benth.
Nhambi	Ottonia Warakabavoura, Miq.
Nhanica	Artanthe caudata, Miq.
Noz moscada do Brasil	Cryptocarya moschata, Mart.
Oiti	Moquilea tomentosa, Benth.
Oiti-cica	Moquilea grandiflora, Mart.
Oiti-cica	Soaresia nitida, Fr. Allem.
Oiti de porco	Conepia Martiana, Hook.
Oleo de Jetahy	Peltogyne discolor, Benth.
Oleo de mico	Myrocarpus frondosus, Fr. Allem.
Oleo pardo	Myrocarpus fastigiatus, Fr. Allem.
Oleo vermelho	Myroxylon peruiferum, Linn. fil.
Ora pro nobis	Cactus Rosa, Vellos.
Oro pro nobis miudo	Talinum patens, Willd.
Paó d'alho	Crataeva Tapia, L.
Paó d'alho do campo	Agonandra brasiliensis, Miers.
Paó d'alho de Minas	Gallesia Gorazema, Moq.
Paó d'alho do Rio	Seguieria floribunda, Benth.
Paó Brasil	Caesalpinia echinata, Lam.
Paó de colher	Tabernaemontana Salzmanni, A. DC.
Paó ferro	Caesalpinia ferrea, Mart.
Paó de incenzo	Protium guianense, Marsh.
Paó de lagarto	Casearia parviflora, Mart.
Paó Pereira	Geissospermum Vellosii, Fr. Allem.
Paó rei	Sterculia Rex, Mart.
Paratudo	Hortia arborea, Engl.
Pati amargoso	Cocos oleracea, Mart.
Pati doce	Cocos butyracea, L.
Pecegueiro	Persica vulgaris, DC.
Pecegueiro do mato	Prunus sphaerocarpa, Sw.
Pepino do mato	Sicyos.
Peroba	Aspidosperma peroba, Fr. Allem.
Peroba branca	Sapota gonocarpa, Mart. et Eichl.
Peroba mirim	Aspidosperma polyneuron, Müll.
Piassabá (Bahia)	Attalea funifera. Mart.
Piassabá (Pará)	Leopoldinia Piassaba, Wallace.
Pichurim	Nectandra Puchury major, N. et Mart.
Pichurim bastardo	Nectandra Puchury minor, N. et Mart.
Pijericú	Xylopia grandiflora, St. Hil.
Pimenta de cheiro	Capsicum ovatum, DC.
Pimenta cumarina	Capsicum frutescens, Willd.
Pimenta malaqueta	Capsicum baccatum, L.
Pimenta Pitanga	Capsicum cerasiforme, Wild.

Popular Name.	Systematic Name.
Pimentaó	Capsicum annuum, L.
Pimentao doce	Capsicum tetragonum, Müll.
Pimentao miudo	Capsicum luteum, Lam.
Pimenta de Jamaica	Pimenta officinalis, Bg.
Pimenta da terra	Xylopia sericea, St. Hil.
Pimenta do mato	Xylopia frutescens, Aubl.
Pinheiro	Araucaria brasiliana, Lamb.
Pinheiro da India	Pinus Pinea, L.
Piqui	Evolvulus Daphnoides, Moric.
Piquiá	Caryocar brasiliense, St. Hil.
Pita	Stenocalyx Pitanga, Bg.
Pitangueira (Rio)	Fourcroya gigantea, Vent.
Pitangueira (Norden)	Stenocalyx Michelii, Bg.
Pitangueira (Süden)	Stenocalyx sulcatus, Bg.
Pitangueira de cachorro	Calyptranthes obscura *β*. fluminensis, Bg.
Pitangueira do mato	Eugenia ligustrina, Bg.
Pitangueira mirim	Alomyrcia rubella, Bg.
Pitanga-úba	Phyllocalyx edulis, Bg.
Pitombeira	Sapindus esculentus, St. Hil.
Pitombeira mirim	Eugenia Luschnathiana, Bg.
Poaya	*vide* Ipecacuanha.
Pongo	Cannabis sativa, L.
Quina do Rio	Ladenbergia hexandra, Kltz.
Quebra machado	Astronium fraxinifolium Schott.
Ratanhia da terra	Krameria tomentosa, St Hil.
Rosa Prava	Rosa setigera, Mich.
Roseira do mato	Bougainvillæa spectabilis, Willd.
Rosa do caboclo	Langsdorffia rubiginosa, Wedd.
Rompa gibao	Bumelia sartorum, Mart.
Rhuibarbo do campo	Lansbergia cathartica, Kl.
Rhuibarbo do mato	Lansbergia caracasana, Detr.
Samambaia	Pteris caudata, L.
Sangue de burro	Terminalia tinctoria, Pers.
Sangue de drago	Croton erythræma, Mart.
Sangue de drago de Minas	Trigonia cretonoides, Camb.
Sanque de drago de folha larga	Croton echinocarpus, Müll.
Sapé	Anatherum bicorne, Beauv.
Sapotá	Sapota Achras, Müll.
Sapucaieiro	Lecythis urnigera, Mart.
Sapucai-assú	Lecythis Ollaria, L.
Sapucaia branca	Lecythis lanceolata, Poir.
Sapucaia mirim	Lecythis Pohlii, Mart.
Sapucainha	Carpotroche brasiliensis, Juss.
Sebastiao de Arruda	Physocalymna floribunda, Pohl.
Serralha	Sonchus laevis, Vellos.
Sorveira	Callophora utilis, Mart.
Sucopira	Bowdichia major, Mart.
Subrasil	Caesalpinia peltophoroides, Benth.
Tabibuja	Bignonia Tababuya ? Peck.
Taboca	Plumiera bicolor, R. et P.
Tapinhoam	Silvia navalium, Fr. Allem.
Taquára	Bambusa Tayvara, Nees.
Tayoba	Colocasia esculentum, Mart.
Timbó arvore	Lonchocarpus Peckoltii, Wawra.
Timbó de boi	Cleobulia multiflora, Benth.
Timbó peise	Serjania noxia, St. Hil.
Tinguaciba	Xanthoxylon Tinguaciba, Fr. Allem.
Tomate	Lycopersicum esculentum, Müll.
Unha de boi	Bauhinia pulchella, Benth.
Unha de gato	Acacia paniculata, Willd.
Unha de vacca	Bauhinia forticata, Link.
Urucú	Bixa Orellana, L.
Urucarana	Hieronyma Alchornoides, Fr. Allem.
Urucú bravo	Bixa Urucurana, Willd.
Uva de espinha	Berberis laurina, Billb.
Uva do mato	Cissampelos rhombifolia, Val.
Uvaaya	Eugenia Arrabidæ, Bg.
Uvalha	Eugenia Uvalha, Camb.
Uvalho de campo	Eugenia pyriformis, Camb.
Vampi	Cookia punctata, Retz.
Vinagreiro	Hibiscus Sabdariffa, Linn.
Vinhatico	Acacia maleolens, Fr. Allem.
Visgueira	Parkia platycephala, Benth.
Viuva	Petrea denticulata, Schmd.
Viuvinha	Browallia demissa, L.
Ycó	Colicodendron Ycó, Mart.
Ypadú	*vide* Coca.

Rio, September 20, 1882.

BLEACHING SPONGES.*

Several correspondents of the *Pharmaceutische Zeitung* communicate methods for bleaching sponges, all of which we have been acquainted with ourselves, and which we can recommend as quite satisfactory.

1. First clean, wash, and squeeze out the sponges; then dip them into a two per cent. solution of permanganate of potassium. Here they become quite brown (from separated manganic oxide); after ten minutes they are taken out, washed in water, again well pressed, and then dipped into a two per cent. solution of oxalic acid [we prefer diluted sulphuric (1 : 20) or diluted hydrochloric acid (1 : 15)], in which they become perfectly white. Success mainly depends on the soaking in the permanganate solution; if they are macerated too short a time, they do not become thoroughly white; if too long, they are apt to become rotten (Dr. Siemens).

2. First clean the sponges by immersing them in diluted hydrochloric acid. Then soak them in the bleaching liquid, composed of hyposulphite of sodium, one part, water, twelve parts, and hydrochloric acid, two parts. After some time, they are removed and well washed. To the last wash water a little glycerin is added in order to preserve the sponges soft. The liquid is best pressed out by passing the sponges through a clothes-wringer.

3. Toilet sponges, which have been in use, often become peculiarly slimy, fatty, and almost useless, owing to some action of the soap. Mere washing in distilled water does not remove the dificulty. It may be overcome by using fused chloride of calcium. The sponge is pressed as much as possible, placed on a plate, the powdered chloride of calcium sprinkled upon it, and allowed to deliquesce upon the sponge. After about half an hour, the sponge may be washed in water and dried, when it will become white (M. v. Valta).

Though all the above processes furnish satisfatory results, yet the following combination and modification of two of the above processes, which was devised by Mr. John Borham, and has been in use in Bellevue Hospital for a considerable time, will be found to work better still :—

Soak the sponges, previously deprived of sand and dirt by beating and washing, in a one per cent. solution of permanganate of potassium. Then remove them, wash them thoroughly with water, and press out the water. Next put them into a solution of one half pound of hyposulphite of sodium in one gallon of water, to which one ounce of oxalic acid has been added, and leave them in the solution for fifteen minutes. Finally, take them out, and wash them thoroughly.

By this treatment, the sponges are rendered perfectly white. Many sponges contain a more or less dark-coloured, brownish core. If treated only with permanganate and acid, the core is either not bleached at all, or if it has been somewhat bleached, the tint is apt to grow again darker. By the above modification, every portion of the sponge is rendered white, and remains so.

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The Pharmaceutical Journal.

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STATE AID FOR SCIENCE TEACHING.

THIRTY years have now elapsed since in a speech from the throne, upon the occasion of the opening of a session of Parliament, Her Majesty announced that a scheme had been prepared for adding a Science division to the Department of Practical Art, which had been established in the previous year. This scheme provided for an extension of a system of encouragement to local institutions for teaching practical science similar to that already commenced for schools for practical art, by the "creation in the metropolis of a science school of "the highest class, capable of affording the best "instruction and the most perfect training," and by aiding in the establishment of local science schools, such institutions to be made as largely self-supporting as possible. The praiseworthy ambition thus manifested for bringing Great Britain abreast of the continental nations most favoured in respect to scientific teaching has not been without result. It has no doubt extended and fostered a desire for scientific studies and been an immense boon to many who would not otherwise have been able to pursue them under such favourable conditions, and it has furnished opportunities to a much larger number of persons for acquiring a smattering of the sciences, which has at least the advantage of being better than no knowledge at all; on the other hand it has notoriously developed the art of preparing for examination, and it has made a considerable impression upon the national expenditure. To what extent the good effected preponderates over the disadvantages in the results, and whether the country derives the maximum possible of the former with the minimum of the latter are questions about which there has existed some diversity of opinion, especially in respect to the metropolitan "science school of the highest class," and this diversity of opinion has led to more than one reorganization before that institution took its present conglomerate form as the "Normal School of Science and Royal School of Mines." Some materials for assisting in the formation of a correct judgment are, however, furnished in the annual reports presented to Parliament by the Science and Art Department of the Privy Council, the thirtieth of which has just appeared.

The Report states that in the year 1882 the number of persons receiving elementary scientific instruction in 1402 schools having relations with the Department was 68,581, who were taught in 4881 separate classes, being an increase of 7404 pupils and 42 schools as compared with the previous year. The number of students who went up for examination from these schools was 43,331, and in addition there were 7290 candidates who presented themselves either as self-taught or from classes not entitled to claim payments on results, making a total of 50,621. Many of these persons presented themselves for examination in more than one subject, the number of papers worked being 76,063, of which 50,741 were passed, rather more than one-fourth of those accepted being ranked as "first class" in the respective stages. The "payments on results" made by the Department on account of the instruction that stands the test of examination are £2 for a "first class" and £1 for a "second class" in the elementary and in the advanced stages, and £2 for a "second" and £4 for a "first class" in "honours." Extra payments are made for attendance in organized "science schools," and special payments are made for practical chemistry and practical metallurgy. The total amount paid on account of the results of the examinations in 1882 was £45,376, or an average of 13*s.* 3*d.* per student. Payments were made to 1851 teachers, and the average payment per teacher was £24 10*s.* 3*d.*

So far as statistics are concerned therefore, the figures in the Report may be accepted as indicating that a slight break which occurred in 1881 in the steady but decided increase in the number of persons who annually prove capable of furnishing such evidence as the Department requires that they have been educated in certain sciences was not a commencement of a decline. When we turn, however, to the evidence as to the quality of the education, the statements in the Report are not so satisfactory. Apart from the disadvantage inseparable from any system of payment by results, in the temptation that it presents to teachers to neglect the systematic teaching of fundamental principles in favour of a preparation to meet certain anticipated, and to some extent inevitable, questions, the safeguards for ensuring proper qualifications in the teachers appear to be at present decidedly insufficient. This is not to be wondered at when it is remembered that during the last six years any person who has passed in the advanced stage of a science at an ordinary general examination in May has been deemed qualified to act as a teacher and earn payment on results, although this standard is not unfrequently attained by intelligent lads in attending a single course of twenty-eight lectures. It may be argued that the incompetent teacher will be checkmated by not producing "results," and consequently not becoming entitled to payment, but that would be to ignore what is due to the pupils who are betrayed into wasting their time and opportunities with useless teachers bearing the stamp of the Department. This may be illustrated plentifully from the reports of the examiners; for instance, from those upon the sciences of most interest to the readers of this Journal,—Chemistry and Botany. With respect to the elementary stage of Chemistry, Dr. ROSCOE and Professor RUSSELL say, "whilst admitting that "much good work is being done, it is also no less "certain that many of the teachers have not had the "opportunity of acquiring sufficient knowledge or "experience to enable them to give satisfactory syste- "matic instruction." Again, speaking of the advanced stage, the same examiners "strongly urge on the "Department the necessity of encouraging to the "utmost the formation of classes in the advanced "stage under competent teachers." The examiner in Botany, Professor THISELTON DYER, says it is plainly "evident that in each year many of the teachers are "quite incompetent to teach the subject. They seem "to content themselves, in fact, with teaching a "minimum in the most mechanical manner possible, "and obviously (from the uniformity of answering) "out of some inefficient manual compiled as a literary "venture by some person more or less ill-informed "as to the fundamental principles of the subject." It is therefore not so surprising to learn that the structure of the inflorescence of a daisy, which was one of the flowers set in the elementary stage, "was "generally misunderstood, and described as if it were "a flower, the involucre being treated as a calyx and "the florets of the ray as petals;" or that the vernal grass proved equally disastrous in the advanced stage, a large proportion of the candidates being evidently in total ignorance as to the structure of the gramineous inflorescence.

Professor THISELTON DYER is of opinion, and we think most people will agree with him, that as a temporary expedient a great improvement would be effected if groups of centres where scientific instruction is given would combine to secure the help of really efficient teachers, with an aptitude to instruct in particular subjects rather than a general disposition to undertake any in which they think they see a prospect of earning a grant. But he considers the present deplorable state of things must always be more or less irremediable until the work the Department is doing in training the teachers themselves gradually effects a leavening of the whole mass. In the face of such an opinion, and remembering that the reorganized "Normal School of Science and Royal School of Mines" at South Kensington was primarily intended for the instruction of teachers and of students of the industrial classes selected by competition, whilst other students were only to be admitted, so far as there might be accommodation for them, upon payment of fees fixed at a scale sufficiently high to prevent undue competition with institutions that do not receive State aid, it is not unreasonable to scan the Report for indications as to the rate at which the leavening process is going on. But it cannot be affirmed that the outlook is very promising. Of 78 students who received instruction in Chemistry during the session only 24 were Government students, the other 54 being private students, paying fees; of 31 who received instruction in Physics 13 were Government students; and out of 20 who were taught in Biology (including Botany) there were 13 more. These fifty students we presume, therefore, represent, as far as these three important sciences are concerned, the extent to which this "science school of the highest class" was during the year 1882 made available to the two kinds of students for whom it was primarily intended, and if from these fifty be deducted a proportion of the exhibitioners and scholars "selected by competition" it will be seen that the proportion of leaven introduced into the mass of nearly two thousand teachers is a very moderate one.

THE INTERNATIONAL PHARMACEUTICAL EXHIBITION AT VIENNA.

ON Saturday next, the 11th inst., the first of what is designed by the promoters to be a series of international pharmaceutical exhibitions, held in different parts of the world, will be formally opened in Vienna by His Imperial Highness the Archduke KARL LUDWIG, brother of the Emperor of Austria, and a hearty invitation to be present at the ceremony has been issued by the General Committee to pharmacists at home and abroad. It is perhaps unfortunate that such a movement was not initiated in a country more freely visited by foreigners; but this, if it be a disadvantage, is somewhat compensated by the fact that it is under the management of men who well understand the essentials to the success of such an exhibition, the Committee being presided over by Herr ANTON VON WALDHEIM, a former President of the International Pharmaceutical Congress and the present President of the International Pharmacopœia Commission. Notwithstanding the distance, we have reason to believe that between the 11th and the 27th of this month, when the exhibition will close, several Englishmen will be numbered among the visitors, and we hope to be able to lay before those pharmacists who have to stop at home an account of the most interesting of the objects shown.

We understand that there will be about three hundred exhibitors; most of these, as might be expected, will belong to the Austro-Hungarian empire, but Germany, Russia, France, England, America, Italy, Turkey, Spain, Portugal, Belgium, Holland, Denmark, Sweden, Norway, Switzerland and Roumania will be represented. Numerous scientific societies, also, have placed at the disposal of the Committee objects of very great interest, especially many illustrative of the conditions of pharmacy in the olden times.

The distinctions to be accorded for meritorious exhibits are of three kinds, diplomas of honour, silver medal diplomas and gold medal diplomas. These are to be awarded on the report of a committee of thirty-six jurors, nominated by the Executive Committee, care being taken that, as far as possible, every State participating in the exhibition shall be represented. Eighteen of these thirty-six jurors will deal with the class including drugs, chemical products, and pharmaceutical preparations and wares intended for medicinal use; the remaining eighteen being divided into groups who are to be intrusted with the other five classes devoted mainly to literature, pharmaceutical antiquities, scientific instruments and pharmaceutical apparatus. Where necessary the jurors are to be authorized to avail themselves of the assistance of experts, who also are to be nominated by the General Committee. The jurors are to meet on the 15th inst., and are to complete their labours by the 20th, immediately after which the list of awards will be published.

It only remains to repeat that the exhibition is to be held in the rooms of the Imperial Agricultural Society, which are beautifully situated in the Park-Ring, opposite the City Park. In the Rotunda, which formed part of the building erected for the universal exhibition of 1873, there will be held simultaneously an International Electric Exhibition; whilst two of the principal Austrian Pharmaceutical Associations will hold their annual gatherings in Vienna between the 20th and 25th of the month.

THE USE OF THE ROYAL ARMS.

It will be observed, from the correspondence laid before the Council at its meeting on Wednesday last that the Board of Trade recognizes the inconvenience which might be consequent upon the passing of the clause in the Patents Bill relating to the use of the coat of arms in its present form, and has suggested an amendment which the Council might adopt and procure to be moved upon the report of the Bill. Even in its amended form the clause would not be free from objection; but the real abuse at which the Government wishes to strike,—the fraudulent use of the arms by unscrupulous patent agents,—may be difficult to reach with a less stringent provision, whilst it is hardly probable that the law officers of the Crown would attempt to enforce a vexatious construction which it is now on record the clause is not intended to bear. The Patents Bill as amended was to be considered on Friday, and on Thursday Sir John Lubbock gave notice that he would move a fresh amendment, which is identical with that approved by the Council. It may, therefore, be assumed that a satisfactory decision will be arrived at, and we think that the thanks not only of chemists and druggists, but of the public generally, are due to the Council of the Pharmaceutical Society for the judicious manner in which it has brought the subject under the attention of the Government.

It appears from a remark made on Wednesday by Mr. Mundella on the occasion of receiving a deputation of Scottish graduates that the Government still hopes to be able to pass the Medical Acts Amendment Bill during the present session. It does not, however, appear to have been referred to by the Prime Minister in his statement as to the business before Parliament made on Thursday.

* * *

The Petroleum Bill was again set down for second reading in the House of Lords on Friday.

* * *

The British Medical Association commenced its fifty-first annual meeting at Liverpool on Tuesday last. The report showed that there had been an increase of nearly five hundred members since the meeting last year, the total number at the commencement of July being 10,050. The revenue for the year 1882 was £19,076, and the expenditure £16,288. A lively scene seems to have been provoked during a discussion of the bye-laws by the proposal of an amendment intended to exclude homœopathists from the Association, which, however, was not carried. On Wednesday it was decided that the meeting for 1884 should be held in Belfast, Dr. Cumming, of that city, being chosen President-elect.

* * *

The Honorary Secretaries of the Local Executive Committee at Southport have issued a circular stating that the Lancashire and Yorkshire and West Lancashire Railway Companies have arranged to issue season tickets at very cheap rates, permitting the holders to travel to and fro, as often as may be desired, between Southport and the chief stations on their respective lines for the period of a fortnight, covering the session of the Association. On production of the Association ticket or letter of invitation, also, return tickets will be issued to or from Southport from or to Lancashire and Yorkshire stations at a single fare, available on the day of issue only. Further, it may be convenient to intending visitors to the British Pharmaceutical Conference to know that the London and North Western Railway Company will attach through carriages to Southport to the carriages leaving Euston at 7.15 a.m., 11 a.m., 1.30 p.m., 3 p.m., and 4 p.m. on the 17th, 18th, and 19th of September.

* * *

We have received a copy of the programme of the International Medical Congress, with special reference to the Colonies, which is to be held in Amsterdam on the 6th, 7th and 8th of September. From it we learn that special reports by various eminent men will be presented to the Congress upon quarantine, the special education of colonial doctors; the hygiene of unhealthy professions, cultivations and trades in the colonies; the modifications which certain diseases, and especially infectious ones, undergo under the influence of tropical climates; phthisis in the colonies and tropical climates; and the treatment of exotic and tropical diseases in temperate climates. The President of the Organization Committee is Professor Stokvis, of Amsterdam.

* * *

We regret to have to announce that Mr. William Henry Slater, who was elected an Annuitant in 1878, died on the 29th ult., at the age of 59, from softening of the brain.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, August 1, 1883.

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Present—Messrs. Andrews, Borland, Butt, Churchill, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht and Williams.

The minutes of the previous meeting were read and confirmed.

DIPLOMAS.

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

Baily, Edward.
Barnes, James Burden.
Bessell, James Walter.
Corder, Edward.
Corder, Walter Shewell.
Crow, William Edward.
Dott, David Brown.
Gulliver, Walter Frederick.
Hopkins, William Richard.
Houfe, Robert William.
Ivatt, Albert.
Johns, Henry Benjamin Jeffery.
King, Arthur.
Presbury, Herbert Henry.
Ranken, Charles.
Rees, David.
Williams, William Lloyd.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Baily, Edward ....Ramsgate.
Barnes, James Burden ....London.
Bessell, James Walter............Ludlow.
Corder, Edward ....Norwich.
Crow, William Edward ....Louth.
Dott, David Brown ... .Edinburgh.
Hopkins, William Richard......Aberystwith.
King, Arthur ....Norwich.
Presbury, Herbert Henry ......Chaddesden.
Ranken, Charles ....Sunderland.
Rees, David ....London.

Chemist and Druggist.

The following registered chemist and druggist, who was in business on his own account before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society:—

Anderson, Alexander Black ...Dundee.

ASSOCIATES IN BUSINESS.

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

Bowden, Thomas Lemon ......Keynsham.
Bowman, Edmund ....Edinburgh.
Gordelier, Frank Heward ......Sidcup.

ASSOCIATES.

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

Adamson, Joseph William ......Epworth.
Arthur, John........................Chesterfield.
Badcock, Hy. Southgate R.......South Petherton.
Beale, William Scott ....London.
Brown, Joseph ....Walker-on-Tyne.
Burnett, Joseph Fearon ....Hyde.
Charge, Arthur William.........Chichester.
Crofts, John Ernest............ ..Leicester.
Crompton, William ....Bury.
Davies, Edward Charles James..London.
Denham, Albert Shaw............Preston.
Dewes, George ... .Wolverhampton.
Dickson, John ....Dumfries.
Edmunds, Henry Herbert ......Mere.
Elliott, Stephen James .. ..Preston.
Haddock, James ....Bedford Leigh.
Hart, Frederick Charles ....Tongham.
Hartley, Walter Edward.........London.
Heath, Walter Edwin ....Coleshill.
Hudson, Alfred Wickens..... ...London.
Jones, David.........................Carnarvon.
Kay, Thomas Wilkinson ... .Manchester.
King, Frederick Herbert.........Market Drayton.
Lambert, Oliver ....Hull.
Lees, James ....Leighton Buzzard.
Metcalf, Rowland Alfred ......Uxbridge.
Mowatt, John Rodman ....London.
Munkman, Robert Allen ......Boston.
Parker, Edmund Lloyd Philips..Nottingham.
Pottage, Edwin.....................Beverley.
Reynolds, Richard Freshfield...Leeds.
Roberts, Edmund..................Upper Norwood.
Rowland, Langshaw ....Wrexham.
Scupham, Herbert ....Ulceby.
Walker, George Edward.........Royston.
Wiggin, John Chinery............Ipswich.
Wilson, David William Richard.Thirsk.

Modified.

Bottomley, Lawrence Whinray..Sheffield.

APPRENTICES OR STUDENTS.

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

Allison, Henry ....Birmingham.
Aspinall, John William ....Ulverston.
Barker, James Herbert Bond...Mold.
Bray, John ....Lochmaben.
Buxton, Alfred......... ....Stafford.
Clayton, George ....Manchester.
Cobham, George William ......Gravesend.
Crofts, Robart ....Canterbury.
Guest, William Joseph ....Walsall.
Harold, John P. ....London.
Haywood, William Henry ......Liverpool.
Heap, Arthur ... .Coventry.
Hulland, James ....Bath.
Jeffcoat, Joseph George.........London.
Johnstone, Edward Straus ......Whaley Bridge.
Jones, John ....Llandovery.
Keyzor, Alfred Abraham ......London.
Lawrenson, John..................Radcliffe.
Lewis, Thomas......................Wednesbury.
Lord, William Butler ....Lancaster.
Miller, William Gow ....Wick.
Morris, John........ ....Birkenhead.
Patchett, John ....Halifax.
Robinson, Richard Hardy ......Wainfleet.
Rogers, Charles Henry ....Ipswich.
Sewell, Thomas Arthur Wm....Lee.
Shand, Alexander, jun. ....Dunfermline.
Simpson, James William.........Maidstone.
Squire, George ....Barnsley.
Walter, John Albert ....Ampleforth.

Warren, Thomas ....Hingham.
West, George William.............Stokesley.
Williams, George Whitfield ...Cardiff.

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

Addition to the Register.

The Registrar reported that—

FitzWilliam Bennett Townley, 2 Commercial Place, Landport,

having made a statutory declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been duly supported by a qualified person, his name had been placed on the Register.

Superintendents of Written Examinations.

The following list of Superintendents and Deputy-Superintendents of written examinations for the ensuing year was agreed to:—

Aberdeen ....Kay, James Petrie.
Birmingham ....Southall, William.
Brighton ....Gwatkin, James Ross.
Bristol ....Stroud, John.
Cambridge ....Deck, Arthur.
Canterbury ....Bing, Edwin.
Cardiff ....Munday, John.
Carlisle ....Thompson, Andrew.
Carmarthen ....Davies, Richard Morgan.
Carnarvon ....Lloyd, William.
Cheltenham ....Smith, Nathaniel.
Darlington ....Robinson, James.
Douglas, Isle of Man ......Brearey, William A.
Dundee ....Hardie, James.
Edinburgh ....Stephenson, John B.
Exeter ....Broom, William Willey.
Glasgow ....Kinninmont, Alexander.
Guernsey ....Arnold, Adolphus.
Hull ....Bell, Charles Bains.
Inverness ....Galloway, George Ross.
Jersey ....Ereaut, John, jun.
Lancaster ....Bagnall, William Henry.
Leeds ....Reynolds, Richard.
Lincoln ....Maltby, Joseph.
Liverpool ....Symes, Charles.
London ....Taylor, George Spratt.
Manchester ....Wilkinson, William.
Newcastle-on-Tyne ....Martin, Nicholas Henry.
Northampton ....Bingley, John.
Norwich ....Sutton, Francis.
Nottingham ....Bolton, Charles Alfred.
Oxford ....Prior, George Thomas.
Peterborough ....Heanley, Marshall.
Sheffield ....Ward, William.
Shrewsbury ....Cross, William Gowen.
Southampton ....Dawson, Oliver Robert.
Truro ....Percy, Thomas Bickle.
Worcester ....Virgo, Charles.
York ....Sowray, Joseph.

Deputy-Superintendents of Written Examinations.

Aberdeen ....Glover, William K.
Birmingham ....Churchill, William John.
Brighton ....Savage, William Wallace.
Bristol ....Pitman, John.
Cambridge ....Hoare, William Parker.
Canterbury ....Amos, Daniel.
Cardiff ....Coleman, Alfred
Carlisle ....Hallaway, John
Carmarthen ....Davies, R. Morgan, jun.
Carnarvon ....Francis, James
Cheltenham ....Barron, William
Darlington ....Hutchinson, Rev. E.
Douglas, Isle of Man ......Brearey, Arthur W.
Dundee ....Kerr, Charles
Edinburgh ....Ainslie, William
Exeter ....Harris, Henry William.
Glasgow ....Davison, Thomas.
Guernsey ....Collenette, Adolphus.
Hull ....Baynes, James.
Inverness ....Galloway, George.
Jersey ....Ereaut, John.
Lancaster ....Wilcock, John.
Leeds ....Smeeton, William.
Lincoln ....Battle, John Scoley.
Liverpool ....Sumner, Robert.
London ....Bremridge, Richard. Knapman, John W. Holmes, Edward M.
Manchester ....Wilkinson, George.
Newcastle-on-Tyne ....Stuart, Charles Edward.
Northampton ....Mayger, William D.
Norwich ....Corder, Octavius.
Nottingham ....Parker, William H.
Oxford ....Thurland, Henry.
Peterborough ....Buckle, Frank George.
Sheffield ....Wilkinson-Newsholme, G. T.
Shrewsbury ....Blunt, Thomas P.
Southampton ....Spearing, James.
Truro ....Anstey, John U.
Worcester ....Lunn, Thomas.
York ....Wilson, Thomas William.

FINANCE.

The report of this Committee recommended sundry accounts for payment. It also recommended that the Committee be authorized to sell out a sufficient amount of stock to complete the purchase of freehold ground rents at Paddington Green, Strawberry Hill and Wimbledon, which purchases had been already sanctioned by the Council.

The Council went into committee whilst the President explained the above business in detail. On resuming, the report and recommendations of the Committee were received and adopted.

BENEVOLENT FUND.

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

£10 to the widow, aged 72, of a pharmaceutical chemist and member, who was also an annuitant on the fund.

£10 to a former member, in very infirm health. Applicant has had seven previous grants.

£10 to the widow, aged 71, of a registered chemist and druggist.

£10 to the widow, aged 74, of a pharmaceutical chemist member.

£10 to a registered chemist and druggist.

£5 to the widow of a chemist and druggist member.

The Secretary had reported that a grant of twenty guineas made in February last to aid in securing the election of an orphan had been expended successfully, and the child had been elected.

The Committee had declined to entertain one application which had been made for assistance.

The Isherwood Orphans.

Mr. Savage said he had recently had an opportunity of seeing the little girl Isherwood and he found that she was very comfortably domiciled. The gentleman with whom she was placed had died, but his widow carried on two businesses, the one a chemist's by the aid of a qualified assistant and the other that of a general trade, in which the girl Isherwood assisted, and her adopted mother said she could not think of parting with her.

Mr. Williams said this was a very gratifying statement and he hoped that its publication would have the effect of inducing some one to take the charge of the elder boy, who was now of an age when he ought to be doing something to earn his living.

The Vice-President said he was glad this subject had been mentioned, and he hoped some kind-hearted person would come forward and help. The lad was now between thirteen and fourteen; he was an intelligent boy, but of rather delicate health. The other boy, who was about nine, was still at school.

The Secretary read a letter which had been received from a widow who had received three separate grants of £15 each, at intervals since 1877, saying that she was no longer in need of assistance and enclosing a postal order for 5*s.* as a small contribution to the Benevolent Fund.

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

LIBRARY, MUSEUM, LABORATORY, AND HOUSE.

Library.

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

	Attendance.	Total.	Highest.	Lowest.	Average.
June . . .	Day . . .	739	38	16	28
	Evening . .	148	16	2	7

	No. of Entries.		
Circulation of books.	Town.	Country.	Total.
June	170	118	288

Carriage paid, £1 7*s.* 2*d.*

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

Bentley (Professor R.), Student's Guide to Structural, Morphological, and Physiological Botany, 1883. From the AUTHOR.

Coles (O.), List of Works on Dentistry, published between the years 1536 and 1882. From the BRITISH DENTAL ASSOCIATION.

Hooker (J. D.), Flora of British India, part 10. From H.M. SECRETARY OF STATE FOR INDIA.

The Committee recommended the purchase of the undermentioned works:—

Baillon (H.), Traité de Botanique Médicale Phanerogamique, 1883, 2 fascicules.

Köhler's Medizinal-Pflanzen.

Lindley (J.), School Botany.

The Librarian had informed the Committee that the annual meeting of the Library Association would be held at Liverpool in September. The Committee recommended that the Librarian should attend the meeting.

The President had afterwards recommended the purchase of another copy of Sachs' Botany.

Curator's Report.

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

	Total.	Highest.	Lowest.	Average.
Morning .	520	49	4	20
Evening .	147	13	2	7

Estimates had been obtained for new Museum cases in the examination room, and the Committee recommended that Mr. Howlett's estimate for £221 5*s.* be accepted.

Professors Redwood and Bentley had attended and reported satisfactorily as to their respective classes.

Professor Attfield had sent in his usual statistical report as to the Practical Chemistry class. The whole class had worked well, the progress made had been satisfactory, and the conduct of all unexceptionable.

The PRESIDENT asked for authority to carry out during the vacation certain small alterations, whitewashing and cleansing, etc.

This was agreed to, and the report and recommendations of the Committee were unanimously adopted.

Resignation of the Assistant-Curator.

The PRESIDENT reported that the Assistant-Curator in the Museum, Mr. Elborne, had written a letter tendering his resignation, as he had recently obtained the appointment of Assistant-Lecturer at Owens College, Manchester. He thought it was not desirable at the present moment to make a permanent appointment in the place of Mr. Elborne, but suggested that the Curator be authorized to employ such temporary assistance as he required for the present.

The letter was ordered to be entered on the minutes, and the resignation accepted.

The VICE-PRESIDENT said he understood that there had been a sharp competition for the post at Owens College, and he believed Mr. Elborne owed his success in great measure to the position he had held in connection with the Pharmaceutical Society.

Mr. GREENISH expressed his pleasure at Mr. Elborne's success, he having discharged his duties greatly to the satisfaction of the Committee.

GENERAL PURPOSES.

The report of this Committee included the reports of the Professors as to the School of Pharmacy prizes, the report of the Examiners appointed to conduct the competition for the Pereira Medal, etc., and Professor Bentley's report on the Herbarium Prize. The purport of these reports was as follows:—

Chemistry and Pharmacy.

Professor Redwood reported that at the examination held at the termination of the second course of five months four competitors had obtained sufficient marks to entitle them to recognition. He also reported that there had been twelve competitors for the Silver Medal at the sessional examination, of whom seven had distinguished themselves. The session had been generally a successful one, as indicated by the number of students from the School who had passed the Major examination during the session.

Materia Medica and Botany.

Professor Bentley reported the result of the examination held at the termination of the second course of five months. Two competitors were entitled to recognition. In the sessional examination for the Silver Medal, thirteen students had competed, all of whom acquitted themselves satisfactorily in the *vivâ voce* examination on medicinal plants and the diagnosis of the natural orders, and eleven of them did well in the written examinations. The Professor expressed his satisfaction at the working of the system of examining the class at the end of each lecture, and he reported most satisfactorily on the excellent conduct of the students generally.

Herbarium.

For the Herbarium Prize only two collections had been submitted, the best of which contained about 350 specimens, and for this Professor Bentley recommended the award of a bronze medal. The second contained over 200 specimens and also deserved recognition.

Practical Chemistry.

Professor Attfield reported that no less than twenty-three students competed for the prizes in his class, and that twelve of them had obtained sufficient marks to entitle them to medals and certificates.

Council Examination Prizes.

The examiners, Messrs. Plowman and Southall, appointed to conduct the examinations for these prizes, reported that there were thirteen competitors, two of whom were entitled to recognition. They had been unable to award the Pereira Medal, as no competitor had obtained the standard number of marks required, but recommended the award of the Society's Silver and Bronze Medals.

The report, which included the usual letter from the Solicitor, stating the progress made with cases which had been placed in his hands, was as usual considered in committee. On resuming, the report and recommendations of the Committee were received and adopted.

On the motion of the PRESIDENT, seconded by the VICE-PRESIDENT, it was resolved—

"That the best thanks of the Council be given to Messrs. Plowman and Southall for having conducted the Council Prizes examination; to Messrs. Ekin and Taylor for having conducted the Jacob Bell Memorial Scholarship examination; and to Professor Bentley for his report on the Herbarium competition."

Prize Awards.

The following awards were made on the recommendation of the General Purposes Committee:—

Chemistry and Pharmacy.

[Five months' course.]

Bronze Medal	Lewis Walter Hawkins.
Certificates of Merit	John Chinery Wiggin. Ernest James Reynolds. John Rodman Mowatt.

[Ten months' course.]

Silver Medal	David Rees.
Certificates of Honour	Francis Ransom. Edward Baily. David Low.
Certificates of Merit	Charles Ranken. William Edward Crow. Thos. Southall Dymond.

Botany and Materia Medica.

[Five months' course.]

Bronze Medal	John Chinery Wiggin.
Certificate of Merit	Ernest James Reynolds.

[Ten months' course.]

Silver Medal	Edward Baily.
Certificates of Honour	Francis Ransom. William Edward Crow. William Lloyd Williams. Equal. Charles Ranken. David Low. Edward Ernest Sewell.
Certificates of Merit	Thos. Southall Dymond. William Johnston. Arthur Pumphrey. John Chinery Wiggin.

Practical Chemistry.

Silver Medal	William Edward Crow.
Bronze Medals	Thos. Southall Dymond. David Rees.
Certificates of Honour	Charles Ranken. John Chinery Wiggin. William Lloyd Williams. Bernard Keene.
Certificates of Merit	Edward Baily. Francis Ransom. David Low. Edward Marsh. James Burden Barnes.

Herbarium Prize.

Bronze Medal	Thomas Stephenson.
Certificate of Merit	Frederick Miller.

Council Examination Prizes.

Pharmaceutical Society's Medal (silver); and Books value £3, presented by Mr. T. H. Hills.

William Lloyd Williams.

Pharmaceutical Society's Medal (Bronze); and Books value £2, presented by Mr. T. H. Hills.

Edward Baily.

Jacob Bell Memorial Scholarships.

The Committee appointed to make the award of the Jacob Bell Memorial Scholarships for the ensuing session, subject to the approval of the Council, reported that twenty-five candidates had presented themselves at the following centres:—Birmingham, 1; Cambridge, 1; Canterbury, 2; Cardiff, 1; Carnarvon, 1; Darlington, 1; Edinburgh, 1; Exeter, 1; Lincoln, 1; Liverpool, 2; London, 8; Manchester, 2; Oxford, 1; Sheffield, 1; Shrewsbury, 1. Of these, five had obtained more than the minimum number of marks requisite to entitle them to the award.

The envelopes bearing the mottoes of the successful candidates having been opened, their names were found to be

Fraser McDiarmid,
and
Robert Wynn Charles Pierce.

The report was received and adopted.

Mr. Hills said it was very satisfactory to find that five men had obtained enough marks to gain a scholarship.

The Education Scheme.

Mr. Schacht said he wished to take the opinion of the Council as to what it was desirable to do in connection with the education scheme. He would suggest that at the meeting in October a resolution should be submitted and the whole subject could then be discussed. It seemed a pity that the subject should be allowed to lapse, and by that time, the Council would be able to judge as to the probability of an Amended Pharmacy Act being passed, and might be induced, if necessary, to undertake substantial alterations independently of any amendment of the Act.

Mr. Williams remarked that if this were done, it would be very desirable that the scheme as drawn up by the Committee and approved by the Council should be submitted to the Solicitor, in order to have his deliberate opinion, and, if necessary, that of counsel, as to how far the proposed changes were or were not within the power of the Council to carry out. If there were no power to make the alterations, it would be mere waste of time to discuss the subject.

Mr. Richardson did not see that it could be waste of time to discuss such an important matter.

Mr. Schacht thought the proper time to take the Solicitor's opinion would be later, when the Council had determined on what it desired to do.

Mr. Hampson thought it unwise to continue the present conversation, which would necessarily result in discussing the whole scheme. The Committee had issued its report, which had been accepted by the Council, and there the matter ended for the present. He thought reopening the discussion at present would only prejudice the passing of an amended Pharmacy Bill.

Mr. Borland thought if Mr. Schacht's proposal were carried out it would be very desirable that Mr. Williams's suggestion should be adopted. Before the Council came to any definite conclusion as to the adoption of a new educational scheme it was very desirable that the legal position should be very strictly defined.

Mr. Schacht thought it would be premature to obtain the opinion of the Solicitor until the Council had decided whether it was desirable to take any action before an amended Pharmacy Act was passed. The report of the Committee had been agreed to, and his object was to ascertain whether any further step should be taken. He saw no objection to the Solicitor being present when the discussion took place, but he thought the Council should first decide what it wanted to do before ascertaining whether it was legal.

Mr. Williams thought it was no use coming to any conclusion until the Council knew whether it was legal or not.

Mr. Radley said the opinion of the Solicitor could be obtained on the general principle embodied in the report of the Committee.

Mr. Schacht said he had no objection to the Solicitor's opinion being obtained.

The President said the matter could not be more fully discussed then, but any member could give notice of a motion for the October meeting.

Mr. Williams then moved—

"That the opinion of the Solicitor be taken as to the legal power of the Council to carry out the scheme embodied in the report of the Committee."

Mr. Hampson seconded the motion.

The VICE-PRESIDENT thought it would be better to wait and see whether there was any chance of passing an amended PharmacyBill that would give the Council the powers required.

Mr. WILLIAMS, on the other hand, thought if it were shown that the Council could not carry out what was desired in the way of education under its present powers, it would be a strong argument to help the passing of a new Bill.

The PRESIDENT said if Mr. Schacht gave notice of motion for the October meeting Mr. Williams could propose an amendment, such as he had now proposed, but on consideration he did not think he could receive the motion at present as notice had not been given according to the standing orders.

THE HANBURY MEDAL.

The following report was received:—

"Pharmaceutical Society of Great Britain,
"17 Bloomsbury Square.

"We, the undersigned adjudicators, appointed under the provisions of the Deed of Settlement of the Daniel Hanbury Memorial Fund, award the second Hanbury Gold Medal to

JOHN ELIOT HOWARD, F.R.S.,

for his distinguished excellence in the prosecution of original research in the natural history and chemistry of drugs.

(Signed)	"John Lubbock...	President of the Linnean Society.
(Signed)	"W. H. Perkin ...	President of the Chemical Society.
(Signed)	"M. Carteighe ...	President of the Pharmaceutical Society of Great Britain.
(Signed)	"John Attfield ...	President of the British Pharmaceutical Conference.
(Signed)	"Henry B. Brady..	Pharmaceutical Chemist, nominated by the Presidents of the Pharmaceutical Society of Great Britain and the British Pharmaceutical Conference.

"*July*, 1883."

THE NORTH BRITISH BRANCH.

A resolution was passed authorizing the closing of the Society's premises in Edinburgh, from August 18 to September 17, for the vacation.

THE BRITISH PHARMACEUTICAL CONFERENCE.

The President and Vice-President, with Messrs. Butt, Greenish, Hills, Radley, Savage, Schacht and Williams, were appointed delegates from the Council to attend the Conference at Southport in September.

THE PATENTS FOR INVENTIONS BILL, ETC.

The PRESIDENT said he had seen Mr. Farrer, of the Board of Trade, on the subject of the clause in the Patents Bill forbidding the unauthorized use of the royal arms in connection with business under a penalty of £20. He understood that the cause of this clause being introduced was the use of the royal arms by certain patent agents, which had led to misunderstanding, persons from the country having entered private offices, and been led to part with their money under the impression that they were visiting the Government Patent Office. Mr. Farrer said it had not occurred to the authorities that the clause would interfere with the use of labels, and he invited him to send the Department a letter on the subject. The following correspondence was the result:—

"Pharmaceutical Society of Great Britain,
"17, Bloomsbury Square, London, W.C.
"T. H. Farrer, Esq., "*July* 18, 1883.
"Secretary, Board of Trade,
"Whitehall, S.W.

"Dear Sir,—I am requested by the Council of this Society to draw the attention of the President of the Board of Trade to the wording of clause 94 of the 'Patents for Inventions Bill' as follows:—

"94.—'Any person who without due authority assume or uses in connection with any trade or business, the royal arms, or any arms so nearly resembling the same as to be calculated to deceive, shall be liable on a summary conviction to a fine not exceeding £20.'

"The use of labels and wrappers bearing an impression of the royal arms is very general among manufacturing chemists, pharmaceutical chemists, chemists and druggists, drysalters, grocers and village shopkeepers, and I am directed to enquire if it is the intention of the Board that the users of such labels, etc., shall be liable to the penalty mentioned in the clause.

"I enclose a few specimens, obtained from the stock of one printer only, to illustrate the kind of labels, etc., referred to, and I may remind you that biscuits, nuts, and fruit of all kinds are very commonly sold in bags bearing an impression, more or less artistic, of the royal arms.

"A reference to the specimen book of any type founder will also show the enormous number of designs in which the royal arms form either the whole or a part.

"Soliciting the favour of an early reply,
"I am, dear Sir,
"Yours faithfully,
"M. CARTEIGHE,
"*President.*"

A second letter was addressed to Mr. Farrer, on July 27th, asking for a reply, in order that the subject might be considered by the Council at its next meeting.

The following reply was received:—

"(Immediate.)
"The Secretary,
"Pharmaceutical Society of Great Britain,
"17, Bloomsbury Square, W.C.
"Board of Trade,
"London, S.W.
"*July* 28, 1883.

"Sir,—I am directed by the Board of Trade to acknowledge the receipt of your letter of the 27th instant, in respect to the provisions of clause 103 of the Government Patents Bill (as amended).

"In reply, I am to state, for the information of the President of the Pharmaceutical Society, that it appears to the Board of Trade very doubtful whether the clause in question would apply in the manner the Society anticipate. An amendment of the clause, is, however, under consideration, and the Board of Trade will forward it to you when prepared, and will be glad to consider the same with the representations of the Society.

"I am to add that, if agreed on, the clause might be proposed by some member on behalf of the Society on report of the Bill in Parliament.

"I am, Sir,
"Your obedient servant,
"HENRY G. CALCRAFT."

"(Immediate.)
"Board of Trade,
"London, S.W.
"The Secretary, "*July* 30*th*, 1883
"Pharmaceutical Society of Great Britain,
"17, Bloomsbury Square, W.C.

"Sir,—Referring to the letter from this Department of the 28th inst., touching the provisions of clause 103 of the Government Patents Bill, I am now directed by the

Board of Trade to transmit to you, for the consideration of the Pharmaceutical Society, copy of an amendment of the terms of the clause in question, which the Board of Trade are disposed to think will meet the case.

"I am to request that the Board of Trade may receive the observations of the Society on this amendment at as early a date as possible.

"I am, Sir,
"Your obedient servant,
(Signed) "HENRY G. CALCRAFT."

"*Clause* 103, *page* 33. Leave out from beginning of clause to and inclusive of 'deceive' in line 17, and insert 'Any person who, without the authority of Her Majesty or any of the royal family, or of any Government department, assumes, or uses in connection with any trade, business, calling, or profession the royal arms, or arms so nearly resembling the same as to be calculated to deceive, in such a manner as to be calculated to lead other persons to believe that he is carrying on his trade, business, calling or profession by or under such authority as aforesaid.'"

Mr. HAMPSON asked if the President had referred in his interview to the use of the royal arms on specie jars, and so on. He hoped the clause would be withdrawn.

Mr. SCHACHT thought it was the general opinion when the matter was mentioned last month that the principle of the clause was right, and that there was no desire to defend an improper assumption and use of the royal arms. All, he thought, that was required was that persons who had labels in use having the royal arms upon them, should have fair time allowed to get rid of them. There was no more right to take liberties with the royal arms than with the arms of any private individual.

Mr. HAMPSON said the use of the arms on a specie jar or labels was only for the sake of ornament. It was not for the purpose of leading the public to suppose there was any special authority to use the arms.

Mr. ANDREWS said there was no doubt the royal arms were sometimes used for the purpose of defrauding the public by making them believe that the person using them had a royal appointment. So far as the clause would prevent that, it would do good. As now amended he saw no objection to it.

The VICE-PRESIDENT said this was a much larger question than that of a few specie jars; there were millions of labels and bags thus ornamented in use in every branch of business. He was astonished to hear of persons putting the royal arms over their door improperly, and agreed that any attempt to impose on the public should be put down.

The PRESIDENT remarked that the question was raised principally with regard to labels. He thought it would be impossible to put a sudden stop to a custom which had grown up during many years, and which by many was supposed to be a loyal custom.

Mr. ROBBINS did not think the public had ever been deceived by seeing the royal arms in a chemist's shop or on his labels, but there was no doubt that some people had improperly put the arms over the door without authority, and this should be stopped. He did not think much injury would be done by the clause as it originally stood, though it might involve some little expense. The street in which his business was conducted had recently been renumbered, and he did not know that he had suffered by having to change his labels beyond the expense.

Mr. SAVAGE thought the amended clause was not open to objection.

Mr. GREENISH thought this subject required very careful watching. There had been no intention on the part of chemists and other tradesmen to deceive anyone by the use of the royal arms, and he must confess he was not prepared to sacrifice a considerable amount of property in the shape of labels. It did not appear to him that the amendment was satisfactory, and he should much prefer to see the clause withdrawn. It seemed to him that enacting such a clause to meet the evil which had been complained of was like using a Nasmyth hammer to crack a nut.

Mr. CHURCHILL said it had been found in the case of another Act of Parliament, that whereas one thing was intended by the Legislature, the Act was used by inspectors for another. It would be preferable to have a clause forbidding the use of the royal arms over the door.

Mr. WILLIAMS thought this was one of those irritating little pieces of legislation which would annoy the public without doing any good. It would probably be wholly inoperative, but at the same time it might be used to annoy people who were perfectly innocent. He did not believe the public was ever deceived by this sort of thing, and he hoped the Government would be requested to withdraw the clause altogether.

Mr. HAMPSON thought it would be well to get more information as to what was the intention of the Government.

The VICE-PRESIDENT thought the members of Council were all in accord with the Government in a desire to put down any attempt at deception or improper use of the royal arms; and the only question was whether the amended clause was free from the objection felt to it as originally drawn.

Mr. HILLS thought the clause even as amended was a very clumsy instrument for meeting the evil to which special reference had been made. Nearly every shop in Regent Street had the royal arms over the door, but no one was deceived by it.

After some further conversation, Mr. ROBBINS moved—

"That the President be instructed to reply to the letter from the Board of Trade to the effect that as amended the clause would be satisfactory to the Council."

Mr. ANDREWS seconded the motion, which was carried by 8 votes to 5.

A letter from Mr. Keyworth on the subject of the Patents Bill and Poisons law was read.

It was arranged, in accordance with custom, that no quorum would be formed for the Council meeting in September.

REPORT OF EXAMINATIONS.

July, 1883.

ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.
Major (11th)	7	4	3
„ (12th)	8	7	1
„ (18th)	6	3	3
„ (19th)	7	2	5
	—28	—16	—12
Minor (11th)	23	12	11
„ (12th)	23	12	11
„ (13th)	30	7	23
„ (18th)	25	10	15
„ (19th)	25	8	17
„ (20th)	30	6	24
	—156	—55	—101
Modified (20th) . . .	1	0	1
	185	71	114

SCOTLAND.

	Candidates. Examined.	Passed.	Failed.
Major (11th)	2	1	1
Minor (11th)	9	5	4
„ (12th)	11	6	5
„ (13th)	10	4	6
	—30	—15	—15
Modified (13th) . . .	1	1	0
	33	17	16

Preliminary Examination.

	Candidates. Examined.	Passed.	Failed.
July 3rd.	451	226	225

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

2 College of Preceptors.
1 Faculty of Physicians and Surgeons of Glasgow.
2 University of Oxford.

Provincial Transactions.

OLDHAM CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

On Tuesday evening, July 31, Mr. Jones, of Royton, read a paper before the members of this Association, in the room, Church Institute, on "Coal and its Chemical Products."

The essayist first gave a brief account of the supposed formation of coal, and afterwards spoke of the products, commencing with coal-gas and describing its constituent gases; then of the ammoniacal liquor and its uses in pharmacy; lastly, of coal tar, and benzine, aniline and naphthaline, etc., made from it.

The paper was most interesting.

A vote of thanks was proposed by Mr. Buckley, seconded by Mr. Smith, and passed unanimously.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, July 26. Prof. Attfield, F.R.S., President, in the chair.

The following report of the Executive Committee was read:—

Annual Report.

"The Executive Committee of the School of Pharmacy Students' Association have transacted the business of the past session at three Committee meetings. At a meeting held December 14, 1882, the Secretary reported that nomination papers had been printed at the commencement of the session and forwarded to all members who had previously paid their annual subscription.

"Your Committee have transacted the following business:—

"At a meeting held December 14, 1882, the following gentlemen were appointed as a Committee of Reporters, to report upon the progress made in the various branches of science allied to pharmacy:—

Pharmacology ....Mr. H. G. Greenish.
Practical Pharmacy.........Mr. R. A. Cripps.
Botany ....Mr. J. O. Braithwaite.
Materia Medica ....Mr. W. Elborne.
Physics ....Mr. H. Allen.
Organic Chemistry ....Mr. W. R. Dunstan.
Inorganic Chemistry ......Mr. F. W. Short.
Analytical Chemistry ......Mr. C. Thompson.

"At a meeting held February 15, 1883, your Committee made a grant of 5*s*. from the Research Fund to Mr. E. Baily, for an examination of commercial specimens of dried alum. The results were brought before the Association in a paper read March 8, 1883, which was subsequently published in the *Pharmaceutical Journal.*

"At a meeting held July 26, 1883, your Committee made a grant of 10*s*. to Mr. R. A. Cripps, for an examination of the deposits occurring in the principal tinctures of the British Pharmacopœia.

"At a meeting held July 26, 1883, the following statement of the Committee of Reporters, including the work done by them during the session, was read by the Secretary on behalf of the Committee:—

"The Committee of Reporters on Science have since their appointment in December, 1882, held two meetings for the transaction of business.

"At a meeting held Thursday, January 4, 1883, Mr. Greenish was appointed Chairman, and Mr. Dunstan Secretary of the Committee.

"The only alteration in the constitution of the Committee has been the division of the subject of Pharmacy into two parts, Pharmacology and Practical Pharmacy. This change has been found to be entirely satisfactory.

"The following reports have been made by the members of the Committee during the session:—

"Two reports upon Materia Medica (New Remedies; Commercial Rhubarbs), by Mr. W. Elborne; Report upon Pharmacology (Convallaria Majalis), by Mr. H. G. Greenish; two Reports upon Analytical Chemistry (the Separation of Cadmium from Copper (in two parts); the Estimation of Carbolic Acid), by Mr. C. Thompson; Report upon Organic Chemistry (the Chemistry of Mel Boracis), by Mr. Dunstan; Report upon Inorganic Chemistry (the Alkali Manufacture), by Mr. Short; Report upon Physics (Secondary Batteries), by Mr. H. Allen; Report upon Practical Pharmacy (Notes upon the United States Pharmacopœia), by Mr. Cripps; Report upon Botany (Plant Movement), by Mr. Braithwaite.

"The above statement was approved by your Committee. At the meeting held July 26, 1883, the following letter from the Honorary Secretary was read by the President:—

'London, 17, Bloomsbury Square, W.C.,
'*July* 26, 1883.

'Dear Mr. President,—I regret that I have to place in your hands the trust of Honorary Secretary of the School of Pharmacy Students' Association, which I now hold. During the three years that I have filled the office, my spare time has been gradually more and more encroached upon, and I now feel it is necessary that my work with the Association should be in some measure lightened. I say 'lightened,' for I shall ever feel pleasure in taking every opportunity to advance those objects for which the Association was founded, and in the promotion of which it has been so eminently successful.

'I remain, dear Mr. President,
'Very sincerely yours,
'Wyndham R. Dunstan.

'To Professor Attfield, F.R.S.,
President of the School of Pharmacy
Students' Association.'

"Your Committee considered this letter in the absence of Mr. Dunstan, and in consideration of his services to the Association unanimously resolved that the members assembled in Annual Meeting be recommended to appoint an Assistant Secretary for the next session in order to relieve Mr. Dunstan of some of the work. This action being represented to Mr. Dunstan, he kindly consented to withdraw his resignation.

"With regard to the statistics of the Association, your Committee would draw attention to the following points: The number of members upon the books shows an increase of 10 upon last session. The gross attendance has been 301, an increase of 48 upon last session; the average attendance has been 21 per meeting against 18 of last session. Besides the Presidential Address at the opening, meeting, the number of communications read has been 25, an increase of 2 upon last session. Eleven of these have been reports already noticed, and 14 have been papers. The following is the list of papers:—

"Introductory Address, by the President—The Pharmacopœia as a Students' Manual; Original Investigation in Pharmacy, by Mr. E. M. Holmes; Genius, Talent, and Industry, and their Relation to Pharmaceutical Research, by Mr. R. W. Giles; Notes upon Practical Photography, by Mr. R. J. MacDermott; The Detection of Strontium, by Mr. F. Ransom; Dispensing Notes, by Mr. W. Johnston; Linnæus, by Mr. W. E. Crow; Note on Dried Alum, by Mr. E. Baily; Vortmann's Method for the Separation of Chlorides, Bromides and Iodides, by Mr. J. B. Barnes; The Synthesis of Uric Acid, by Mr. T. S. Dymond; The United States Pharmacopœia Process for the Estimation of Hydrocyanic Acid, by Mr. R. A. Cripps; Acetic Acid and its Derivatives, by Mr. H. S. Elworth; Some Abnornal Flowers, by Mr. E. E. Sewell; Some Old and New Theories concerning the Vegetable Cell, by Mr. C. Ranken; The Characteristics of the Principal Natural Orders, by Mr. H. Hamilton.

"Fifteen of these communications, six reports and nine papers, have been published in full by the Editor of the *Pharmaceutical Journal*, besides abstracts of all the others. The Treasurer's accounts, to be presently audited, show that the receipts have exceeded the expenditure by £1, which leaves a total balance of £11 8*s.* 1½*d.* in the hands of the Treasurer."

Messrs. T. S. Dymond and G. Fowler having been appointed Auditors, they examined the Treasurer's accounts and reported them to be correct.

After some observations upon the progress indicated by the Report from the President and Mr. H. G. Greenish (Vice-President), Mr. H. Allen, B.Sc., moved the adoption of the Report, and referred to the satisfactory condition of the Association, remarking that the Research Fund would enable the Association to still further extend its sphere of usefulness.

This was seconded by Mr. C. Thompson, and upon being put to the meeting was carried unanimously.

Mr. R. H. Parker (Vice-President) then moved "That an Assistant-Secretary be appointed for the ensuing session." In moving the resolution Mr. Parker observed that the prosperous condition of the Association during the last three years was mainly due to the exertions of the present Secretary, and this resolution would enable the Association to still have the benefit of his services.

Mr. W. E. Crow stated that as a member of the Executive Committee he was able to fully appreciate Mr. Dunstan's services to the Association, and he therefore seconded the resolution.

After some remarks from Mr. Thompson and the President, supporting the resolution, it was put to the meeting and carried unanimously.

Mr. H. G. Greenish then moved, and Mr. J. O. Braithwaite seconded, a vote of thanks to the President for his continued interest in the Association; after this had been unanimously carried by acclamation, the Association adjourned over the summer vacation.

Parliamentary and Law Proceedings.

Prosecution under the 17th Section of the Pharmacy Act, 1868.

At the Clerkenwell Police Court on Thursday, July 26, before Mr. Barstow, Edward Knight, gold and silver refiner, of 29A and 30A, Percival Street, Clerkenwell, London, E.C., was charged on two summonses, 1. For having sold to Alfred Wright, Assistant Secretary of the Chemists and Druggists' Trade Association of Great Britain a certain poison, to wit, cyanide of potassium, in a certain packet, the cover of which packet did not set forth the name of the poison and the name and address of the seller of the same. 2. That the said sale was effected, the purchaser being unknown to the seller and not introduced to the seller, in contravention of the statute in such case made and provided.

Mr. Henry Glaisyer, solicitor of the Chemists and Druggists' Trade Association, appeared for the prosecution, and defendant appeared in person.

The defendant pleaded guilty.

A fine of 50*s.* and costs was inflicted on the first summons, and 5*s.* and costs on the second.

Review.

The Extra Pharmacopœia of Unofficial Drugs and Chemical and Pharmaceutical Preparations.* By W. Martindale, F.C.S., and W. Wynn Westcott, M.B. Lond.

New preparations are constantly being prescribed by medical men, and pharmacists as well as wholesale druggists are often puzzled to know where to find the formula for a particular preparation ordered in a prescription. In some cases, too, the strength and appearance of new preparations differ when obtained from different firms. A book, therefore, giving reliable formulæ and doses and comprising all the latest information on new drugs has for some time been a desideratum, although the want has been to some extent met by Squire's 'Companion to the Pharmacopœia.'

The little work before us was written, as the authors tell us in the preface, with the view of describing new drugs and their uses, as well as new uses of drugs already official and non-official preparations met with in pharmacy, the area of selection being limited by the personal experience of the authors.

Mr. Martindale's well-known reputation as a pharmacist is a guarantee that the selection is by no means a small one and that it possesses the essential element for proving useful, viz., that it is the outcome of the experience of a considerable period. It is now sixteen years since the last British Pharmacopœia was issued, and the number of new drugs that have come into general use since that date is by no means small, to say nothing of the many that are still on trial.

The drugs are arranged alphabetically throughout the book. Under each heading the Latin and English name is given and the synonyms in ordinary use. The dose, description of the crude drug and tests for its purity, and the preparations in use, follow in order; and, finally, references as to the therapeutic uses and the doses given in different diseases, etc. This portion of the work, while serving as a guide to the pharmacist as to unusual doses, is chiefly of use to the physician or medical practitioner, to whom, as a sort of handy *précis* of the uses of new drugs, it must prove of considerable value.

The references have been compiled by Mr. W. Wynn Westcott, M.B. Lond., from the leading medical journals, hospital pharmacopœias, Ringer's 'Handbook of Therapeutics,' the *Pharmaceutical Journal*, and the *Chemical News*, each paragraph being accompanied by an abbreviated reference to the page of the book or journal from which it is taken. In this portion of the work, which must have been prepared at no small expenditure of time and trouble, it may be hoped that the author has availed himself of the help of Neal's 'Medical Digest.' It is exceedingly well done, and forms a most admirable example of the value of *précis*, as applied to medical literature.

There are two appendixes at the end of the book. The first is an alphabetical list of antiseptic applications and surgical dressings, which serves at the same time as an index to the descriptions in the body of the work and as an indication to chemists as to the size and

* London: H. K. Lewis. 1883. Fcap. 8vo. Pp. i.-viii., 1-313. 6*s.*

weight of the packages met with in commerce. The second appendix gives a list of histological preparations for staining, hardening and mounting microscopic objects.

The volume concludes with an excellent index and posological table, in which the official preparations of the British Pharmacopœia that have a dose assigned to them in that work are given in addition to those comprised in the present book.

We have rarely seen a work which is so thoroughly up to date or which more fully meets the wants of the readers for whom it is intended than the 'Extra Pharmacopœia,' and can strongly recommend it as a most handy, useful and reliable book to both the pharmacist and the busy medical practitioner. It fairly represents what can be done when medicine works in accord with pharmacy. The book is of small size and can be easily carried in the pocket, and in fact is convenient in every way. We venture to prophesy for it a considerable success.

Obituary.

Notice has been received of the death of the following:—

On the 5th of July, Mr. Joseph James Scholey, Chemist and Druggist, Hemsworth, Yorkshire. Aged 55 years.

On the 14th of July, Mr. Frederick Blackwell, Pharmaceutical Chemist, Stoke Terrace, Devonport. Aged 42 years.

On the 20th of July, Mr. Charles Milnes Hallam, Chemist and Druggist, High Street, Burton-on-Trent. Aged 51 years.

On the 27th of July, from heart disease, after an illness of about six months, Mr. George Kendall, Pharmaceutical Chemist, Masham, Yorkshire. The deceased gentleman was 63 years of age and had been a Member of the Pharmaceutical Society since the year 1844. He commenced business in Masham about forty years ago, and led a very active and useful life, taking a leading share in every good work for the advancement and improvement of the town and neighbourhood, so that his loss will be deeply regretted by his fellow-townsmen, by whom he was deservedly held in great esteem.

BOOKS RECEIVED.

The Book of Prescriptions. By Henry Beasley. Sixth Edition. London: J. and A. Churchill. 1883. From the Publishers.

The Political Powerlessness of the Medical Profession: its Causes and its Remedies. By Balthazar Foster, M.D., F.R.C.P., etc. London. J. and A. Churchill. 1883. (Pamphlet.) From the Author.

Correspondence.

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

Royal Naval Reserve Dispensing.

Sir,—A few weeks ago you were good enough to give publicity to a short note of mine referring to the Royal Naval Reserve and Coast Guard dispensing. I called attention to the fact that at the several stations throughout the country, the duties of dispensing, etc., for the men who belong to these forces, were relegated to the medical man, the druggist being entirely ignored, and I suggested that this was a matter on which more light might, with advantage, be shed.

My note eliciting no reply from any reader of the Journal, I communicated with Mr. Bremridge in hopes that the Council of the Society might be induced to take up the matter, but from the courteous reply received from that gentleman, I learned that it had already been a subject of much consideration by the Members of the Council, but that as a Council they did not see that they could do anything at present.

As the question was one of considerable importance to myself, I determined to "take the bull by the horns" and lay the case before Mr. Campbell Bannerman, the present Secretary to the Admiralty.

If you think the subject of sufficient importance, perhaps you will give this, together with that right hon. gentleman's letter, which I append, a place in your next issue.

Quærens.

Copy of Mr. Campbell Bannerman's Letter.

"*Admiralty, S.W.*,
"*July* 5, 1883.

"Dear Sir,—I am directed by Mr. Campbell Bannerman to inform you that he has looked carefully into the subject of your letter of the 16th ultimo, and after consultation with the head of our medical department he has come to the conclusion that it would be impossible for him to take any steps towards altering the present regulations, which direct that all medicines and dressings are to be supplied by the medical officer.

"Any change in this respect would probably be attended with increased cost to the public, and as in many districts it would be difficult to get at a good chemist or druggist it is considered desirable to make one general rule and oblige our surgeon and agent to supply his own drugs.

"I remain,
"Yours faithfully,
"Gordon B. Voules."

Battley's Liquor Cinchonæ.

Sir,—If Mr. Ekin will kindly travel back with me to the time when nauseating doses of 20, 30, 40, and even 60 grains of powdered bark, or cup of thick decoction, every four hours, were given to patients shaking with ague or debilitated by more serious diseases, he will realize the benign influence of a preparation which produced the same effects on the pulse and system by a dose of a few drops. Such is the only possible rendering of Mr. Battley's label, "1 drachm is equivalent to 1 ounce of the finest bark or 12 ounces of the decoction."

During the thirty-three years I have used Battley's bark, I have never once met with a doctor or chemist who was mistaken by Mr. Battley's statement.

Let Mr. Ekin estimate the cost of making by any process 1 lb. of liquor containing the kinates of 7 or 8 lbs. of bark. Has Mr. Battley raised or lowered the price according to the market value of bark? Is it not a fact that for many years 32*s*. per lb. has been the price, and 20s. for the liquor opii sedativus.

I believe Mr. Battley, like several of our early pharmacists of note, was an apothecary, and I know that his label was addressed to medical men.

"Tempora mutantur, et nos mutamur in illis."

George Mee.

Erratum.—Page 76, col. i., line 11 from top, *for*—
Hague, William ....Sheffield.
read—
Hague, William ....Ashton-under-Lyne.

Apex.—Not unless the person's name is on either the Medical Register or the Register of Chemists and Druggists.

A. S. Thompson.—(1) Such registration cannot be effected under the present law, but is provided for in a Bill at present before Parliament. See before, p. 73. (2) There are three registered persons bearing the name.

W.—The Pharmacy Acts Amendment Bill has not yet been introduced into Parliament.

A. W. Turpin.—Our statement was quite correct; you will find the name in Gray's 'Supplement,' and other works. It no doubt originated in connection with a process formerly adopted in the manufacture of vermilion, or "factitious cinnabar," in which a regulus of antimony was used, although no antimony remained in the finished product.

Communications, Letters, etc., have been received from Messrs. Worrall, Hayes, Spencer, Thompson, Mackay, Heger, MacEwan, Bates, F. C. S.

THE NEW PHARMACOPŒIAS FOR THE UNITED STATES AND GERMANY.

(*Continued from p.* 84.)

ÆTHER, U.S.P., P.G., and ÆTHER FORTIOR, U.S.P.—The "ether" of the U.S.P., as in the previous edition, contains more alcohol than that of the P.G. or B.P., it having a sp. gr. of about 0·750 at 15° C., and consisting of 74 per cent. of ethyl oxide and 26 per cent. of alcohol containing a little water. It should be neutral to test paper, and 10 c.c. shaken with an equal volume of glycerine should not be reduced to less than 75 c.c. The "æther" of the P.G. has a sp. gr. of 0·724 to 0·728, and boils at 34° to 36° C., and therefore, closely resembles the "æther fortior" of the U.S.P., the sp. gr. of which is fixed at not higher than 0·725 at 15° C., and the boiling point at 37° C. There is no representative of "æther purus," B.P. in either the U.S.P. or P.G.

ÆTHER ACETICUS, U.S.P. (new); P.G.—The acetic ether of the U.S.P. is described as having a sp. gr. of 0·889 to 0·897 and boiling at about 76° C. The P.G. gives the boiling point as between 74° to 76° and the sp. gr. at 0·900 to 0·904. The corrected B.P. sp. gr. is 0·900. These figures have recently been criticized by Dr. Clark (see *Pharm. Journ.*, [3], xiii., 782). Both the U.S.P. and P.G. require that when acetic ether is shaken up with an equal volume of water, the water shall not be augmented more than one-tenth of its original volume.

ALCOHOL and ALCOHOL DILUTUM, U.S.P., and SPIRITUS and SPIRITUS DILUTUM, P.G.—From the U.S.P., the "alcohol fortior," sp. gr. 0·817, has been omitted; but there has been a considerable increase in the strength of "alcohol," for whereas in the 1870 edition it was of sp. gr. 0·835, and was, therefore, intermediate between the P.G. "spiritus" and the B.P. "spiritus rectificatus," the U.S.P. sp. gr. is now ·820 at 60°F., representing 91 per cent. by weight of alcohol. The "spiritus," P.G., remains unchanged, sp. gr. 0·830 to 0·834, containing 87·2 to 85·6 per cent. by weight of spirit. The "alcohol dilutum" of the U.S.P. is made by mixing equal weights of alcohol and water, and is also stronger than in 1870, being sp. gr. 0·928 at 60° F., and containing 45·5 per cent. by weight of absolute alcohol. "Spiritus dilutum," P.G., is of sp. gr. 0·892 to 0·896, and contains 59·8 to 61·5 per cent. by weight of absolute alcohol. The respective specific gravities and percentage of alcohol in the two strengths of spirit in the three Pharmacopœias, are shown in the following table:—

U.S.P., 1880.		P.G., 1882.		B.P., 1867.	
Sp. gr. at 60° F.	P.c. by weight.	Sp. gr. at 59° F.	P.c. by weight.	Sp. gr. at 60° F.	P.c. by weight.
·820	91	·830–·834	87·2–85·6	·838	84
·928	45·5	·892–·896	59·8–61·5	·920	—

Alcohol Amylicum is omitted from the U.S.P.

SPIRITUS ÆTHERIS, U.S.P. (new); SPIRITUS ÆTHEREUS, P.G.—A "spirit of ether" has now been introduced into the U.S.P., it consists of 30 parts of ether and 70 of alcohol. The P.G. formula is 1 part of ether to 4 parts of spirit. The relative strength of the "spirit of ether" of the three Pharmacopœias, taking into account the characters of the ethers used, may therefore be represented as:—U.S.P., about 22 per cent. of ethyl oxide and spirit of sp. gr. 0·820; P.G., about 23½ per cent. of ethyl oxide and spirit of sp. gr. 0·830 to 0·834; and B.P., about 28 per cent. of ethyl oxide and spirit of sp. gr 0·838. The U.S.P. also includes a "Spiritus Ætheris Compositus: Hoffmann's Anodyne," made with stronger ether, 30 parts; alcohol, 67 parts; ethereal oil, 3 parts; which is, therefore, about the same ether strength as the "spirit of ether," B.P.

SPIRITUS ÆTHERIS NITROSI, U.S.P., P.G.—A considerable modification has been made in the U.S.P. formula for "spirit of nitrous ether," which in the 1870 edition closely resembled the B.P. formula. Seven parts of sulphuric acid (sp. gr. 1·840) are added gradually to 31 parts of alcohol (sp. gr. 0·820), the mixture when cooled transferred to "a tubulated retort connected with a well-cooled condenser, to which a receiver, surrounded by broken ice, is connected air-tight, and which is further connected, by means of a glass tube, with a small vial containing water, the end of the tube dipping into the latter." The nitric acid is added and heat is applied by means of a water-bath until strong reaction occurs and the temperature reaches 176° F.; the distillation is then continued at a temperature not exceeding 180° F. until the reaction ceases. The distillate is immediately poured into a flask containing 16 parts of ice-cold distilled water and the flask closed and shaken repeatedly, the temperature being kept down by immersing the flask occasionally in ice water. Finally the ethereal layer is separated and mixed with 19 parts of alcohol. No copper is used. The sp. gr. of the product is given as 0·823 to 0·825. Ten grams macerated with 1·5 gram of potassa for twelve hours, with occasional agitation, then diluted with an equal volume of water and after being set aside until the odour of alcohol has disappeared, acidulated with dilute sulphuric acid, should discharge the colour from a solution of 0·335 gram of permanganate of potassium, which is said to indicate the presence of at least 4 per cent. of real ethyl nitrite. The P.G. formula, which has not been altered, consists in distilling a mixture of 48 parts of spirit (sp. gr. ·830) and 12 of nitric acid (sp. gr. 1·185) until 40 parts have passed over, using enough magnesia to keep the distillate neutral, and at the end of twenty-four hours rectifying from a water-bath. The sp. gr. given is 0·840 to 0·850; it should form with water a clear solution, which treated with concentrated solution of ferric chloride should turn black. The P.G. orders the preparation to be kept over some crystals of potassium tartrate.

ALUMEN, U.S.P., P.G.—The U.S.P., 1870, included both ammonia and potash alum, but ammonia alum has now been omitted; the P.G. also orders potash alum.

ALUMEN EXSICCATUM, U.S.P.; ALUMEN USTUM, P.G.—The U.S.P. specifies that in preparing dried alum a temperature of 401° F. shall not be exceeded; the limit of temperature in the P.G. is 160° C. (320° F.). Both Pharmacopœias require that the product shall be slowly but completely soluble in cold water.

ALUMINII HYDRAS, U.S.P. (new).—Prepared by boiling together 11 parts of alum and 10 parts of sodium carbonate, each previously dissolved in 150 parts of water, and washing the precipitate with hot water until free from traces of sulphuric acid. Not in P.G. Both Pharmacopœias include sulphate of aluminium.

AMMONII BROMIDUM, U.S.P., P.G. (new).—Bromide of ammonium has been introduced into the P.G.

AMMONII IODIDUM, U.S.P.—This salt is now ordered not to be dispensed when "deeply coloured," but it is pointed out that it may be deprived of all but traces of free iodine by washing it with stronger ether and rapidly drying.

AMMONII PHOSPHAS has been on the one hand introduced into the U.S.P. and on the other hand dismissed from the P.G.

AMYL NITRIS, U.S.P. (new); AMYLIUM NITROSUM, P.G. (new).—In the U.S.P. the sp. gr. is given as 0·872 to 0·874, and the boiling point about 96° C. (205° F.). In the P.G. no sp. gr. is given, but its boiling point is fixed somewhat higher, namely, 97° to 99° C., the latter, according to Guthrie, being the boiling point of pure amyl nitrite. In both Pharmacopœias the limit of acidity is fixed by requiring that 10 c.c., after the addition of 2 c.c. of a mixture of 1 part of liq. ammoniæ and 9 parts of water, should not redden blue litmus. The U.S.P. gives as a test to distinguish nitrite from nitrate of amyl that when mixed with excess of solution of potash, a little test solution of potassium iodide added, and then acetic acid to an acid reaction, there is with the nitrite an immediate separation of iodine, giving the characteristic blue colour with gelatinized starch. It also requires that when exposed to the temperature of melting ice it should remain transparent, or nearly so, denoting the absence of water. The U.S.P. recommends that it be kept in small glass-stoppered vials, in a cool and dark place, and the P.G. says over some crystals of potassium tartrate.

APOMORPHINÆ HYDROCHLORAS, U.S.P. (new); APOMORPHINUM HYDROCHLORICUM, P.G. — This powerful derivative from morphia is introduced into both Pharmacopœias. The U.S.P. describes it, not very elegantly, as follows:—"Minute, colourless, or greyish-white shining crystals, turning greenish on exposure to light and air, odourless, having a bitter taste and a neutral or faintly acid reaction. Soluble in 6·8 parts of water and in 50 parts of alcohol at 15° C., slowly decomposed by boiling water or boiling alcohol, almost insoluble in ether or chloroform; should it impart colour to either of these liquids, it should be rejected, or it may be purified by thoroughly agitating it with either liquid, filtering, and then rapidly drying the salt on bibulous paper, in a dark place. The aqueous solution, on gentle warming, rapidly turns green, but retains a neutral reaction." The P.G. says: "Sal, si cum partibus centum Aquæ solutionem smaragdinam præbet, rejiciendum est." It also gives the maximum single dose as 0·01 gram, and the maximum daily dose as 0·05 gram.

ARGENTI CYANIDUM is retained in the U.S.P. as a means of preparing "dilute hydrocyanic acid" extemporaneously.

ARGENTI NITRAS DILUTUS, U.S.P. (new), ARGENTUM NITRICUM CUM KALIO NITRICO, P.G.—Under the former name a formula has been introduced into the U.S.P. for a variety of nitrate of silver pencils that has met with some acceptance. It consists in melting together in a porcelain crucible equal parts of nitrate of silver and nitrate of potassium, at as low a temperature as possible, stirring the melted mass until it flows freely and then pouring it into moulds. This and the next preparation are ordered to be kept in amber-coloured bottles. The P.G. "argentum nitricum cum kalio nitrico" is a similar preparation made with 1 part of nitrate of silver to 2 parts of nitrate of potassium.

ARGENTI NITRAS FUSUS, U.S.P. (altered).—this preparation now contains a little chloride of silver to give it toughness. It is made by melting 100 parts of nitrate of silver at a low temperature, then adding gradually 4 parts of hydrochloric acid, stirring until nitrous fumes cease to be evolved and pouring into moulds.

AURI ET SODI CHLORIDUM, U.S.P. (new); AURO-NATRIUM CHLORATUM, P.G.—This, according to the U.S.P., is an orange-yellow, slightly deliquescent, odourless powder, consisting of a mixture of equal parts of dry chloride of gold and chloride of sodium. No process is given in the U.S.P.; that in the P.G. consists in adding sodium chloride to a solution of gold in aqua regia and evaporating the liquid to dryness. It is used as a caustic and internally as a remedy in syphilitic disorders, the maximum single dose being given in the P.G. as 0·05 gram, the maximum daily dose as 0·2 gram.

ARGENTI IODIDUM, U.S.P. (new).—"A heavy, amorphous, light yellowish power, unaltered by light if pure, but generally becoming somewhat greenish-yellow, without odour and taste, and insoluble in water, alcohol, diluted acids or in solution of ammonium." Soluble in about 2500 parts of stronger water of ammonia. The salt fuses at about 720° F., and should be free from chloride.

BENZINUM, U.S.P. (new); BENZINUM PETROLEI, P.G. (new).—In the U.S.P. "benzin" (synn. "petroleum benzin" and "petroleum ether") is defined as a purified distillate from American petroleum, consisting of hydrocarbons chiefly of the marsh-gas series, having a sp. gr. from 0·670 to 0·675 and boiling at 50° to 60° C. The P.G. "petroleum benzin" consists of the colourless non-fluorescent portions of petroleum, having a sp. gr. of 0·640 to 0·670, and distilling nearly entirely between 55° and 75° C. It appears a pity that the names and synonyms adopted for this indefinite mixture should so closely resemble those of well-known definite substances; that some consequent confusion is anticipated is shown by the fact that both Pharmacopœias give a test for the absence of benzene.

BISMUTHI CITRAS, U.S.P. (new), and BISMUTHI ET AMMONII CITRAS, U.S.P. (new).—Bismuth citrate is introduced into the U.S.P. for the sake of the ammonia compound. It is ordered to be prepared by boiling 10 parts of bismuth subnitrate with 10 parts of citric acid in 40 parts of distilled water until a drop of the mixture gives a clear solution with ammonia water. The soluble citrate of bismuth and ammonium is prepared by making a paste of the citrate with double its weight of water, then adding ammonia water until the salt is dissolved, filtering, evaporating to a syrupy consistence, and scaling. The scales should be shining, pearly or translucent, neutral or faintly alkaline, very soluble in water and sparingly soluble in alcohol; but they alter by exposure, and are, therefore, ordered to be kept in small well-stopped bottles protected from light.

CAFFEINA, U.S.P. (new); CAFFEINUM, P.G.—This alkaloid has now been introduced into the U.S.P., where its solubility is given as 1 in 75 parts of water or 35 parts of alcohol at 15° C., 1 in 9·5 parts of boiling water, very soluble in boiling alcohol and 1 in 6 parts of chloroform. The above solubility in boiling water does not agree with a statement in the P.G. that the crystals "in pondere duplici aquæ fervidæ solvuntur, refrigeratæ in pultem crystallinam rigescunt." The P.G. also gives the solubility in chloroform at 1 in 9. Neither of the more soluble double salts of caffeine described by M. Tanret (*Pharm. Journ.*, [3], x.) has been adopted. The P.G. maximum single dose is 0·2 gram and the daily maximum dose is 0·6 gram.

Calcii Bromidum, U.S.P. (new).—This is described as a white granular salt, very deliquescent, odourless, having a pungent saline and bitter taste and a neutral reaction. It must not contain more than a trace of magnesium or of chloride, and no iodide or bromate.

Calx Sulphurata, U.S.P. (new).—Under this name is included in the U.S.P. the mixture usually know as "sulphide of calcium," but consisting chiefly of sulphide and sulphate of calcium in varying proportions. It is ordered to be made by submitting 100 parts of lime and 90 parts of precipitated sulphur in a luted crucible to a low red heat by means of a charcoal fire so arranged that the upper part of the crucible is heated first. When freshly prepared it is a greyish-white or yellowish powder, and it should contain at least 36 per cent. of real sulphide (CaS).

Camphora Monobromata, U.S.P. (new).—The body ($C_{10}H_{15}BrO$), which was discovered by Swarts about twenty years ago and introduced into medicine about ten years afterwards, has been made official in the U.S.P., but not in the P.G. It was also included in the new list of medicaments drawn up a few year since by the Paris Society, and will, therefore, probably find a place in the next edition of the Codex.

Carbonei Bisulphidum, U.S.P. (new).—It is described as boiling at 46° C. and having a sp. gr. of 1·272. Tests are given for its freedom from sulphurous and hydrosulphuric acids and sulphur.

Chinoidin, Cinchonidine Sulphate and Cinchonine will be referred to together with the other cinchona compounds.

Codeina, U.S.P. (new); P.G.—According to the U.S.P. codeine occurs in white or yellowish-white, more or less translucent rhombic prisms, but the P.G. now requires that the crystals shall be "coloris expertia vel alba," although in the 1872 edition they were allowed to be yellowish-white. The P.G. mentions that when boiled with water, before being dissolved, codeine liquefies and forms limpid drops that crystallize upon being cooled. The maximum single dose is given as 0·05 gram, and the daily dose as 0·2 gram.

Cupri Acetas, U.S.P.—The crystalline neutral acetate of copper takes the places of the subacetate in the U.S.P., whilst on the other hand it has been dismissed from the P.G.

Ferri Oxidum Hydratum c. Magnesia, U.S.P.; Antidotum Arsenici, P.G.—This antidote to arsenic is now included in the U.S.P. in addition to the hydrated oxide of iron. It is prepared from 1000 grains of solution of tersulphate of iron mixed with twice its weight of water, and 150 grains of magnesia rubbed to a thin paste with water and then transferred to a bottle of 32 ounces capacity which is then filled with water. The two liquids are kept separately until required and then the magnesia mixture is added gradually to the iron solution and the whole shaken together until a homogeneous mass results. It needs to be mentioned that the liquor ferri tersulphatis, U.S.P., is not so strong as the corresponding B.P. solution; its sp. gr. is 1·320 and it contains 28·7 per cent. of the salt. According to Hager (*Commentar*, i., 347) the freshly prepared antidote, well shaken, should be given in doses of one to two tablespoonfuls; at first every fifteen minutes, afterwards at half, one or two hour intervals. It is recommended in the U.S.P. to keep in separate bottles in like manner the ingredients for preparing hydrated oxide of iron until required for use.

Ferri Sulphas Præcipitatus, U.S.P. (new).—Same as granulated sulphate of iron, B.P.

Ferri Valerianas, U.S.P. (new).—This ferric salt is described as "a dark tile-red, amorphous powder, permanent in dry air, having a faint odour of valerianic acid and a mildly styptic taste. Insoluble in cold water, but readily soluble in alcohol. Boiling water decomposes it, setting free the valerianic acid and leaving ferric hydrate. . . . Mineral acids decompose the valerianate, forming the respective ferric salts and liberating valerianic acid." This salt has not been introduced into the P.G.

Ferrum Reductum.—The U.S.P. now specifies that with the iodine and iodide of potassium test reduced iron should give results corresponding to at least 80 per cent. of metallic iron, and the P.G. that it should require for its oxidation a quantity of potassium permanganate solution corresponding to at least 89·75 per cent. A few years ago eight specimens from English, French and German sources were examined by Mr. Creuse, who reported (*Pharm. Journ.*, [3], vi., 127) that the richest sample contained only 52 per cent. of metallic iron, while only one other contained more than 30 per cent.

Glycerinum.—In the U.S.P. the sp. gr. of glycerine has been maintained at not less than 1·250, which is the same as in the B.P. and corresponds to the presence of 5 per cent. of water. On the other hand, in the P.G. the sp. gr. has been lowered from 1·23 to 1·25 to 1·225 to 1·235, which would admit of the presence of at least 10 per cent. of water, on the ground that in practice it is preferable to employ a glycerine containing that amount of water. It has been pointed out that a preparation made with nearly anhydrous glycerine is capable of causing a smarting sensation and also that it absorbs moisture from the atmosphere. (See, for instance, *Pharm. Journ.*, [3], ix., 815).

Glycyrrhizinum Ammoniatum, U.S.P. (new).—The intensely sweet compound of glycyrrhizin with ammonia was first described by Roussin in 1875 (*Pharm. Journ.*, [3], vi., 53) and is said to represent the form in which glycyrrhizin exists in liquorice root. The U.S.P. directs it to be prepared by macerating 100 parts of liquorice root (No. 20 powder) during twenty-four hours with a mixture of 95 parts of water and 5 parts of solution of ammonia (sp. gr. 0·959), then percolating with water until 500 parts of percolate have been obtained, to which sulphuric acid is to be added as long as a precipitate is produced. This precipitate is collected, washed with cold water, redissolved in a mixture of water and ammonia, the liquid filtered if necessary, and then again precipitated with sulphuric acid. The precipitate is washed and dissolved in a sufficient quantity of solution of ammonia previously diluted with an equal volume of water, and the clear solution spread out to evaporate upon plates on glass. The product should be in dark brown or brownish-red scales, inodorous, of a very sweet taste, and soluble in water and in alcohol.

(*To be continued.*)

PSEUDO-GUTTA PERCHAS,*

OR SUBSTANCES SUPPLEMENTARY TO GUTTA PERCHA.

Foremost amongst pseudo-guttas, as we use the phrase, stands Balata gum. It is obtained from the *Mimusops Balata* of Gærtner (Nat. Ord. *Sapotaceæ*) and is synonymous with the *Sapota Mulleri* of Bleekrod, the *Achras Balata* of Aublet, etc. It is found in Demerara, Berbice, British and French Guiana, Antilles, Jamaica and Surinam. It has many vernacular names, amongst which may be mentioned, Balata, Paardenvleesch (Dutch—horse-flesh), bullet-tree, etc.

One of the first writers on this substance was Professor Bleekrod, who communicated some information as to the plant and its product to the Society of Arts, in 1857. He, too, described the plant and named it *Sapota Mulleri*. In 1860, Mr. Walker communicated samples, etc., received from Dr. Van Holst, of Berbice, to the same Society, and in 1864 Sir William Holmes also drew attention to the same subject. The tree is a large one with a trunk of about 6 feet in diameter, and furnishes a wood much liked for building purposes and of the colour of horse-flesh—hence the Dutch name. The bark is thick and rough, and the fruit is of the size of a coffee berry, sweet like a plum, and with a hard white kernel which yields a bitter oil. The leaves are glossy, oval and accuminated. The milk is drunk by the natives, in cases of diarrhœa, and when diluted with water it is used as cow's milk. The trees grow in groups and in alluvial soil.

The "Balata" gum is of a character somewhat between caoutchouc and gutta percha, combining in some degree the elasticity of the one with the ductility of the other, freely softening and becoming plastic and easily moulded like gutta percha. What small parcels arrived in England met with a ready sale and were remarkably free from adulteration. But, unfortunately, through the difficulty of collection—the undertaking being so dangerous and unhealthy—the supply of this excellent article has fallen off. It is collected by making incisions in the bark about 7 feet from the ground, and a ring of clay placed round the tree to catch the milk as it exudes. The yield is said to be in profusion especially at the time of the full moon, and the operation can be repeated every two months in the rainy season. It takes six hours to bring about coalescence by simple atmospheric influence, but very quickly by boiling in water. A large tree is said to yield as much as 45 lb. of "dry gum." The tree in every way is well worthy of a trial by acclimating it.

In India there are several plants whose products may be classed as pseudo guttas. First and foremost of these we have the Pauchontee or India gutta tree, the *Bassia elliptica* of Dalzell, the *Isonandra acuminata* of Lindley, but now known as *Dichopsis elliptica*. It is found in the Wynaad, Coorg, Anamallay and Neilgherry Hills, Sholah Forest, Cochin, Sichar, and according to General Cullen, "appears to be common in all the forest tracts at all within the influences of the south-west rains." This tree, which is now placed in the same genus as the true gutta percha, is a large one—from 80 to 100 feet high—and was first met with by Mr. Dalzell, in North Canara, near the falls of Goirsuppah, in 1849. Since that date, General Cullen and Dr. Cleghorn have used every exertion to bring the substance prominently forward, but without success. The gum is obtained by tapping, $1\frac{1}{2}$ lb. being obtained from one tree by five or six incisions, a large tree yielding as much as 20 to 40 lb. of sap. Many experiments have been made with specimens of the raw milk, *i.e.*, milk simply dried by exposure to the atmosphere. The results of these experiments have shown that for telegraphic purposes it is wanting in some essential qualities, but it has been recommended as a subaqueous cement or glue. When dissolved in ordinary gutta percha solvents, it, after the evaporation of the solvent, remains some time soft and viscid, and partakes somewhat of the character of bird-lime. When cold, it is hard and brittle. Without wishing in the slightest degree to throw doubt or discredit on the many and valuable experiments made, we would suggest that good samples be collected and treated in the same manner as recommended for gutta percha. We have no doubt that many a parcel of what would otherwise be *good* gutta percha, is spoilt through not being well boiled *immediately* after collection from the tree. At present this is the only way in which we see there is a possibility of ascertaining whether this product can be utilized, and we have the more hope from the fact that the structural character has led the plant to be placed in the same genus as the true gutta percha—structural affinity agreeing so often to chemical affinity.

There are in India other nearly allied *Sapotaceæ* which deserve attention in order to ascertain whether any of them yield a milky juice likely to be of commercial use. Amongst the *Euphorbiaceæ* there are two plants worthy of notice. The *Euphorbia Cattimandoo*, found in various parts of India, was first brought to notice by the Honourable W. Elliot, and a prize medal was awarded for this substance by the jurors of the 1851 exhibition. This spiny euphorb grows to the size of a shrub or small tree, and the milk flows out freely when a branch is cut. The natives use it as a cement to fasten knives in handles, etc. Under the influence of heat it becomes soft and viscid, and when dry, very brittle. The *Euphorbia Tirucalli*, the milk hedge or Indian tree spurge, is a succulent unarmed plant attaining a height of 20 feet, and its inspissated milk is used for various—chiefly medicinal—purposes, and has been recommended as a gutta percha substitute; but like gum *Euphorbium*, it has a very acrid character, and the collection is a very dangerous operation to the eyes.

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THE RAPID DETERMINATION OF THE VALUE OF EXTRACT OF MALT.*

BY J. F. CARL JUNGK.

It is customary to consider an extract of malt good, if it readily dissolves in water, has a pleasant taste and also remains unfermented for a long time. Worthless preparations may have all these properties, therefore such an examination is only superficial. Thus far no convenient process has been published by which the pharmacist or physician may convince himself of the value of extract of malt. Such a process, in daily use by me, may, therefore, be of interest. A good extract of malt should, I think, possess the following properties in addition to those noted above.

I. The extract should be light in colour; dark coloured preparations are partly burned, therefore contain neither active diastase nor soluble albumen, and differ from ordinary molasses only in containing dextrin.

II. The free acid should not be present over a certain proportion.

III. The proportion of water and solid matters should be within certain limits.

IV. The principal determination is that of the diastastic strength. A good extract should contain all soluble substances of the malt, of which diastase is the principal one. If the extract contains no diastase it differs little from honey or any other saccharine preparation. The action of diastase on amylaceous substances is wanted if the extract is to possess any value for a sick stomach at all.

Liebig uses powdered malt in preparing his infants' food, in order to change the starchy matter, before it enters the stomach, into easily digestible compounds. If we consider how much amylaceous food we use which could be changed by a small quantity of diastastic extract

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of malt into dextrin and sugar, the value of such a preparation in the process of digestion is readily seen. Although the saliva possesses the same properties as the diastase of the malt, the action of the latter is nearly five times as great as that of the former, and the diastastic action of the malt can stand about four times more acid than that of the saliva without being interfered with.

V. Nitrogenized constituents (albuminates) should be present in an easily digestible form.

These are the principal conditions in the analysis of an extract of malt.

Many put a great value on the soluble phosphates in the examination of the ash, but it cannot be accepted as a criterion of a good extract. The percentage of the phosphates will vary according as hard or soft water is used, and furthermore, these substances can be added to the most worthless preparation. The examination of the ash will not be described here, as directions can be found in every analytical work.

The estimation of the percentage of dextrin and maltose is also of no consequence, as a preparation which has the properties noted above will have the proper amount of dextrin and sugar.

Estimation of Solid Matters and Water.—Twenty grams of extract are dissolved in enough distilled water to make the solution weigh 200 grams. With this solution I determine the percentage of extract by means of a Czeczetka's maltometer, which shows the percentage of extract dried at 110° C. Those not in possession of one or of a similar instrument should estimate the specific gravity of the liquid at 17·5° C., and compare the same with a table by Griesmayer, published in 'Fresenius' Analytische Zeitschrift,' 1880, page 104, in order to determine the amount of extract. Another method is the following:—

Specific gravity.	Extract dried at 100° C.
1·1032	50 per cent.
1·1053	51 per cent.
1·1075	52 per cent.
1·1096	53 per cent.
1·1117	54 per cent.
1·1138	55 per cent.
1·1159	56 per cent.
1·1180	57 per cent.
1·1202	58 per cent.
1·1235	59 per cent.
1·1258	60 per cent.
1·1281	61 per cent.
1·1305	62 per cent.
1·1329	63 per cent.
1·1353	64 per cent.
1·1377	65 per cent.
1·1401	66 per cent.
1·1425	67 per cent.
1·1449	68 per cent.
1·1473	69 per cent.
1·1497	70 per cent.
1·1521	71 per cent.
1·1545	72 per cent.
1·1569	73 per cent.
1·1594	74 per cent.
1·1618	75 per cent.
1·1668	77 per cent.
1·1691	78 per cent.
1·1718	79 per cent.
1·1741	80 per cent.
1·1767	81 per cent.
1·1792	82 per cent.
1·1818	83 per cent.
1·1844	84 per cent.
1·1870	85 per cent.
1·1897	86 per cent.
1·1925	87 per cent.
1·1952	88 per cent.
1·1979	89 per cent.
1·2007	90 per cent.

A certain weight of extract is dissolved in an equal weight of water, the specific gravity of this solution at 17·5° C. is determined and from the table given the percentage of extract is ascertained. On subtracting the extract from 100 the percentage of water is found.

A good extract containing both diastase and albumen seldom contains more than 25 per cent. of water. Should the percentage of extract fall to 50 or, as with many so-called beers, to 5 or 6 per cent., diastase cannot be present, as it would not keep in such diluted liquids. To such preparations salicylic acid is usually added to prevent for some time the decomposition of the dextrin. On agitating such a preparation with strong ether, the salicylic acid is easily separated. Evaporate the ethereal solution, dissolve the residue in water and test this solution with diluted ferric chloride, when the salicylic acid is easily recognized by the violet colour produced. If we reflect that the addition of one-fourth to one-half per cent. of salicylic acid to solutions of starch renders even preparations very rich in diastase inactive, it becomes obvious that the addition of this acid to an extract of malt is incorrect.

Determination of Free Acid.—The free acid of freshly prepared extract of malt is almost exclusively lactic acid; but with the age of the preparation other acids are formed, and for this reason I estimate the amount of caustic soda used and note this as percentage. In a solution of pure caustic soda, 5 grams to 1000 c.c. water, each c.c. represents 0·005 sodium hydrate. Ten grams of extract are dissolved in 100 grams of water and neutralized with the soda solution. For this purpose a burette graduated into one-tenth c.c. is used, and the point of neutralization determined by means of very sensitive litmus paper. With a little practice the estimation of the acid does not present any difficulty. Good extract of malt tested by this method will seldom require more than 6 to 7 c.c. soda solution.

To take an example, suppose 6 c.c. soda solution, that is, $6 \times 0·005 = 0·030$ hydrate of sodium, to be necessary for complete neutralization of 10 grams of extract of malt, then 100 grams of extract must need 0·30 sodium hydrate. If for 100 parts of extract of malt more than 0·5 sodium hydrate should be required, the durability of the preparation will be doubtful and the diastatic power will soon disappear.

Estimation of Diastatic Strength.—Twelve clear and uniform 2 oz. vials each filled with 2 oz. distilled water and 2 drops of iodine solution, prepared from 2 grams iodine, 4 grams iodide of potassium and 250 grams water; a good thermometer and starch mucilage are needed for this purpose.

Ten grams of starch are stirred with 30 grams of water and poured into 125 or 150 grams of boiling water. The mixture is stirred and boiled for some time. The thermometer is then introduced and the mucilage is allowed to cool to and kept at a temperature of 100° F. by means of a water-bath.

Ten grams extract of malt dissolved in 10 c.c. water are then stirred into the mucilage, the time being accurately noted. After one minute a good extract will have converted the thick mucilage into a thin liquid. As soon as this change has taken place it is necessary to examine the progress of the conversion of starch into soluble starch, dextrin and sugar at the end of every minute, by the following method:—

After the expiration of the first minute transfer two drops, by means of a glass rod, into one of the 2 oz. bottles. The bottle is shaken and placed near a window. At the end of every minute repeat this manipulation with a new bottle until the coloration is no longer produced. The time necessary for effecting this change gives the indication as to the amount of diastase present. Undecomposed starch mucilage gives a greenish blue colour and after standing some time a blue precipitate. Soluble starch, the first product of the change, yields with iodine, a dark blue solution without a precipitate.

If the amount of soluble starch equals that of dextrin and sugar the colour of the solution will be purple. As the soluble starch disappears the solution will be of a decided red colour if dextrin predominates, or faintly red if the sugar be in excess; and when starch and most of the dextrin have been converted into sugar, the liquid will be nearly or entirely colourless. This experiment is very interesting and is simple to perform.

A good extract of malt should convert its own weight of starch within ten minutes at 100° F.; at 62° F. forty minutes will be necessary for the conversion, and at 150° F. only three minutes. An extract of malt of the above strength will convert five times its weight of starch at 100° F. in forty minutes and eight times that amount in ninety minutes.

Furthermore, an extract of malt which converts its own weight of starch at 100° F. in ten minutes into dextrin and sugar will in the following time digest the following boiled amylaceous articles:—

Boiled potatoes, 4 parts in three minutes; 16 parts in fifteen minutes.

Boiled rice, 4 parts in ten minutes.

Boiled bread, 4 parts in nine minutes; 16 parts in forty-five minutes.

Boiled crackers, 4 parts in five minutes; 16 parts in twenty-five minutes.

Boiled sago, 4 parts in twelve minutes; 8 parts in thirty minutes.

The following experiments made with the view of studying the influence of acids and alcohol on diastase and the conversion of starch are produced in tabular form in comparison with saliva. They may interest many readers, and encourage them to similar investigations.

The experiments were conducted as follows:—

1. A paste was made by boiling starch in water until it was thoroughly gelatinous, 5 fluid ounces containing exactly 100 grains of starch; the specific gravity of this paste was 1·0117.

2. For each experiment, 5 fluid ounces of the paste were mixed in a porcelain capsule with 200 minims of a mixture of equal parts of malt extract and water. The malt solution was freshly prepared each day from the same sample of malt extract, and tested, to secure a uniformity of *diastatic power*. In the experiments with saliva, 100 minims were added to the 5 fluid ounces of starch paste. The saliva was collected from a number of persons, both adults and children, and was tested from time to time. The saliva always gave a neutral reaction, while the malt extract always gave an acid reaction, owing to the presence in the latter of $\frac{4}{10}$ per cent. of acid calculated as lactic acid.

3. Before adding the malt extract solution or saliva, the starch paste was by means of a water-bath brought to a temperature of 100° F., and maintained at a temperature ranging from 95° to 100° F. until the experiments were completed.

4. The acids or alkalies were always added to and thoroughly mixed with the paste before adding the malt extract solution or saliva.

5. When the change in the condition of starch paste operated on was very rapid, it was tested every minute with iodine, otherwise every five minutes. In a few instances the action was so rapid that tests were required to be made in fractions of a minute.

6. The iodine solution was made and used as described above.

7. Except in a few instances, the experiments were discontinued at the end of an hour.

8. The acids were calculated as anhydrous.

100 mimims of—		Blue, with precipitate after minutes.	Blue, no precipitate after minutes.	Purple, after minutes.	Red, after minutes.	Nearly colourless after minutes.	Remarks.
Extract of malt	—	—	—	1	2	7	Relative amylolytic power of pure malt extract and saliva.
Saliva	—	—	—	4	6	14	
Ext. malt, with HCl. . .	$\frac{1}{40}$ p. c.	—	—	1	—	2	Amylolytic power of both very considerably increased.
Saliva, with HCl. . . .	$\frac{1}{40}$ „	—	1	5	8	10	
Ext. malt with HCl. . .	$\frac{1}{30}$ „	—	—	—	—	—	Amylolytic power completely arrested.
Saliva, with HCl. . . .	$\frac{1}{30}$ „	—	—	—	—	—	
Ext. malt, with acetic acid	$\frac{1}{5}$ „	—	—	—	1	2	Amylolytic power more than doubled.
Saliva, with acetic acid .	$\frac{1}{5}$ „	—	—	1	4	6	
Ext. malt, with acetic acid	$\frac{4}{10}$ „	—	1	2	3	6	Excellent result with malt ext.; action of saliva arrested, in two hours paste only liquefied.
Saliva, with acetic acid .	$\frac{4}{10}$ „	60	120	—	—	—	
Ext. malt, with acetic acid	$\frac{1}{2}$ „	—	1	5	10	12	Diastatic power of malt extract decreased, and arrested when acid exceeded $1\frac{1}{2}$ per cent.
Ext. malt, with acetic acid	1 „	—	—	15	25	35	
Ext. malt, with acetic acid	$1\frac{1}{2}$ „	5	15	30	65	75	
Ext. malt, with lactic acid	$\frac{1}{20}$ „	—	—	1	$1\frac{1}{2}$	2	Diastatic power of both increased, that of saliva seven times greater.
Saliva, with lactic acid . .	$\frac{1}{20}$ „	—	—	1	$1\frac{1}{2}$	2	
Ext. malt, with lactic acid	$\frac{1}{10}$ „	—	—	1	2	3	Action of malt extract increased, of saliva slightly retarded.
Saliva, with lactic acid. .	$\frac{1}{10}$ „	—	1	5	10	15	
Ext. malt, with lactic acid	$\frac{1}{5}$ „	—	—	—	1	2	Favourable to malt ext.; saliva nearly inert.
Saliva, with lactic acid .	$\frac{1}{5}$ „	35	60	—	—	—	
Ext. malt, with lactic acid	$\frac{3}{10}$ „	—	—	1	3	5	Lactic acid, one-half per ct., nearly stops all diastatic action.
Ext. malt, with lactic acid	$\frac{1}{2}$ „	—	1	8	40	60	
Ext. malt (Mixture of 1 p. HCl, 2 p. lactic and 8 acetic acid.)	$\frac{1}{10}$ „	—	—	$\frac{1}{4}$	$\frac{1}{2}$	1	A mixture of three acids, in the proportions indicated most favourable to the action of saliva.
Saliva . .	$\frac{1}{10}$ „	—	1	2	3	4	
Ext. malt	$\frac{1}{5}$ „	—	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	
Saliva . .	$\frac{1}{5}$ „	—	5	25	30	45	
Ext. malt (Mixture of 1 p. HCl. and 8 p. acetic acid.)	$\frac{1}{10}$ „	—	—	1	2	$2\frac{1}{2}$	Absence of lactic acid diminishes diastatic action of both.
Saliva .	$\frac{1}{10}$ „	—	1	6	7	12	
Ext. malt	$\frac{1}{5}$ „	—	1	2	3	4	
Saliva .	$\frac{1}{5}$ „	60	—	—	—	—	

The alkalies used were calculated as anhydrous. In testing the liquids, the proportion of iodine used was sufficiently large to insure an excess of free iodine.

100 minims of—		Blue, with precipitate after minutes.	Blue, no precipitate after minutes.	Purple after minutes.	Red after minutes.	Nearly colourless after minutes.	Remarks.
Ext. malt, with Na_2O . .	$\frac{1}{20}$ p. c	5	10	15	25	30	$\frac{1}{20}$ per cent. of caustic alkali totally destroys action of saliva, the starch paste becoming thicker instead of being liquefied. By $\frac{1}{10}$ per cent. the action of malt extract is also destroyed. Alkaline carbonates act less energetically.
Saliva, with Na_2O . . .	$\frac{1}{20}$ "	60	—	—	—	—	
Ext. malt, with Na_2O . .	$\frac{1}{10}$ "	15	—	—	—	—	
Ext. malt, with Na_2CO_3 .	$\frac{1}{20}$ "	—	—	5	—	10	
Saliva, with Na_2CO_3 . .	$\frac{1}{20}$ "	—	5	30	60	—	
Ext. malt, with K_2O . .	$\frac{1}{20}$ "	—	5	25	30	60	
Saliva, with K_2O . . .	$\frac{1}{20}$ "	—	—	—	—	—	
Ext. malt, with K_2O . .	$\frac{1}{10}$ "	2	5	30	60	—	
Ext. malt, with K_2CO_3 .	$\frac{1}{20}$ "	—	—	5	—	10	
Saliva, with K_2CO_3. . .	$\frac{1}{20}$ "	5	10	40	60	—	

Whisky contained alcohol 30 vol. per cent., acid 0·0525, sodium hydrate.
Wine contained alcohol 9 vol. per cent., acid 0·75 (with 0·064 sulphuric acid).
Brandy contained alcohol 30 vol. per cent., acid 0·075.

	THE MIXTURE CONTAINED.					TEST WITH IODINE SOLUTION AND TIME.				
	Alcohol. P. c.	Acid. P. c.	Starch. P. c.	Extract malt. P. c.	Saliva. P. c.	Blue, with precipitate. Min.	Blue, no precipitate. Min.	Purple. Min.	Red. Min.	Nearly colourless. Min.
Ext. malt, with wine . .	1·5	0·125	3·46	1·73	—	—	1	5	4	5
Saliva, with wine . . .	1·5	0·125	3·46	—	3·46	—	1	25	30	45
Ext. malt, with whisky .	2·72	0·004	3·7	1·85	—	—	1	6	9	10
Saliva, with whisky . .	2·72	0·004	3·7	—	3·7	—	1	10	15	20
Ext. malt, with wine . .	2·56	0·214	2·9	1·45	—	—	—	3	—	5
Saliva, with wine . . .	2·56	0·214	2·9	—	2·9	60	—	—	—	—
Ext. malt, with whisky .	5	0·0087	3·46	1·73	—	—	5	7	8	10
Saliva, with whisky . .	5	0·0087	3·46	—	3·46	—	5	10	12	14
Ext. malt, with whisky .	5	0·0087	3·46	3·46	—	—	—	1	2	3
Ext. malt, with wine . .	5·5	0·46	1·5	1·5	—	5	60	—	—	—
Ext. malt, with wine and water	3·42	0·28	0·99	0·99	—	—	—	3	4	5
Malt, with whisky . . .	8·5	0·014	2·9	2·9	—	—	5	10	15	20
Saliva, with whisky . .	8·5	0·014	2·9	—	2·9	—	1	2	3	4
Malt, with whisky . . .	13·33	0·0231	2·31	2·31	—	—	2	3	6	7
Saliva, with whisky . .	13·33	0·0231	2·31	—	2·31	—	1	2	3	4
Malt, with brandy . . .	15	0·40	2·08	2·08	—	—	1	5	6	7
Saliva, with wine . . .	0·818	0·068	3·7	—	3·7	—	—	1	2	4

The following table shows clearly that alcohol has only a slight influence upon the diastatic action:—

	THE LIQUID CONTAINED.					TEST WITH IODINE AND TIME.			
	Alcohol. Fluid ounce.	Alcohol. P. c.	Starch. P. c.	Ext. malt. P. c.	Saliva. P. c.	Blue, no precipitate. Min.	Purple. Min.	Red. Min.	Colourless Min.
Extract of malt . . .	$\frac{1}{2}$	8·85	3·37	3·37	—	—	1	3	5
Saliva	$\frac{1}{2}$	8·85	3·37	—	3·39	1	5	20	25
Malt	1	15·6	3·46	3·46	—	—	1	3	5
Saliva	1	15·6	3·46	—	3·46	1	15	20	25
Neutral extract of malt .	1	15·6	3·46	3·46	—	1	15	20	24
Malt	$1\frac{1}{2}$	21·7*	3·2	3·2	—	1	2	3	5

* Starch precipitated.

The last table shows that the diastatic action of extract of malt and of saliva is but little affected by the presence of alcohol in the starch solution, but is influenced by the acid. The small amount of sulphuric acid contained in the wine interferes little with the action of malt extract compared with that of saliva.

DETERMINATION OF THE NITROGENIZED BODIES.

Albuminates.—For this estimation I use a solution of picric acid in water, saturated in the cold; also a glass tube such as is used for the estimation of nitrogen in elementary analyses, divided into one hundred equal parts, the lower five divisions being further divided into fifths; but any tall narrow glass cylinder, which is divided accurately into equal parts, will answer the purpose. The cylinder is filled with eighty parts of the solution of picric acid, and twenty parts of extract of malt, and well agitated until the extract is dissolved with the exception of the albumen, then placed in a vertical position for twenty-four hours and the quantity of precipitate read off. Each division represents 1 per cent. by weight of albumen (nitrogenous matter) dried at 100° C.

The correctness of this estimation is reliable within $\frac{1}{5}$ per cent. and has been verified by a series of elementary analyses, undertaken with the view of convincing myself of the exactness of this method, which may be approximately proven by coagulating the albumen by boiling. This last method is never exact, since malt contains some nitrogenous matter which is not coagulated by heat.

The average amount of nitrogenous matter contained in extract of malt of the consistency of honey is 3 to 3·25 per cent. A well prepared extract of malt produces, with cold water, a faintly turbid solution, which becomes much clearer if carefully heated to 150° F.

The above described determinations with extract of malt furnish the proof as to whether the preparation is of good quality or is worthless.

Simple Estimation of Dextrin, Sugar and Glycerin.—A polariscope is not always available, and if at hand the instrument must first be tested with pure crystallized malt sugar; the separation of the sugar from dextrin, and the decolorization of the liquid are tedious operations. For these reasons I use this method only occasionally for controlling the results; but the following short process will be found to give quite accurate results.

Weigh from 2 to 5 grams of extract of malt; mix with 20 grams of dry sand which has been previously washed with hydrochloric acid and water, and dry this mixture in an air-bath at 100° C. until it ceases to lose weight. The loss of weight represents amount of water.

Transfer the mixture into a small glass percolator (glass syringe) supported by a wire stand of such a size that the entire apparatus may be weighed on an analytical balance. Dry thoroughly in an air-bath and weigh. Now percolate with strong ether, evaporate the percolate and dry the residue; its weight indicates the *resin of hops.* The apparatus is also dried in the air-bath and weighed; the loss in weight shows likewise the resin of hops.

Then percolate with a mixture of two volumes of absolute alcohol and three volumes concentrated ether until a drop of the percolate heated on a platinum foil will not char. The loss of weight after drying in air-bath represents *glycerin.* A mixture of chloroform and alcohol cannot be used as a solvent for glycerin, as the malt sugar is somewhat soluble therein.

Exhaust the residue completely with stronger alcohol; dry and weigh. The loss of weight gives amount of *sugar.*

The balance, after subtracting the weight of sand is *dextrin* and *albumin.* The dextrin may also be extracted with hot water and determined from the loss of weight.

After igniting the sand its weight must be the same as in the beginning. The difference in weight before and after ignition indicates the weight of albumen.

By the methods detailed above I have examined twenty different malt extracts of American and European manufacture; but the publication of the figures obtained would be of no value unless accompanied by the designation of the articles, which appears to be inadmissible.

THE SPONGE TRADE OF THE BAHAMAS.*

Next to the pine-apple business the sponge trade is the most important industry of the Bahamas, bringing considerable money into the colony, and furnishing steady and lucrative employment to several hundred vessels and several thousand persons.

Forty years ago the gathering and shipment of sponges was practically unknown in these islands. The people found so much more profit and excitement in the business of "wrecking" that the ordinary methods of procuring a livelihood were not in much favour.

Gradually, however, as the erection of lighthouses upon exposed points and the substitution of steam for sailing craft lessened the number of wrecks, the colonists began to cultivate the soil and to explore the depths of the sea in the pursuit of wealth.

At first sponges were divided into only two classes, the coarse and the fine, the former bringing about 5 dollars per cwt., and the latter about double that sum. Sponges are now divided into many varieties, the principal of which known to the trade here are as follows, in the order of their value, the first being the best, viz.:—Sheep-wool, white reef, abaco velvet, dark reef, boat, hard-head, grass, yellow, and glove. Of some of these varieties there are several grades designated by numbers, all being useful for mechanical, surgical, and bathing purposes. Bahama and Florida sponges are of about equal value, both kinds being inferior in texture and market value to those of the Mediterranean.

From the opening of the trade in the Bahamas up to the year 1864 the amount of sponges gathered was small, averaging only 3331 pounds per annum, valued at 26 dollars per cwt. During 1863–65 the business of blockade-running so engrossed the Bahamians that nearly all legitimate business was suspended, and the sponge industry sank to a low ebb. In the years immediately subsequent to our civil war the trade grew brisker until the outbreak of domestic troubles on the adjacent island of Cuba gave it a check, the Spanish authorities withdrawing the privilege of fishing for sponges upon the Cuban coast, lest the spongers might carry on a contraband trade with the insurgents. In 1878, the insurrection having been substantially quelled, the Spanish consul at Nassau issued over one hundred licences, at 25 dollars apiece, to Bahamian vessels to sponge in Cuban waters, and the trade was rapidly reviving when the jealousy of the Spaniards was aroused, and all the licences were peremptorily revoked. Since then the Bahama spongers have confined operations to their own waters, but with such assiduity that new fields have been discovered, and the yield has materially increased.

The vessels employed in sponging are small craft, their average being about ten tons burden, each vessel carrying from six to twelve men. These vessels take on board about six weeks' provisions and start out coasting along the banks and reefs, where the water is shallow, and among the islands, for in such localities the sponges are found. In case of a storm the little craft takes refuge inside the coral reefs or under the lee of an island. The sponges are readily seen growing upon the rocks reefs and shallows, for the water is marvellously clear, and they are brought to the surface by means of iron

* From a Report by Consul McLain of Nassau. Reprinted from the *Canadian Pharmaceutical Journal*, July.

hooks fastened to long poles, or by diving. When first caught they are found to be covered with a soft gelatinous substance, full of life, and as black as tar, the sponge proper being really only the skeleton or the support of this living organism.

The day's catch is spread upon the deck so as to kill this living covering, which in decaying emits an odour by no means as fragrant as that of frangipanni. When a sufficient quantity of sponge has been gathered to warrant it the spongers go ashore, build a pen or "crawl" of stakes at the water's edge, and place the sponges therein, when the action of the tide helps to remove the black covering, the process being completed by pounding the sponges with sticks. Having been cleansed in this manner the sponges are strung upon small palmetto strips, each string containing three or four sponges, being called a "bead," and with this cargo the vessels return to Nassau. A cargo will range in value from 75 dollars to 300 dollars, according to quality, quantity and demand.

The sales and handling of sponges are substantially controlled by what is known as the "Nassau Sponge Exchange Company, Limited," an organization holding a charter from the colonial Legislature, with a capital of £600, and possessing certain privileges. The company has erected a commodious building upon one of the wharves, and here all the sponges are sold, subject to certain taxes and restrictions. No person is permitted to buy until he has become a member of the exchange, under certain conditions, and a seller who attempts to dispose of his cargo outside of the exchange will soon be put under the ban. Sales are made upon every week day, except Saturday, at 11 o'clock a.m., each buyer offering his tender in writing and privately, and he is expected to make some offer for each lot on sale.

As soon as the daily sale is concluded, the sponges are hauled away to the packing yards, where they are assorted and clipped into good shape. They are then put into tubs or vats of lime-water to soak for several hours, and are afterwards spread upon canvas to bleach and dry in the sun. Next they are pressed by machinery into bales about 3 by 2 feet in size, each containing 100 pounds, the packages being covered with coarse bagging securely sewed and corded, and are then ready for shipment. All the work bestowed upon the sponges from catching to shipment, except the purchasing at the exchange, is performed by the native blacks.

There are at present only about a dozen qualified buyers of sponges in Nassau, nearly all of whom buy exclusively for houses in America and England.

The American trade is monopolized by a few firms in New York (through resident agents in Nassau), the leading houses being as follows, viz.:—Messrs. A. Isaacs and Co., Mansell, Birnbaum and Co., Raboteau and Moses, Lasker and Bernstein, McKesson and Robbins, and Wrightington and Jackson.

The average current market value of sponges in this colony for the past year or two is substantially as follows, which represents their cost on shipboard, viz.;—Sheep-wool, 75 cents per pound; white reef, 75 cents; abaco velvet, 55 cents; dark reef, 35 cents; boat, 35 cents; hardhead, 30 cents; grass, 20 cents; yellow, 20 cents; glove, 15 cents. These are for the best grades of each variety, and are the average of prices; the absolute prices, of course, changing at times, according to the laws of trade.

Bahama sponges are shipped to the United States and Great Britain, with an occasional lot to Paris. Up to three years ago, Great Britain got the bulk of the trade. Since then the United States has taken a greater part of the sponges. In 1881 the total value of the sponges shipped from these islands was 150,000 dollars, of which 36,357 dollars worth went to England, and 113,643 dollars went to the United States. The following figures will show the volume and course of the sponge trade of the Bahamas for the last eight years:—

Year.	Exports to Great Britain. Dollars.	Exports to United States. Dollars.	Total. Dollars.
1874	32,500	44,000	76,500
1875	42,600	34,400	77,000
1876	52,000	35,000	87,000
1877	59,300	30,700	90,000
1878	69,927	53,073	123,000
1879	95,000	70,000	165,000
1880	66,000	102,428	168,000
1881	36,357	113,643	150,000
1882 (first quarter only) . .	...	82,664	...

As appears above, the first quarter of the present year shows a signal increase in the trade with the United States, the amount shipped during January, February and March being more than two-thirds as much as the total for the year 1881, which year was itself an improvement over all the preceding ones.

There was no special increase during that quarter in the shipments to Europe. This sudden increase in shipments to the United States was owing to the discovery of a new and extensive field of sponges near the island of Elouthera, only sixty miles distant from Nassau, the product of which the American agents eagerly bought up.

The water on the new field is from five to eight fathoms in depth, making the gathering of the sponges tedious and laborious. It is thought that the field is a very extensive one, extending over many miles, and the sponges are, so far as known, all of the sheep-wool or most valuable variety.

The majority of the sponges found up to this time are of an extra large size, and they will not bear cutting to advantage, since the inner portions seem to be very tender. A medium sized and solid sponge would have been more valuable.

During the last quarter this field was actively worked, but a sudden interruption has occurred, caused by the fact that myriads of small fish called "sailors" have invaded the grassy bottom, stirring up the mud to such a degree as to prevent the sponges from being seen. Old fishermen give it as their opinion that the sponges can be gathered to advantage in this field only during a portion of the year, when the water is still and the "sailors" are absent. If this be true, it will detract somewhat from the value of the new find.

If the colonists could handle and ship the sponges on their own account, as they do with their pine-apple crop, the trade would be of more benefit to the islands; but their control ceases when the sponges are sold at the exchange, and all subsequent profits after shipment go to the foreign purchaser.

The business of gathering, curing, and packing, however, brings about 150,000 dollars of foreign capital into the colony every year, which is largely sent to the United States to purchase materials for the vessels, provisions for the men, and for general purchases; and so any increase of the sponge industry will enlarge the amount of goods which the colonists will be able to buy of us. In fact, the trade relations of the Bahamas are now so intimate with the United States, that the prosperity of the former is directly beneficial to the latter; and we do not overstate the truth when we assert that this colony, although politically a "dependency" of Great Britain, is in reality, so far as an increasing profitable trade and commerce is concerned, a "dependency" of the United States. A liberal spirit on the part of our Government, and fair and honest dealing by our merchants and manufacturers, are all that is needed to retain our present trade with the Bahamas, and to materially enlarge the same, as the colony itself develops its natural resources and prospers.

THE RELATION BETWEEN FLUORESCENCE AND CHEMICAL CONSTITUTION OF ORGANIC BODIES.*

Why do some substances exhibit fluorescence and others not? This is a problem that must remain for a long time unsolved, and we cannot, at present, expect to answer that question any more than we can tell why sodium sulphate is soluble in water while barium sulphate is not.

In order to approach a little nearer to an understanding of the subject, we must decide to proceed in such a way as to find out what may be called the *statistical* reason, as distinguished from the true and actual cause. This can be accomplished by grouping together known facts and cases so as to see what peculiarities of constitution are common to substances having the same physical peculiarities. This method has been pursued in the numerous experiments made to determine the cause of colours in dyes, and it can also be applied to the study of fluorescent bodies, of which there are already quite a large number to experiment upon.

Liebermann collected the fluorescent derivatives of anthracene, and thereby arrived at a very remarkable result. Anthracene has the formula $C_6H_4(CH)_2C_6H_4$, or two groups of C_6H_4 are connected by a pair of carbon atoms, to each of which is attached one of hydrogen; hence these hydrogen atoms (which we have placed in the parenthesis) have an entirely different position from the others. Liebermann found that all anthracene derivatives which contained these hydrogen atoms unchanged, or had them replaced by monad groups, possessed fluorescence. If, however, the CH groups are changed to CO groups, as in anthraquinone, which has the formula $C_6H_4(CO)_2C_6H_4$, and its derivatives, the fluorescence is wanting.

The most beautiful and intense exhibition of fluorescence is shown in a substance discovered by Baeyer, and called "fluoresceine." It is made from resorcine, $C_6H_4(OH)_2$, and phthalic acid, $C_6H_4(COOH)$, by fusing them together. The new compound may be looked upon as resorcine, in which one of the hydrogen atoms of the C_6H_4 group has been replaced by the residue of the phthalic acid. For brevity we may represent this residue by *Phth*, and write the formula of fluoresceine thus: $C_6H_3(Phth)(OH)_2$. It is a brick red powder, and when dissolved in alkalies forms a red liquid which has such an intensely green fluorescence that, viewed by reflected light, one thinks that he sees a glittering green precipitate in the liquid, which was clear by reflected light and of a red colour. This peculiarity enables us to utilize the phthalic acid as a delicate reagent for the detection of resorcine. If the slightest trace of the latter is melted with phthalic acid, and the fusion dissolved in alkali, the liquid will exhibit this magnificent fluorescence in the most intense degree.

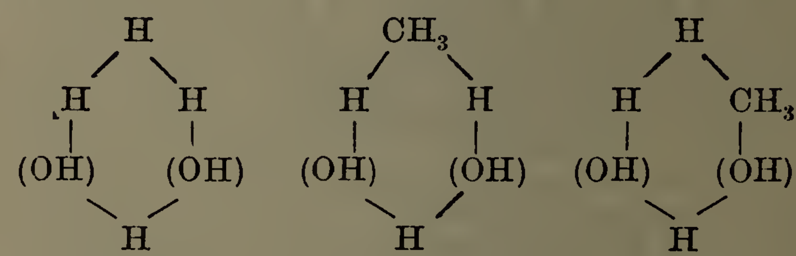
Orcine is a homologue of resorcine. In constitution it is a resorcine with the hydrogen atom replaced by the methyl group, CH_3, a methylated resorcine having a formula $C_6H_3,CH_3,(OH)_2$. This substance is very similar to resorcine in all its properties and reactions, except in its action towards phthalic acid. It does, indeed, unite with the latter, but the resulting compound has no fluorescence at all. In a free state it is colourless, and its alkaline solution is red both in transmitted and in reflected light.

To ascertain why it was that a substance so similiar to resorcine should act so differently in that one respect, Knecht adopted an ingenious method of experimentation. He prepared a substance homologous with resorcine, but having the same chemical composition as orcine, a new isomeric body. This substance, which he called *cressorcine*, has the formula $C_6H_3,CH_3(OH)_2$. It was made from cressol, or methyl phenol, the constitution of which is well known.

Cressorcine, this new isomer of orcine, was found to yield a fluorescent body when melted with phthalic acid, although the new substance had the same chemical composition as the colourless one obtained from orcine and phthalic acid.

The fluoresceine prepared from cressorcine is so similar to that obtained from resorcine that Knecht sought for a long time before he could discover any method of distinguishing the one from the other. Both are brick red powders, soluble in alkali with an astonishing green fluorescence, but by the action of acetic anhydride, acetyl ethers of unlike melting points are produced.

The theory proposed to account for this is that in orcine the CH_3 group occupies the position usually designated as No. 1, and that when this is left free the phthalic acid attaches itself there to form fluoresceine, but that is not possible when this is occupied, as it is in orcine, by a methyl group. The following diagrams exhibit the relative position of the groups on Kekulé's benzol ring:



Resorcine. Orcine. Cressorcine.

* From the *Scientific American*, April 21, 1883.

HEDGE-MUSTARD OIL.*

BY E. VALENTA.

To obtain a substitute for rape-seed oil there has been an oil manufactured of late years from the so called hedge-mustard or bank-cresses—*Raphanus raphanistrum* or *Raphanistrum arvense*, a plant which is now cultivated in Hungary. This oil is brought to the market either by itself or mixed with rape-seed oil and under this latter name.

The siliquous fruit of the plant mentioned bears little seeds which contain 30 to 35 per cent. oil. This can be for the most part obtained by pressing. It has a dark olive-green colour, and an odour and taste very similar to rape-seed oil; its density and faculty for saponifying with alkali is also nearly the same, so that it is difficult to recognize it in a mixture of the two oils. The author, who has made this point the object of a special examination, has tested the two oils as regards their behaviour to the usual reagents.

On acting upon them with acids of different strength, such as sulphuric and nitric acids, a mixture of these, aqua regia, phosphoric acid, etc., as well as with oxidizing mixtures, as potassium bichromate and sulphuric acid, or concentrated nitric acid saturated with nitric oxide, various colours are produced with both oils, by the shade and intensity of which they can be pretty well distinguished.

The author gives a list of these reactions. Most characteristic for hedge-mustard oil appears the following reaction:—About 5 grams of this oil are saponified with potassium hydrate and spirit with warming, and the soap thus obtained is filtered from the unchanged oil, which is golden yellow and almost odourless and tasteless. The concentrated filtrate, on adding hydrochloric acid to strongly acid reaction, assumes a distinct green colour if a somewhat large portion of hedge-mustard oil be present.

* From *Dingl. Polyt. Journ.* Bd. 247, Heft 1. Reprinted from the *Journal of the Society of Chemical Industry*.

The Pharmaceutical Journal.

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WHAT IS THE SOURCE OF LEDGER BARK?

AT a meeting of the Linnean Society, on May 3, a paper on this subject was read by Mr. J. E. HOWARD, F.R.S., the substance of which we had intended to lay before our readers as soon as the paper should be published in the Journal of that Society. A report of Mr. HOWARD'S paper has, however, in the meantime reached the Colonies and has provoked a somewhat animated discussion, as a result of which Mr. T. N. CHRISTIE, one of the leading cinchona planters of Ceylon, has forwarded to us samples and notes which he hopes may clear up the points in dispute.

The point at issue appears to be whether the plant named "*Cinchona Ledgeriana*" by Dr. TRIMEN is a true species or only a variety of *Cinchona Calisaya*. Mr. HOWARD published in his 'Quinology of the East Indian Plantations' a description by Dr. WEDDELL of a variety of *Cinchona Calisaya*, which he named *Ledgeriana*. Of this plant three plates were figured, all of which were drawn from plants grown from seed bought of Mr. LEDGER in 1868, and cultivated in Java.

In November 1881, Dr. TRIMEN, who had then seen, in a growing state, the "Ledgeriana" trees as known to planters in Ceylon, and as recognized by Mr. MOENS of Java, described the Ledgeriana tree as a distinct species, in the *London Journal of Botany* for that month, giving the features which he considered distinctive, and a full description of every part of the plant as well as a figure of the leaves, flowers and fruits. To this description of the Ledgeriana plant, as a good species, Mr. J. E. HOWARD appears to have taken exception in the paper read before the Linnean Society, and so far as we understand the remarks made, or reported to have been made, by him, he believes "the tree "figured as *C. Ledgeriana*, Moens, to be no Calisaya at "all, but a species, standing intermediate between *C.* "*Calisaya* and *C. micrantha*, or a mere variety of "*C. micrantha*," probably var. *Calisayoides*, and he thinks "it will be evident to any botanist" that the plates as well as the descriptions differ very widely. But it is a further question whether the plant thus referred to is that described in WEDDELL'S Notes (Translation, p. 40). Mr. HOWARD adds, "On Mr. MOENS' own authority, I claim that mine alone are authentic," and he seems further to have stigmatized Dr TRIMEN'S typical plant as derived apparently from seed of uncertain origin, given by Mr. MCIVOR.

The question therefore arises, what is the true Ledger Cinchona? Dr. TRIMEN says that the seed from which his plant was raised came from the late Mr. MCIVOR, and that there can be no doubt it was obtained from trees which originated from Mr. LEDGER'S seed. Mr. HOWARD states that his figures were drawn from trees grown in Java from LEDGER'S seed. His description of *Ledgeriana* is not so full as Dr. TRIMEN'S, and the points which Dr. TRIMEN mentions as characteristic of the tree do not appear in Mr. HOWARD'S statements. The features mentioned by Dr. TRIMEN as characteristic are as follows: Leaves always having the broadest part at or about the middle, flowers drooping or divaricate, flower-buds not at all or very slightly widened at the end and never abruptly enlarged there, corolla somewhat inflated in the middle. The unexpanded leaves and the buds and young soft shoots have a bronzed or olive-orange tint, by which, in a field of Calisaya, the plants of *Ledgeriana* may often be picked out at first sight. We have here, therefore, definite characters by which two excellent botanists as well as the planters in Ceylon distinguish a distinct form or variety or species, whichever it may be, for it can only be proved to be a distinct species by it coming true from seed. Dr. TRIMEN admits (*Journ. Bot.*, 1881, p. 322) that we have at present little direct evidence to show that the plant does come true from seed. He also remarks that the progeny which comes from any sowing of *C. Calisaya* seed are certainly less like one another than some are like *C. Ledgeriana*; moreover, seed from the latter has not hitherto been found to come very true, even the progeny of the original seed from Bolivia showing a good deal of variation. The theory that this is due in some measure to "cross-fertilization" might explain the undoubted improvement in the trueness of the seed from a tree grown in proximity to other species, after isolation. This has been conspicuously shown in the case of *C. Ledgeriana* in Sikkim, the seedlings from which, since Mr. GAMMIE uprooted nearly all the neighbouring trees, now come remarkably true, whereas before that was done the sporting was so great that Dr. KING would not propagate by seed at all. The results have been even more marked in Java.

According to statements now forwarded to us by Mr. T. N. CHRISTIE, there can be little doubt that the plant figured by Dr. TRIMEN is recognized in Ceylon by the planters, as well as by Mr. MOENS, as the "true *Ledgeriana*." Some flowers and leaves marked A and B received from Mr. T. N. CHRISTIE correspond closely with Dr. TRIMEN'S figures in the *Journal of Botany*. The flowers are small and drooping and the buds not swollen abruptly below the apices, these being the features pointed out by Dr. TRIMEN as most characteristic of his plant.

The samples of bark corresponding to these specimens give the following results on analysis:—

Quinine	7·50	8·32
Quinidine	—	—
Cinchonidine	·19	1·12
Cinchonine	·18	·20
Amorphous	·60	·60
	8·47	10·24

The amount of cinchonidine in one of these samples is certainly not in favour of its being the produce of a true *Ledgeriana* plant. Mr. CHRISTIE says, "The plant which Dr. TRIMEN figured was one "of those raised from McIVOR's seed by me, and "planted on Mahanilu by Mr. AGAR, and its descent "from LEDGER's original seed is undoubted. Other "plants exactly similar in blossom, raised from the "same pinch of seed, have given over 12, 13, and 14 "per cent. sulphate of quinine, and the very trees "which Mr. HOWARD called in to help him, the "Yarrow Ledgers, have the same blossom and came "out of the same nursery bed as the Ledger figured "by Dr. TRIMEN. Before the least doubt had been "thrown upon his figured type, Dr. TRIMEN selected "a tree here for specimens, as being botanically a "typical Ledger, and his selection was well borne "out when on the following day the analysis of that "very tree arrived from England, and showed 11·29 "per cent. quinine sulphate." The specimens sent by Dr. TRIMEN to the Museum of the Pharmaceutical Society are considered by some not to be typical *Ledgeraina*, but more probably hybrids of *officinalis* and *Calisaya*. Concerning the satiny gloss and hairy margin of the leaves, which Mr. HOWARD appears to have put forward as characteristic of the true *Ledgeriana*, Mr. T. N. CHRISTIE remarks, "The "veriest tyro in cinchona cultivation could have "told Mr. HOWARD that these characteristics are "common to all *Ledgerianas* and all the *Cali*-"*sayas* when young and that there is not a sign of either in the mature foliage." It is difficult to understand this remark, for Mr. HOWARD must certainly have cultivated seed of Calisaya and would scarcely have pointed out the satiny gloss and hairy margin of the leaves as characteristic of the *Ledgeriana* if it occurred in other Calisayas, and it certainly was not present in all the Bolivian Calisayas exhibited by Mr. HOWARD and Mr. T. CHRISTY at the meeting of the Linnean Society. Mr. CHRISTIE also points out that while Mr. HOWARD is said to claim "on Mr. MOENS' own authority" that his plants alone are authentic, he repudiates Mr. MOENS' identification of Dr. TRIMEN's plant.

Mr. T. N. CHRISTIE claims that he, "having lived "for years beside mature *Ledgerianas* which have "given the highest analyses we have yet heard of, may "presume to think that he knows a *Ledgeriana* when "he sees it, and that Dr. TRIMEN, who has seen the "Ceylon and Indian plantations and many mature "analysed *Ledgerianas*, knows *C. Ledgeriana*, and that "the latter has figured it; and that Mr. HOWARD, "with the knowledge of hot-house plants and dried "specimens, does not know and has not figured *C.* "*Ledgeriana*." In support of this claim he refers to Kew Gardens 'Report,' 1880, p. 12, where it is stated that some plants grown from seed were forwarded by Mr. HOWARD to Kew, and through Kew to Mr. J. A. CAMPBELL, of Lindula, Ceylon; and three others from the same authentic strain, to Jamaica. Concerning those received by Mr. CAMPBELL, that gentleman writes to Mr. CHRISTIE, "No one who "knows a *Ledgeriana* tree of pure type would think "of calling the trees I have (raised from cuttings "received from Mr. HOWARD) *Ledgerianas*. Two "of them are very shrubby in their growth and with "hard shiny leaves. The other is a Calisaya of the "broad-leaved variety very much like what I believe "is called in Java, *Calisaya Anglica*. I have also "another plant that Mr. HOWARD gave me, which "I understood him to say had been raised from "*Ledgeriana* seed, received from Java. This is the "best, so far as appearance goes, but I should not "call it a *Ledgeriana*."

It is not surprising that Mr. HOWARD should refer Dr. TRIMEN's *C. Ledgeriana* to *C. micrantha*, since in the 'Quinology of the East Indian Plantations,' p. 84, Mr. HOWARD remarks:—"By placing "my plate of the B-form of *Ledgeriana* beside that "of *C. micrantha* in 'Nueva Quinologia,' the reader "will be struck with a certain kind of analogy and "general resemblance." In a previous note on p. 5, he says:—"It is specially remarked by G. M. VAN "GORKOM that about three thousand plants raised "from seed from British India present quite a "peculiar character, which partly belongs to the "*Calisaya micrantha*," and adds, "I assisted at "the purchase of the bag of seeds (collected by "LECHLER*) for British India, to which no doubt "this refers, and having some growing freely side by "side with the *C. micrantha*, brought by PRITCHETT "from Huanuco, can quite confirm their resemblance. "The plants are, I think, those of the *C. micrantha* "(Bolivian variety) of WEDDELL." According to these remarks it would appear that Mr. HOWARD considered the plants raised from LEDGER's seed to strongly resemble *C. micrantha*, and his reference of Dr. TRIMEN's *Ledgeriana* to *C. micrantha* is therefore easily understood.

Mr. HOWARD's plates of *C. Ledgeriana* do not seem to belong to one distinct form, such as is recognized by Dr. TRIMEN and the Ceylon planters, since one variety has the flowers light-red, and another has scrobicules much more numerous than in the two others, and Dr. WEDDELL himself seems to have thought this, as indicated by his remarks ('East Indian Quinology,' p. 85):—"I think you

* Corrected to "LEDGER" on p. 84.

"are quite right in considering your two Java "plants as constituting a distinct variety of *C. Cali-* "*saya*, but whether one of the two forms you have "had pictured is worthy or not of being ranked as a "sub-variety of the other could hardly be affirmed "without comparing a considerable number of spe- "cimens."

Mr. HOWARD doubtless has a right to claim, not only on account of his special acquaintance with the subject, but also as a botanist, that a cinchona, not corresponding with his published description and plates, should not be called by the name he has adopted. In this case, if Dr. TRIMEN'S plant be distinct from what Mr. HOWARD has described, then the name of *C. Ledgeriana*, Moens, for the tree distinguished by the Ceylon planters as Ledger Cinchona is, to say the least, confusing, and the awkwardness would be best avoided by the adoption of a different name for Dr. TRIMEN'S plant. Mr. HOWARD seems to have recognized the likeness of his own *Ledgerianas* to *C. micrantha* when they first came into his hands, and now attributes the same likeness to Dr. TRIMEN'S plant. Moreover, it is understood that Mr. HOWARD, in selecting his types from a number of specimens, was partly guided by their large yield of quinine. The analysis of Dr. TRIMEN'S plant showed it to be equally rich in quinine, and the specimens now sent by Dr. TRIMEN show the same result. In any case, the question whether Dr. TRIMEN'S *Ledgeriana* and Mr. HOWARD'S *C. Calisaya*, var. *Ledgeriana*, are identical or not obviously requires further elucidation.

We must, however, admit that we do not understand the botanical part of the subject sufficiently to offer any opinion upon the point at issue or even to say with certainty what that point is. But at the same time the subject is of such importance, and has gained such an amount of public notice, that we think it desirable to place before our readers, so far as we can, a statement of what has been said upon it, without, however, accepting any responsibility for supporting either view.

In reply to a question by Sir Trevor Lawrence, the Prime Minister stated in the House of Commons on Monday night that it was undoubtedly the intention of the Government to proceed with the Medical Acts Amendment Bill, but as it was a measure that had come down from the House of Lords, precedence had been given to other Bills, hence the delay. The Second reading of the Bill was on the paper for Thursday, but at the time of going to press it had not been reached.

* * *

The Petroleum Bill was on the 3rd instant read a second time in the House of Lords and referred to a Select Committee, which met on Monday and again on Thursday. At a meeting of members of the Petroleum Association and others engaged in the petroleum trade, held on Wednesday, strong opposition to the provisions of the Bill was expressed.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

SOLID AND LIQUID ILLUMINATING AGENTS.*

BY LEOPOLD FIELD, F.C.S.

Lecture I.

You, who come from stations lighted by electricity, and through streets brilliant in gas light, may find good cause for wonder that so much can be found to be said upon out-of-date subjects like the lamp and the candle, which are the simple equivalents of the title of these lectures.

The system according to which I have concatenated the various bodies, used for lamps and candles, is based upon the theories held by the generality of modern chemists. Every member almost of these myriad—these Mormon—families, can be assigned to one or the other of the four groups—hydrocarbons, alcohols, ethers, and acids. Hydro carbons may be regarded as parents of the others, which in theory, borne out to a certain extent by experiment, are derived from them by more or less complicated processes. As their name implies, the hydrocarbons consist entirely of hydrogen and carbon. The relative proportions of these elements in the different series vary by equal increments. First on the list, as to us they are most important, come the paraffins. The white solid familiar to us under that denomination consists of a number of the higher homologues of this series, the composition of which is so nearly identical as to defy the most cunning attempts at isolation. At the present time twenty well defined paraffins have been individualized. They all conform to one typical formula C_nH_{2n+2}, and are all very inert, characterless compounds, to which qualities they owe their name (*parum*, little, *affinis*, akin). The first of the twenty has long been known—it is the joy of the lecturer, as methane; the wonder of the bucolic, as marsh gas; and terror of the miner, as fire damp. The formula of methane is CH_4. It is a colourless gas, becoming liquid only under extreme cold and pressure. Its sp. gr. is ·55. Here is a cylinder of it: observe the bright, smokeless flame, characteristic of the paraffins generally. In this short, stout tube, there are confined four volumes of oxygen with two of methane: applying a light, the brisk detonation suggests that methane, at least, has kindred feelings to oxygen. But the methane exists no longer; at the moment of union, water and carbon dioxide—the dreaded chokedamp—were formed—

$$CH_4 + O_4 = CO_2 + 2H_2O.$$

Marsh gas is the invariable concomitant of slow organic decomposition. The formation of coal was attended with evolution of this gas, large volumes of which are often stored in coal mines. The mud-volcano of Bulganak, in the Crimea, belches forth pure CH_4. The fire-worshippers of Baku, according to O'Donovan,† prostrate themselves before a stream of this gas. It is also seen dancing over marshes, ablaze, as Will-o'-the-Wisp. Methane and the three following members, ethane, C_2H_6, propane, C_3H_8, and butane, C_4H_6, are gases of density, increasing with their molecular weights. The fifth, pentane, C_5H_{12}, is a liquid at 38° C., and so till the sixteenth, hexdecane, $C_{16}H_{34}$, solid at 21° C. Ethane, C_2H_6, is noteworthy as the parent of alcohol, ether, and acetic acid.

The paraffins allow of substitution products with the haloids, that is, they give up two atoms of hydrogen in exchange for an equal number of atoms of chlorine, bromine, or iodine. This is important, as the *substitution* compounds thus formed are identical with the *additive*

* Cantor Lectures. Reprinted from the *Journal of the Society of Arts.*

† O'Donovan, 'Merv Oasis.'

compounds of the haloids with the olefins; which are the next series. These bodies have C_nH_{2n} for their typical formula. Like the paraffins, they are colourless, readily inflammable, forming carbon dioxide and water. They are, however, much more easily acted upon by acids, and combine directly with the haloids. Here we have olefiant gas or ethylene, the first of the class, burning with a flame much resembling that of methane. In this jar, inverted over water, I have two volumes of ethylene. Passing up from this bottle an equal proportion of chlorine, you will see the water, at first displaced, soon rise rapidly, while drops of an oily liquid collect in the apex of the funnel, whence they can be drawn off afterwards. This oily pungent liquid is ethylene dichloride, called of old, Dutch liquid. The name olefiant—oil making—is attributable to this property.

The reaction, as before mentioned, is additive, and symbolized thus:—

$$\underset{\text{ethylene}}{C_2H_4} + \underset{\text{chlorine}}{Cl_2} = \underset{\text{ethylene dichloride}}{C_2H_4Cl_2}$$

which is identical with the substitution product formed by the action of chlorine upon methane.

With the exception of cetene and cerotine, constituents of wax and spermaceti, the other olefines are of no interest to us. What renders ethylene of moment is the method of its formation from acetylene, the head of the third series of hydrocarbons, called acetylenes.

The typical formula of these is C_nH_{2n-2}. We will only take acetylene itself, C_2H_2. Owing to the preponderance of carbon, it burns with a smoky reddish flame. Though colourless, acetylene possesses a strong unpleasant smell, familiar to all who have allowed Bunsen burners to ignite below. In fact, as methane is always attendant upon slow decomposition of organic bodies, so acetylene is formed in every imperfect organic combustion. The feature of salient interest in its character is its production from the direct union of carbon and hydrogen. When a stream of the latter is passed over the carbon electrodes of a powerful battery, combination takes place, thus:—

$$C_2 + H_2 = \underset{\text{acetylene.}}{C_2H_2}$$

Now, if nascent hydrogen act upon cuprous acetylide, we obtain ethylene, which combination we may depict simply as:—

$$\underset{\text{acetylene}}{C_2H_2} + H_2 = \underset{\text{ethylene}}{C_2H_4}$$

Again, by the action of sulphuric acid upon ethylene, ethylic alcohol, or spirits of wine, is formed:—

$$1.\ \underset{\text{ethylene.}}{C_2H_4} + H_2SO_4 = SO_4HC_2H_5$$

$$2.\ SO_4HC_2H_5 + OH_2 = \underset{\text{sulphuric acid}}{H_2SO_4} + \underset{\text{ethylic alcohol}}{C_2H_5OH}$$

And as from ethylic alcohol most other organic compounds may be built up, we may be fairly said to have started *ab ovo*, and call acetylene the tap-root of organic compounds. I must not detain you now with the remaining hydrocarbons, the benzines, terpenes, etc., which are adduced as playing, or having played, some part in the drama of lighting. Nor will we linger long over the alcohols, ethers, and acids, except for just such space as will give us an insight into the meanings and propriety of application of the terms. The alcohols owe their name to ethylic alcohol, the alcohol *par excellence*, our national beverage, commonly called spirits of wine. The word alcohol itself comes from the Arabic, *al kohol*, antimony. This metal, very subtlely powdered, was applied as a pigment to the brows of oriental beauties. Soon any very fine powder was called alcohol. We find Boyle talking of reducing a body to a very "subtile powder or *alcohol*, as the chemists speak." Ultimately, the epithet passed to all "subtile" bodies, and so to spirit of wine. The modern chemist then gave the name to a great order of compounds, which stood respectively in the same relation to hydrocarbons as ethylic alcohol does to its parent ethane; from which it is formed by the substitution of OH, hydroxyl, for H.

$$\left.\begin{matrix} C_2H_5 \\ H \end{matrix}\right\} + O = \left.\begin{matrix} C_2H_5 \\ H \end{matrix}\right\} O$$

ethane, or ethylhydride=ethylic alcohol.

Ethylic and methylic (μέθυ, wine) alcohols have been used for illuminating ends, when tempered with some carbonaceous substance. Here is pure spirit, burning, as you see, non-luminous; and here some spirit in which camphor has been dissolved. This, you perceive has a bright flame. But the sole use of methylated spirit to the chemist now is for heating; the flame gives very great heat; as Boyle remarks—"In lamp furnaces wherein I have used spirits of wine for oil, the same flame has melted foliated gold." The alcohol of chief interest to us, though not itself a luminant, is glycerine, of which later on.

The ethers (αἴθω, I burn) may be regarded as formed from the alcohols, by the substitution of another radicle for H. In fact, the alcohols may be called the hydrates of the anhydride ethers, as in metallic compounds of the same nature. So we have ethylic ether, and ethylic alcohol, formed from ethane, which may, in its turn, be regarded as a hydride of the radical ethyl. The following arrangement gives a brief idea of the view which is taken of the formation of the whole chain, from the melecule of hydrogen to that of acetic acid:—

$$\underset{\text{hydrogen}}{\left.\begin{matrix} H \\ H \end{matrix}\right\}} \ : \ \underset{\substack{\text{ethylhydride} \\ \text{(ethane)}}}{\left.\begin{matrix} C_2H_5 \\ H \end{matrix}\right\}} \ : \ \underset{\substack{\text{ethylhydrate} \\ \text{(alcohol)}}}{\left.\begin{matrix} C_2H_5 \\ H \end{matrix}\right\} O} \ :$$

$$\underset{\substack{\text{ethyloxide} \\ \text{(ether)}}}{\left.\begin{matrix} C_2H_5 \\ C_2H_5 \end{matrix}\right\} O} \ : \ \underset{\substack{\text{aldehyde} \\ \text{(alcohol dehydrated)}}}{\left.\begin{matrix} C_2H_3 \\ H \end{matrix}\right\} O} \ : \ \underset{\text{acetic acid}}{\left.\begin{matrix} C_2H_3 \\ OH \end{matrix}\right\} O} \ :$$

Acetic acid is more properly regarded as being formed from methane, by substitution of—

CO.OH (carbhydroxyl) for H:

$$\underset{\substack{\text{methane} \\ \text{(methyl hydride)}}}{\left.\begin{matrix} CH_3 \\ H \end{matrix}\right\}} + CO.OH. = \underset{\text{acetic acid.}}{\left.\begin{matrix} CH_3 \\ CO.OH \end{matrix}\right\}}$$

Ether also is itself of no consequence here, but the compound ethers, as tallow and palm oil, will fully vindicate the brief attention we have paid the chief of their clan. The word acid originally meant a substance of a sour taste, which acted upon metals. Working upon the typical properties of the first definite acids, as sulphuric and hydrochloric, the name is now bestowed upon an indefinite number of bodies; their qualification being the possession of hydrogen atoms, which they can exchange for metals or radicles. Considering that every flower, berry, insect, animal, metal; in short every body, animate or dead, furnishes a peculiar and distinct acid, it is not surprising that the number is large. Of the substances with which we have to deal, cocoanut oil alone furnishes ten different acids, and beeswax three.

There is an immense deal more to be said about the permutations and combinations possible between organic compounds. Time, and the fear of wearying you, forbid my pursuing the subject further.

Probably the earliest known means of lighting was the *torch*, used largely of old in north countries, and still, no doubt, lighting the Lapp and the Finn. This torch has been sent me from North Germany. It is cut from the pitch pine, and sticky with exuded resin. I will light it; you see the red large flame, and the volumes of smoke. This will presently condense into small particles of soot, colloquially termed "blacks," which adhere to faces and clothes with surprising determination, and may give some idea of the eminent comfort experienced in a hall lighted, like the Walhalla, with pine-splinters—*kien-spähne*. We may presume that, in cooking, some of the fat might saturate a brand, which would burn long without consuming its fibre. Or, perhaps, that the readier and brighter combustion of certain woods was attributed correctly to the resin they contained. This is the crude idea of a link—even of a candle. Substituting a rope for a splinter, and saturating this with pitch or resin, we have the *link* that still, on foggy days, connects us with the past. For the word, and, most probably, the idea, comes from the Greek, λύχνος, or perhaps the Latin *luchnus* (Cic.), as the German "fackel," from the Greek φάκελος (*faggot*), a bundle of sticks—after, a torch. Our word torch, though, is evidently the Latin "*tortitium*"—a twisted thing, which would now be applied more properly to the link; while our pine torch finds its Roman equivalent in *tædæ*—slips of the *tæda*, or Italian pitch pine—the usual outdoor light of Rome. Funalia, with which Virgil tells us Dido's palace was lighted (evidently from "funis," a rope)—

> "—dependent lychni laquearibus aureis
> Incensi, et noctem flammis funalia vincunt,"*

were probably *flambeaux,* a finer kind of link. Here we have specimens both of link and flambeau, disinterred from Lambeth cellars, where they have lain, perhaps, half a century.

The link, giving an eager, smoky flame, was held by the running footmen or linkboys, who quenched their light in the large extinguishers still to be found on houses of aristocratic antiquity. The flambeau has a centre of oakum, surrounded with alternate layers of rosin and crude beeswax, finished off with a coating of the latter, bleached, which gives it a very expensive appearance. This description of torch was more costly, and gave a cleaner flame than its brothers; and so was principally employed in lighting halls, staircases, etc. At what period the torch was superseded, and whether by lamps or candles, is, and will remain, a moot point. The fact is, the Greeks and Romans, regarding lighting as of very minor importance, were shockingly loose in their nomenclature. Nor are we much better in English. In our translation of the Scriptures the words "candle" and "candlestick" are used indiscriminately with "lamp;" though it is quite certain that a *bonâ fide* candle was not known. For example, in Exodus xxv., 31, we have "a candlestick of pure gold," but, from the after text, we may be certain that the right word should be "lampstand." Again, in Matt. v., 15, the words "men do not light a candle and put it under a bushel, but on a candlestick," would seem to positively attest the use of both candle and stick at that period, did we not know that the Latin *candelabrum*, and Greek λυχνία, Latin, *luchnuchus* (Cic.), meant "lampstand." Furthermore, as in the parable of the virgins, where oil is a specified condition, the word λύχνος is rendered lamp (Matt. xxv., 1–5). The confusion of names seems strange to us now, with whom lamp and candle enjoy such distinct individuality; but in old times, no doubt, the terms were interchangeable. Etymology shows the words to be derived from roots signifying to shine or burn—as, candela, κανδήλα, akin to *candeo*, to shine (Persian *kandeel*), (Sans. *kan*)—λύχνος, lucerna, from *lux*, light, (Sans. *lôk*), λάμπας, *lampas*, probably connected with *lame*, and the Hebrew *lapad*, to shine.

We are, I think, safe in concluding the torch to have been superseded by the lamp, and it is interesting to perceive how this is evidenced in mythology. Ceres, in the old legend, sought her daughter in Hell with a torch; Apuleius makes Psyche drop hot oil on Cupid from a lamp. Whether candles, properly so-called, *i.e.*, wicks surrounded with coatings of wax or tallow, were known before or after the use of lamps had become general, I cannot say. We have a passage from Martial (first century, A.D.), in which the candle is mentioned as an old affair. Says he:—

> "Nomina *candelæ* nobis antiqua dederunt,
> Non nôrat parcos uncta lucerna patres."
> (Ep. xiv., 43.)

But here he may mean torch—*funalia*—which the old Romans would more probably call *candela*, from its shining qualities, than *funalia*, in allusion to its manufacture. In the Greek, the word κανδήλα is derived from the Latin, and is not met with till the time of Athenæus, who lived in the reigns of Aurelius and Commodus (about 150-220 A.C.) In his 'Deipnosophistæ' we find one telling a waiter to bring farthing dips:—

> ἐμοι δέ παῖ δωρόιδειπνε ἀσσαρίου κανδήλας πρίω.

By this, no doubt, a rushlight is intended to be understood, which article had at that time come pretty generally into use.

But the most valuable information on this point is obtained from a passage in Apuleius' Metam. iv., where, at a noise in the dead of night, the household runs in with "*tædis, lucerna, sebaceis, cereis, et ceteris,*" that is, with torches of pine, lamps, tallow candles, and wax tapers. This is a decisive proof that candles both of wax and tallow were used. They were, however, at no time considered as respectable as the lamp, for we find in another verse of Martial (Apoph. 42.)

> "Hic tibi nocturnos præstabit cereus ignes
> Subducta est puero namque lucerna tuo."*

An apology for giving his friend a wax light, as his footman has walked off with the lamp. At Herculaneum, a chandler's apparatus was found, and in the British Museum there is a fragment of a huge candle found in Vaison, near Orange, and supposed to have been made about the first century, A.C. (Juvenal, iii., 287, also talks of the "breve lumen candelæ.") The wick of such candles would probably be the pith of rushes—*scirpus*—rudely covered with crude wax or tallow, and rolled into shape. Candlesticks to hold these existed, but later on with a spike to penetrate the butt of the candle. The name *candelabrum,* however, was applied generally to the pillar on which the oil lamp was placed, or from which it was suspended. I have here both diagrams and specimens of lucernæ and candelabra. This one especially deserves notice, as being a genuine bronze candelabrum, said to have been found in Herculaneum. The lamp upon it is a fair representative of its class, scarcely ornamental enough, perhaps, to be worthy of such a support, but the combination of the two will give you an accurate idea of a Roman house-lamp. I have given it a wick of oakum (*stuppa*), and filled the body with crude Italian olive oil, thus imitating, as exactly as may be, the actual light. Not a very brilliant one you will say, and smoking exceedingly. So did all old lamps of necessity, no attempt being made at creating the current of air requisite for proper combustion. You may imagine the state of a room the morning after a symposium, when, perhaps, a dozen lamps had been burning for six hours, smoking fearfully, without the least appliance for the escape of the heavy carbonaceous fumes. Indeed, it was one slave's recognized duty to go round in the morning wiping the sooty pictures and statues. The only instance, to my recollection, of a flue existing, was at the Erectheum of the Athens Acropolis. The lamp was of pure gold, and so large as to require replenishing only once a year. Callimachus designed it for the new temple, about 400 B.C., and provided it with a chimney, in the guise of a bronze palm tree inverted. Otherwise, the smoke appears to have been regarded as an unavoidable evil. Certain it is that, however magnificent and elaborate the design,

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* This reminds us forcibly of Milton's description of Pandemonium—

> "From the arched roof,
> Pendent by subtle magic, many a row
> Of starry lamps and blazing cressets, fed
> With naphtha and asphaltum, yielded light
> As from a sky.

* Pliny, xxxiv., 3–6, speaks of "the extravagant prices of candelabra, which take their name from *so poor a thing*."

the economy of the light remained stationary. A wick, sometimes of oakum, sometimes of the dearer Carpasian flax (cotton?) passed through the nozzle into the body, filled generally with olive oil; though according to Pliny, bitumen was occasionally used. This is the less surprising, as Italy, in parts, is rich in springs of that mineral and petroleum. In the East, especially among the tribes dwelling in the vicinity of the Lacus Asphaltites, or Dead Sea, bitumen and naphtha were extensively consumed for lighting and other purposes. Perhaps *Nephi*, the sacred pit-fire, was of this nature; and, to speculate further, the emphasis laid upon the use of olive oil in the tabernacles of Israel may have been an implied condemnation of the mineral combustible, as peculiar to heathen ritual. Mr. Basil Cooper, the well-known Egyptologist, has kindly suggested to me a very fascinating etymology of the word *naphtha*—viz., NA, water; of PHTHA, the Hephæstos, or Vulcan of Egypt's deities, the god of fire. This is endorsed by the fact that the Indians, who sold the first petroleum as *Seneca oil*, and used it largely in their rites of worship, termed it *fire-water*, which name has descended to alcohol. About bitumen and its kindred we shall speak under the heading petroleum.

The introduction of lamps into Greece was gradual and slow. Probably by the end of the fifth century, B.C., they were in general use in the upper ranks of society. Herodotus, (ii., 62), writing of the *Lychnokaie* (feast of lamps) at Sais, in Egypt (450 B.C.), does not express surprise at the lamps themselves, but only at the great number thereof. Their lamp differed in no way from that of Rome; the wick (θρυαλλίς) made from the woolly leaves of an indigenous plant, passed through the nose (μυκτήρ) into the crude olive oil. Those who wish to become more intimately acquainted with the various styles of ornament in vogue among old nations, will find every conceivable shape and size in the Etruscan Vase gallery at the British Museum, to which I must beg to refer them for further illustration. Becker's 'Gallus' and 'Charicles' also are replete with information on this point. I could not pursue the subject further, without trenching on the ground of my future lectures, in which the main subject will always be prefaced by an outline history of that branch. You will be surprised to find both our latter day inventions foreshadowed in extreme antiquity, and the imperfections of the dark ages maintained to a recent date.

It is worthy of comment, in conclusion, how fire and light have ever been invested with celestial attributes, and reserved for divine worship. I need only instance the Caspian fire-worshippers, and the Persian monarchs, with their silver fire trays borne before them into battle. Great festivals of lamps have been common to all nations. The *Lychnokaie*, above mentioned as an Egyptian lamp-feast, has its parallel in the Chinese feast of lanterns. We send out annually many thousand scarlet candles, —*lobchocks*—for this festival, which happens on the fifteenth day of the first month. Then the Greeks had their λαμπαδη-δρομία, and the Romans their *Lupercalia*. In lieu of this feast, remarkable for its licentiousness, Pope Gelasius instituted Candlemas, falling on the 2nd February. Some have it, that Vigilius supplanted the *Proserpina* by this festival. Anyhow, though the significance be changed, candles play the chief *rôle* in both. According to Pliny ('Nat. Hist.'), the Romans themselves used wax candles in certain rites. I need scarcely hint at the eternal lamp of Vesta, tended by damsels of established reputation; the never-dying lights of Mahomet's tomb, Aaron's tabernacle, and Roman Catholic churches. The Romans lighted lamps in honour of Prometheus, who caught fire from heaven, of Minerva, who gave them oil, of Vulcan, who invented lamps; birthdays were sometimes called days of lamps, as the bulk of their gifts took that form, in cheap terra-cotta or costly metal; there was the *fax belli* or war torch, and *fax nuptialis*, the emblem of marriage.

"There let Hymen oft appear,
In saffron robe, with taper clear."
Milton ('Allegro').

On the tombs of the dead, lamps were placed by the sorrowing hands of their legatees, filled with scented oil. An oracular statue of Hermes, in Achaia, was "worked" by lighting a lamp before him, and placing a small coin at his feet.

Ingenious suggestions have been made about eternal lamps in tombs, which are positively averred to have been found burning after the lapse of centuries.

"Our wasted oil unprofitably burns,
Like hidden lamps in old sepulchral urns."
Cowper ('Conversation').

Indeed, Rosicrucius gives a description of his eternal lamp, with all the circumstance of discovery. "But this," says Disraeli, "is only dwelt on to make it appear that he did discover something." Boyle undertook a series of experiments with the air-pump, which demonstrated the absurdity of such statements. Reserving my private opinion as somewhat iconoclastic, I might suggest the possibility of an asbestos wick, communicating with a supply of light naphtha, burning indefinitely in a tomb not absolutely air-tight. Possibly, also, highly carbonaceous vapours in the sepulchre might have been kindled by the intruded torch.

After this hasty glimpse at our wretchedly illumined forefathers, you will be more than ever inclined to endorse Lamb's opinion, that "one can never hear mention of them without an accompanying feeling, as though a palpable obscure had dimmed the face of things, and that our ancestors wandered to and fro—groping."

SOCIETY OF CHEMICAL INDUSTRY.

Stassfurt Salts and their Mode of Treatment.

BY C. NAPIER HAKE.

(*Concluded from page 57.*)

The raw potash or carnallite salt has the following composition in 100 parts:—

		Per cent.
Chloride of potassium	carnallite	16·2
Chloride of magnesium	carnallite	24·3
Sulphate of magnesium—kieserite		9·7
Common salt		18·7
Chloride of calcium		0·2
Clay and anhydrite		2·1
Water		28·8

I propose first to describe the process by which the chloride of potassium is separated from this raw material, and shall then speak of the bye-products and waste products and their treatment. The manufacture of chloride of potassium is based on the decomposition of the carnallite, contained in the raw material, in a hot saturated solution, potassium chloride separating out on cooling and chloride of magnesium remaining in solution. The process, though simple in theory, is complicated in practice, owing to many difficulties, some of which I shall presently mention. The process of manufacture may be divided into four operations:—

1. Dissolving the raw salt.
2. Evaporating its cold mother liquor.
3. Dissolving the artificial carnallite resulting from the evaporation.
4. Refining the crystallized chloride of potassium.

The raw salt is delivered by the mines to the various factories in an unground state. The large blocks are broken up by a stone breaker, or by a mill of similar construction to a coffee mill, and the material is then lifted, by means of an elevator, into the dissolving pan, a cylindrical wrought-iron vessel, in which is contained a boiling saline solution, preferably of chloride of magnesium. The solution is kept boiling by high-pressure open steam, as the salt is delivered into it. The carnallite dissolves entirely, but the kieserite and common salt to a small extent only. The resulting hot solution which has a specific gravity of 1·32, is then run into deep pans, the sides of which are surrounded by some non-conducting substance. Milk of lime is sprinkled over the surface of the turbid liquor, which decomposes a small portion of the soluble magnesium salts, magnesia being formed, which, on subsiding, carries down with it the fine precipitate of sulphate of calcium. This fine precipitate is formed during the boiling of the solution from the double decomposition of the chloride of calcium contained in the tachydrite with sulphate of magnesium. This method of clarifying the liquor has, after many experiments, been found to be the best and also the cheapest.

The hot solution, thus clarified, is then run into shallow pans and allowed to cool for two or three days. Two-thirds of the potassium chloride contained in the solution crystallizes out and a part of the common salt with it. By this method the first product of crystallization, when refined, contains from 80 to 85 per cent. KCl.

By another method the solution is boiled to specific gravity of 1·34 instead of 1·32, chloride of magnesium liquor being used as a solvent. The solution is then run into the settling pan, and diluted down to a specific gravity of 1·32, in order to prevent the separation of chloride of potassium as carnallite, which would otherwise take place at the higher grade. Less common salt is dissolved in the first place, consequently the solution is much richer in potassium chloride. The first product of crystallization, after being refined, is an almost pure potassium chloride, and is not less in quantity than by the first method. This simple process was introduced by Dr. Dupré into the works of Messrs. Leisler and Townsend in the year 1862, and was successfully kept a secret for fifteen years. It is now universally in operation.

As regards the cold mother liquor, the composition of this in 100 parts is as follows:—

	Per cent.
Chloride of potassium	4·09
Chloride of sodium	1·74
Chloride of magnesium	20·49
Sulphate of magnesia	2·98
Water	70·70

In order to obtain the 4 per cent. of chloride of potassium still remaining in this mother liquor, the solution is concentrated by evaporation to a specific gravity of 1·34, when the chloride of potassium almost completely separates out, on cooling, in the form of double chloride of potassium and magnesium, or artificial carnallite, this double salt being insoluble in a concentrated solution of chloride of magnesium. The double salt is allowed to drain, and is then dissolved in boiling water to saturation, and on cooling, deposits a very pure chloride of potassium. The chloride of potassium resulting from the various operations described is further purified by steeping in cold water, and is then allowed to drain, when it is afterwards either calcined at a gentle heat in reverberatory furnaces or dried by steam in specially constructed pans. It is generally exported packed in jute bags containing 2 cwt. each.

The bye-products resulting from the process just described are kieserite and Epsom salts, crystallized and anhydrous sulphate of soda, a mixed salt which is sold as potash manure, chloride of magnesium, magnesia hydrate and bromine. The first four, viz., kieserite, Epsom salts, crystallized and anhydrous sulphate of soda, are obtained from the residue remaining in the pan after the potash salt has been dissolved out of the raw material. The product sold as potash manure is obtained from the sludge remaining in the settling pan. The last three, viz., chloride of magnesium, magnesia hydrate, and bromine, are obtained from the last mother liquor. With regard to the first four, the deposit, which represents 30 to 40 per cent. of the raw material used, has the following composition:—

	Per cent.
Sulphate of magnesia	26·8
Common salt	34·2
Chloride of magnesium	9·9
Chloride of potassium	2·1
Sulphate of calcium	8·5
Anhydrite	10·3
Water	8·2

The deposit, while still hot, is thrown out of the dissolving pan into a funnel-shaped iron box, at the bottom of which is a grating with bars about ¼ inch apart. A shower of cold water is allowed to play on the surface, by which the common salt is dissolved. The kieserite breaks up into very fine particles, and passes through the grating as a sludge in suspension, accompanied by small quantities of undissolved common salt and crystals of anhydrite. It next passes into a drum sieve, which revolves by the action of the flowing liquor. The finely-divided kieserite falls through the meshes into a pan below, the impurities passing over and along, and falling out at the other end. The kieserite is then allowed to subside, and is rapidly formed into blocks weighing from 50 lbs. to 70 lbs. each. Within a few hours these become very hard from the absorption of 1 molecule of water, in which condition it is exported, without the necessity of further packing. It contains—

	Per cent.
Sulphate of magnesium	60
Sulphate of calcium	5
Common salt	3
Anhydrite	10
Water	22

The kieserite serves as a raw material, in Stassfurt and elsewhere, for the manufacture of Epsom salts. The process consists simply in dissolving it and allowing the hot solution to crystallize.

This same deposit also serves as a raw material for the manufacture of sulphate of soda, which can, however, only be carried on during the winter months, when the thermometer is at 0°. The residue is thrown from the dissolving pan and collected outside the works in large heaps, where it remains exposed to the action of the air until the kieserite, from the absorption of water, is converted into a more soluble form. When the heap accumulated is in a sufficiently soluble condition, a shallow trench is dug round it and puddled out with clay, with an outlet leading to a large tank. A steam and water pipe is laid side by side from the works on to the heap, and hot water injected over the surface continuously. A concentrated warm solution of common salt and sulphate of magnesia runs out at the bottom of the heap, and collecting in the trench flows into the tank, where it is allowed to clarify. The clear liquor is pumped into shallow wood reservoirs standing in the open air. One cold night affords sufficient time for the complete separation of sulphate of soda from this solution.

As much as 10,000 tons of sulphate of soda have been produced in Stassfurt during one winter. The crystallized salt is either recrystallized or is converted into anhydrous sulphate, either by calcination or by Pechiney's process, which consists in adding to a concentrated hot solution 17 to 20 per cent. of common salt. About 85 per cent. of the sulphate of soda present in the solution separates out as the anhydrous salt. Pechiney's process is used by the Stassfurt Chemical Company only, other manufacturers preferring to dehydrate the crystals by calcination. The residue remaining in the settling pans yields a not unimportant bye-product. This residue, which is in a more or less fluid state, is run into large reservoirs, in which the solid matter is allowed to subside, and the supernatant liquor is siphoned off. The still thin sludgy mass is thrown on to a sloping platform of brickwork, where is it left until it is sufficiently drained to bear transport, when it is calcined. The hard, partially-fused mass is then ground to a fine powder, and is packed in bags, each containing 2 cwt., and exported as a potash manure. The composition of this mixture will be seen from the analysis given below:—

	Per cent.
Chloride of potassium	15·0
Chloride of magnesium	19·8
Chloride of sodium	13·1
Sulphate of magnesium	16·8
Insoluble	35·3

It is a curious fact in connection with the calcining of this sludge that though the heat is sufficient to melt the mass only 5 per cent. of the chloride of magnesium present is decomposed. This is no doubt due to the presence of other salts, especially sulphates. In spite of the low percentage of potash in this so-called "potash manure," and of the high percentage of chloride of magnesium and other salts, which can scarcely be called fertilizers, it has an enormous sale, principally in Russia and the colder northern parts of Europe.

The last mother liquor supplies three bye-products, namely, crystallized magnesium chloride, magnesium hydrate, and bromine. This liquor has a specific gravity of 1·32, and consists of—

	Per cent.
Chloride of magnesium	35
Chloride of potassium	1
Chloride of sodium	1
Sulphate of magnesium	3
Bromide of magnesium	0·2
Water	59·8

The crystallized chloride of magnesium is produced by evaporating the mother liquor to a specific gravity of 1·34. The potassium and sodium chlorides and the magnesia sulphate separate out, and the hot concentrated liquor is run into casks, where it solidifies to a white translucent mass on cooling, containing about 50 per cent. of chloride of magnesium. It is largely exported to this country, being used by cotton spinners as a thread lubricator. The cost of production of one ton of crystallized chloride of magnesium in Stassfurt, including casking, is about 16*s.*

The Consolidated Alkali Company manufacture large quantities of magnesia hydrate by the following process: The 3 per cent. of sulphates contained in the last mother liquor are first removed by a solution of calcium chloride. A quantity of milk of lime is then added, rather less than sufficient to decompose the whole of the chloride of magnesium. The precipitated magnesia is allowed to settle as far as practicable, and is then passed through filter presses, in which it is thoroughly washed by water. The magnesia thus prepared contains only 0·1 per cent. sulphate of lime, and is used by Continental sugar refiners as a clarifier.

A certain quantity of this mother liquor is utilized for the distillation of the bromine contained in it. This is carried out in large sandstone vessels saturated with tar, binoxide of manganese and sulphuric acid being used to liberate the bromine.

Many proposals have been made and numerous patents have been taken out for the further utilization of this mother liquor, but it still figures largely as a waste product. Of the 6,000,000 cubic feet yearly produced, corresponding to 150,000 tons of dry $MgCl_2$, one-half only is recovered, the remainder being run into the river, carrying with it 300,000 lbs. of bromine.

The coal used in this industry is a lignite, the heating value of which is about one-third that of English coal. Large deposits exist in the immediate neighbourhood. The absence of good and cheap coal is a serious drawback to the development of a new industry, and this is one of the greatest difficulties manufacturers have to contend with. Another difficulty is that the water in Stassfurt is saturated with sulphate of lime, the river water in the immediate neighbourhood of the works not being available for manufacturing purposes, owing to excessive pollution by salt liquors. Thus manufacturers are compelled to study the economical use of fuel in the construction of their plant.

The dissolving pan, which is usually 7 feet in diameter and 8 feet deep, is entirely closed and steam tight, except where an iron tube passes into it. This tube is 1 foot in diameter, and projects about 2 feet above the cover of the pan. The coarsely-ground raw material falling from the elevator passes through the tube into the dissolving pan, in which there is a quantity of boiling mother liquor sufficient to close the lower end of the iron tube. Only just sufficient steam is allowed to enter so as to keep the solution gently boiling. If the steam valve is opened too much the contents of the pan are forced through the iron tube. With a little experience and care this result is easily avoided, and the arrangement works well, and the solution is completed with the use of a minimum amount of steam. The pans used in Stassfurt for evaporating the mother liquors are variously constructed. In the works built by Messrs. Leisler and Townsend, which have now passed into the hands of the Stassfurt Chemical Company Limited, the whole of the mother liquor is concentrated in iron pans by high pressure steam contained in copper coils, the condensed water being used for feeding the steam boilers. Messrs. Wüstenhagen and Company, in Heklingen, have constructed an evaporating pan which, I believe, gives good results as regards economizing fuel. In another method of dealing with the mother liquors, the pans, which are 15 feet to 20 feet long and 4 feet wide and about 3½ feet deep, are arranged in sets of three, and to each set a condenser is attached—that is to say, an iron reservoir, in which is placed a copper worm. The furnace is built on the central pan, the fire gases passing through the two tubes of this pan, and, further, through the tubes of the smaller closed pans to the right and left of it. The cold mother liquor is pumped into the condenser, when it becomes heated by the steam evolved from the pans. From the condenser it is run into the closed pans, where it is concentrated to a point just below that at which the common salt contained in it would separate out. At this point of concentration it is run into the open central pan, where the evaporation is completed.

The drying of the chloride of potassium is carried out in most of the factories in calcining ovens. Some of the works, however, have adopted a mechanical drying apparatus. This consists of a circular cast-iron plate, enclosing a series of pipes cast in the form of a coil. The plate is surrounded by a sheet-iron border. A stirring arrangement, consisting of a shaft with double arms, to one of which is attached scrapers, to the other rollers, revolves slowly, and continually turns over the salt and grinds it to a very fine powder. The apparatus is heated either by waste or high pressure steam. When the salt is sufficiently dry, the position of the scrapers is altered, the salt is pushed out through a door in the side, and falls into bags held under it. One apparatus is capable of delivering 2½ to 3 tons of dried salt into bags in twenty-four hours, at a cost of 1*s.* per ton.

As to the cost of production of chloride of potassium (known commercially as muriate of potash), taking the price of the raw material at 10*s.* per ton, and containing 16 per cent. chloride of potassium (one-fifth of which is lost during the process of manufacture), then, for the production of 1 ton of 80 per cent. chloride of potassium 6¼ tons of raw material would be required—

	£	*s.*	*d.*
At a cost of	3	2	6
For wages	0	12	0
Fuel	0	15	0
Repairs, packing, etc.	1	0	0
Making a total of	5	9	6

In the year 1880 a committee was formed by the owners of all the mines, or their representatives, to regulate the price of the raw material, and also the quantity that should be worked, the object being to keep the demand for the manufactured product in advance of the supply, and thus benefit the manufacturers. The price and output of the raw material are settled every three months, and a certain fixed quantity apportioned to each factory according to its size.

Private enterprise, however, is threatening the stability of this arrangement, and it is doubtful whether it will remain in force much longer. An English company in Aschersleben, near Stassfurt, has successfully sunk a shaft into the potash deposits, and has erected large works for the production of chloride of potassium, etc. The new Stassfurt Mining Company, one of the mines included in this arrangement, is, in anticipation of a change, erecting plant sufficient to consume 600 tons of its own raw material daily. Under these circumstances the price of chloride of potassium can scarcely be maintained so successfully as heretofore. Manufacturers indeed are anxiously looking out for sources of profit which would make them independent of the production of chloride of potassium.

The mineral kainite, which has hitherto been almost exclusively used as a fertilizer, is now attracting more attention as raw material for the production of the double sulphate of potassium and magnesium, a salt identical in composition with the very rare mineral schönite.

Between the years 1878 and 1882 no less than twenty patents were obtained for the working of kainite, but of these twenty processes only three have been successfully repeated on a manufacturing scale. Artificial schönite is in great demand as a fertilizer, also for the manufacture of sulphate of potash and potash alum, and realizes a comparatively high price.

The first of these processes, patented by Messrs. Botscher and Bruniyes, is worked by the United Chemical Company. The second, patented by my esteemed friend Dr. Precht, is worked by the New Stassfurt Mining Company, with which he has been so long and honourably connected. The third, by Dr. Dupré, of Stassfurt, and myself, has been in successful operation during the last three years at the works of the Stassfurt Chemical Company. Time and the inexorable law of the survival of the fittest will ultimately determine which of these three processes is the best.

There are many other matters connected with Stassfurt to which I have only time to refer, such as the future development of the soda manufacture by the ammonia-soda process, and the further treatment in Stassfurt of some of the manufactured products which, if I enter into at all, must form the subject of a future paper.

As regards the influence of the Stassfurt industry on allied manufactures in this country, doubtless many saltpetre makers have suffered from German competition, owing to the development of Stassfurt; and it is very well known that the manufacture of carbonate of potash is now almost entirely in the hands of the Germans.

After the learned and eloquent paper by our chairman, Mr. Weldon, which we heard not long ago, there is nothing left to be said with reference to the influence of Stassfurt on the alkali trade, though perhaps there are still some who may differ from him in his sanguine expectations. However that may be, the interest which attaches to Stassfurt salts and their treatment may serve, I trust, as an apology for the length of this paper.

So far, then, I have completed my task, viz., the attempt to give you an account of the Stassfurt salts and their mode of treatment. I esteem it an honour to have been requested to do this by our Secretary, Mr. Tyrer, and I have endeavoured to accomplish it to the best of my ability.

Review.

A Manual of Chemical Analysis: as applied to the Examination of Medicinal Chemicals.* A Guide for the Determination of their Identity and Quality, and for the Detection of Impurities and Adulterations for the use of Pharmacists, Physicians, Druggists, Manufacturing Chemists, and Pharmaceutical and Medical Students. Third Edition. Thoroughly revised and greatly enlarged. By Frederick Hoffmann, A.M., Ph.D., and Frederick B. Power, Ph.D.

Following on the heels of the recent Pharmacopœias of the United States and the German Empire, the third edition of this American work on the analysis of medicinal chemicals appears in a revised and enlarged form. The volume opens with a description of the simplest operations employed in analytical work, illustrations being copiously interspersed throughout the text. From this chapter the uninitiated may hope to gather some useful hints, though we cannot refrain from expressing our conviction that it has no legitimate *locus standi* in a manual devoted to an account of the processes of chemical analysis rather than to an explanation of first principles.

Directions for the preparation of reagents follow, the list being unusually lengthy, while a form of apparatus for the generation of sulphuretted hydrogen, though not original, deserves a passing notice.

Instruction upon a systematic course of chemical analysis constitutes the succeeding chapter, in which special attention is directed to what is designated the *dry method.* The scheme for the examination of solutions includes tests for the detection of such rare metals as palladium, uranium and molybdenum. The negative radicals might, we opine, have had a little more thought bestowed upon their arrangement so as to render their study more systematic. Here again we venture to affirm that the directions relating to the preparation of test solutions, and the action of reagents upon the respective groups of metals, belong essentially to an educational treatise which necessarily deals with the fundamental truths of chemical science. Surely such fundamental facts have already been acquired by those for whose special benefit the work before us has been compiled. Thirty pages are devoted to a description of the apparatus and processes used in volumetric analysis, illustrations of the former being inserted. The methods of preparing the usual standard solutions are supplemented by equations expressing their reactions and the corresponding equivalents of the substances estimated by their use. It is to us a matter of surprise that new developments of this simple and rapid method of quantitative determination find no place here. No reference is made to the estimation of phosphoric acid by uranium salt or of the much approved and reliable process of determining cyanogen compounds by mercuric chloride. Saccharimetry by Fehling's solution is treated in a succinct manner. A special feature in this edition is the care which has been exercised on the article on the alkaloids. It comprises a description of their general characters, the systematic separation and recognition of the more important ones, and allied principles. It cannot fail to commend itself to all who may require from time to time to determine the identity or test the purity of an alkaloidal substance.

The second part of the volume contains matter of considerable importance, interesting in varying degrees to the pharmacist, the manufacturing chemist and the commercial analyst. In it the chief medicinal chemicals and their salts are treated of in alphabetical order. The name of each medicament is given in Latin and immediately beneath it appear its German, French and Spanish synonyms. In the case of chemicals having a definite

* London: J. and A. Churchill, 1883. Royal 8vo. Pp. i.-xiv., 1-624. 16*s*.

constitution their formulæ are noted and their molecular weights affixed. Their physical characters are given at length, and not only are the crystallographic structures of solids described, but, in many instances, a woodcut of the perfect crystal is figured. In hydrated salts the amount of water of crystallization is stated, and what is of less practical advantage, the solubility of the majority of substances in various media is supplied. In not a few cases the list of impurities will be held to be too comprehensive, if not, indeed, superfluous. For example, under hydrargyrum ammoniatum, in addition to the usual impurities of mercuric and mercurous chlorides, there are enumerated plumbic carbonate and chloride, calcium carbonate, zinc and magnesium oxide, fusible white precipitate and starch, which would imply fraud rather than probable impurity. In like manner, under quinine sulphate, we find mention of stearic acid and mannite and an examination of our strychnine is to extend to the search for "cinchona alkaloids" and "cinchonine." On the contrary, we find no reference to tellurium as an impurity in bismuth salts, nor are we warned to test our cream of tartar for traces of barium.

No less a space than that occupied by one hundred pages is devoted to a consideration of the acids. The tables of strengths corresponding to various specific gravities and directions for dilution when it is desired to obtain a weaker acid of certain strength constitute an addition which will be highly appreciated. The chief published methods of opium and cinchona analysis are inserted and the characters of the official alkaloids and their salts are explicitly described. The number of medicinal chemicals which have received recognition in this volume is large, embracing such substances as menthol, pilocarpine, curarine and resorcin. By the insertion of medicaments whose introduction into therapeutics is comparatively new we recognize on the part of the authors a laudable effort to keep pace with the requirements of medicine and pharmacy. We trust, however, we shall be acquitted of any desire to be hypercritical if we refer to the number of times certain illustrations occur. Why the simple operation of testing for nitrates, why a graduated jar, why a test tube containing a little zinc, should be figured numerically into teens, baffles our powers of imagination. During a careful perusal of the book, we confess to having experienced some feeling of weariness at beholding these oft recurring illustrations. Need we remark that we are strongly of opinion that, in many instances, these illustrations might have been omitted without any disparagement to the neatly printed volume.

We congratulate the authors on the appearance of the third edition of their work, published for the first time in this country. On the whole it is an admirable compilation and the information it undertakes to supply is both extensive and trustworthy. The selection of processes for determining the purity of the substances of which it treats is excellent and the description of them singularly explicit. Moreover it is exceptionally free from typographical errors. We have no hesitation in recommending it as a useful book of reference to those who are engaged either in the manufacture or the testing of medicinal chemicals.

An Apprentice (who should have sent his name and address).—See an article in the *Pharm. Journal*, [3], vol. xii., p. 997; or the chapter on the subject in Proctor's 'Practical Pharmacy.'

Junior.—Powder the gallic acid, then add the sulphuric acid and afterwards the water. No heat should be applied.

J. F. Giles.—(1) *Origanum vulgare*. (2) *Euonymus europæus*. (3) *Rhamnus Frangula*.

F. C. S.—Apply to the Registrar under the Dentists Act, 299, Oxford Street, W

S. G.—We have been unable to find the receipt you refer to.

Correspondence.

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

Battley's Liquor Cinchonæ.

Sir,—The appended extract from my note-book of observations made more than a year ago, without any idea of publication, may assist Mr. Mee if he should feel disposed to accept the suggestion that has been made to him to pursue his investigations into the merits of Battley's liquor cinchonæ further than his recent letter discloses.

I may say that at the period referred to I examined most of the cinchona preparations of the liquid extract type, and found that Battley's contained by far the largest percentage of alkaloid; but it may fairly be doubted whether something like 3 per cent. is a satisfactory percentage of alkaloid in a preparation professing to represent eight times its relative weight of finest cinchona bark. There are, however, other important conditions demanded from a good liquid extract which are too obvious to need enumeration, and it would seem from my notes that the process of "pegging away by steeping and boiling (?)" has produced changes in Mr. Battley's product which it is a well-understood object of pharmaceutical manipulation to avoid.

"*Note to Examination of Battley's Liquor Cinchonæ by "Prollius' Method.*

" . . . The decanted liquor (ether, ammonia and spirit) was allowed to evaporate spontaneously in a porcelain dish, leaving impure mixed alkaloid as residue. The residue was so largely contaminated with black resinous-looking matter that it was out of the question to estimate it as 'impure alkaloid.' It was therefore redissolved in weak hydrochloric acid, filtered and transferred to separating bottle and shaken with chloroform and caustic soda in excess, and left till the morrow to clear. The chloroform solution was dark in colour and not perfectly clear; it was drawn off and the chloroform distilled; the residue was black and obviously unfit to be weighed as alkaloid. It was, however, weighed, and gave as result 2·638 per cent. (or in reference to volume of liquor operated upon 2·923 per cent.) of total impure alkaloid. The last-mentioned residue (impure alkaloid) was treated with solution of oxalic acid which dissolved out alkaloids, but left a black residue soluble in hydrochloric acid. The black residue was very unlike any extractive which might be expected from cinchona."

N.B.—The actual percentage of alkaloid was estimated by Carle's process, the above being of course unreliable.

Richard W. Giles.

J. J. B. Woods.—(1) *Artemisia vulgaris*. (2) Probably *Atriplex angustifolia*: fruiting specimens only should be sent, with the stem and radical leaves attached. (3) *Eupatorium cannabinum*. (4) *Polygonum aviculare*.

"*Cymro*."—(1) *Ononis arvensis*. (2) *Chlora perfoliata*. (3) *Origanum vulgare*. (4) *Crepis paludosa*. (5) *Hypericum montanum*. (6) *Verbena officinalis*. (8) *Knautia arvensis*. (9) *Epilobium hirsutum*. (10) *Epilobium montanum*. (11) *Melampyrum sylvaticum*. (12) *Helianthemum vulgare*. Please not to send more than six specimens at one time in future.

Herbalist.—(1) *Trifolium arvense*. (2) *Equisetum arvense*. (3) *Ononis arvensis*. (4) *Clematis Vitalba*. (5) Too imperfect; probably *Athyrium Filix-fœmina*. (6) *Lastræa Filix-mas*.

J. Hicking.—The leaf is insufficient for identification but it probably comes from a *Chamærops*.

F. W. Bates.—"Zittmann's Decoction" is a compound decoction of sarsaparilla. It is prepared of two different strengths, the stronger containing calomel and cinnabar, which are left out in the weaker. The formulæ, which are too long for extraction, may be found in Gray's 'Supplement.'

R. A. Hoyle.—(1) *Sisymbrium officinale*. (2) Not found. (3, 4, 5) Named correctly. (6) *Parietaria officinalis*.

COMMERCIAL NITRITE OF SODA.

BY PETER MACEWAN.

The purity of nitrite of soda as found in trade at the present time has been discussed in this Journal.*

The method of preparing this salt most familiar to pharmacists is that of the British Pharmacopœia, 1864, namely, by fusion of a mixture of nitrate of soda and charcoal. The investigations of Howard, Miller and Warrington† showed that the product so obtained is a mixture of carbonate, hydrate, nitrate and nitrite of soda, the latter in varying quantity, never exceeding 42 and generally less than 25 per cent. To obtain a better article Mr. Howard suggested that the complex mixture should be dissolved and fractionally crystallized, the nitrite crystallizing after the carbonate and nitrate. This undoubtedly yields a purer nitrite, but it does not get rid of the principal objections to the charcoal process, namely, somewhat uncontrollable deflagration and formation of a large percentage of carbonate. By the employment of other deoxidizing agents, such as lead or copper (in a fine state of division), these objections are overcome, and a product obtained having a higher percentage of nitrite associated with nitrate and a small proportion of hydrate. This, by fractional crystallization, will yield a salt corresponding to Mr. Ekin's description, that is, containing "98 per cent. of real nitrite, the 2 per cent. of impurity consisting chiefly of moisture."

Previous to the communications of Dr. Hay and Mr. Ekin I had had opportunity of examining several commercial specimens of the salt, and since then have obtained a number from different parts of the country. The following table shows the results of the examination of twelve of these, which I take to represent fairly the commercial article:—

No.	Characters.	$NaNO_2$. Per cent.	Na_2CO_3. Per cent.
1	Large transparent crystals, very moist	0·011	35·5
2	"Old stock," small crystals, brownish	0·028	29·66
3	Large transparent crystals, very moist	0·945	32·6
4	Fused mass, white	9·6	27·34
5	White and granular, very moist	28·4	—
6	White and granular, dry . .	84·14	—
7	Small crystals, white, moist .	92·5	—
8	Small crystals, brownish, moist	93·65	—
9	Small crystals, white, moist .	95·1	—
10	Small crystals, brownish, moist	95·83	—
11	Small crystals, white, dry . .	97·21	—
12	Small crystals, white, dry . .	98·5	—

Nos. 1 to 3 are evidently the first crop of crystals from a solution of such a specimen as No. 4, which, itself, answers the description of the 1864 Pharmacopœia preparation. Nos. 5 and 6 contained undecomposed nitrate and the former much water. The others contained water in varying proportions and but mere traces of other impurity, the higher percentages of Nos. 11 and 12 being accounted for by the fact that they were examined as received from the makers, while the others had been in stock for a few months.

The percentages in this case were determined by decinormal permanganate of potash solution, which gives good results with care and some practice. A very good plan is to fill a burette with a solution of the salt under examination (1 gram in 100 c.c. distilled water is a convenient strength) and drop carefully into a flask containing 10 c.c. permanganate and an equal volume of sulphuric acid (1 in 4) until a pale pink colour is struck, which should not disappear within thirty seconds. The quantity of nitrite solution being noted, the titration is repeated twice, it being merely necessary to add 10 c.c. of permanganate to the contents of the flask each time. The mean of the three estimations is taken for calculation, 10 c.c. of the permanganate solution being equivalent to ·0345 gram $NaNO_2$. Old stock of this article should be looked over. The fused "nitrite of soda" of the 1864 Pharmacopœia (which I understand is not unfrequently sent out by wholesale houses) should certainly not be dispensed, and as the crystalline and granular varieties may be either good or bad, their strength should be ascertained and stock replaced if necessary.

* *Pharm. Journal*, [3], xiii., pp. 995, 1032 and 1052.

† *Pharm. Journal*, [2], vii., pp. 7, 95 and 204.

MATE OR PARAGUAY TEA.*

BY DR. THEODORE PECKOLT.

This plant, which belongs to the holly family (Ilicineæ), has several names in different parts of South America. In the Guarani language it is called *Caá*, which is the Indian word for leaf. The prepared leaves were named by the Spanish "yerba" (herb), and the infusion "mate"† from the native name for the vessel in which the tea is made, and the drug is now generally known as mate in Brazilian commerce, although the Spaniards call it "yerva mate" or "yerva de palos." The name "congonha" has been said by some writers to be applied to mate, but this is an error, for the Brazilians understand by the names "congonha mansa" and "congonha brava," other trees belonging to the same natural order, which are used as a substitute for mate when it is not easily procurable.

The plant was first briefly described by St. Hilaire, in 1822, when he gave to it the name *Ilex paraguariensis*, which he altered in 1826, to *Ilex Mate*, subsequently publishing the first name again in 1833 and this is now adopted in the 'Flora Brasiliensis.' In 1824 the plant was described in detail by Lambert, under the name of *I. paraguensis* and the plant illustrated from specimens obtained from the Jesuit Missions. The synonyms stand as follows:—

Ilex paraguariensis, St. Hil.; *I. Mate*, St. Hil., *I. paraguayensis*, Hooker, fil.; *I. paraguensis*, D. Don.; *I. paraguariensis*, *a*, *obtusifolia*, Mart.; *β*, *acutifolia*, Mart.; *Cassine Gongonha*, Raben.; *C. Gouguba*, Guibourt; *Chomelia amara*, Vell.

The mate plant attains the height of an apple tree, becoming even larger in favourable situations, but when cultivated and deprived from time to time of its leaves, it remains small and forms a mere bush. The leaves are shortly stalked, simple, wedge-shaped, obovate or elongate-lanceolate, toothed, dark green above, paler beneath, shining, of leathery consistence, 1 to 3 inches long, and ½ to 1½ inch broad. The flowers are axillary, situated on one to three times forked peduncles, white, and of similar size to those of the common holly. The calyx consists of four nearly orbicular sepals with a four-parted corolla and four short stamens, the ovary being crowned with a four-

* Abstracted from a paper in the *Zeits. d. allg. öster. Apot.-Verein.*

† The word is not accented, as sometimes written.—T. P.

lobed stigma. The fruit is red and of the size of a pepper-corn, containing four seeds enclosed in a slightly glutinous pulp, but often one seed only is developed. The home of the Paraguay tea plant is said by Martius to lie between 18° and 30° S. latitude, but the district in which the tree grows most luxuriantly is between 21° and 24° S. latitude in the watershed of the Paraguay river on the west, and in that of the Parana on the east, and it is here in a zone between the Serra Amambuhy on the south and the Serra Maracajú on the north that the best and most highly prized mate is prepared.

How long the South American Indians had been in the habit of using mate is not known, but when the Spaniards seized the provinces on the rivers Paraguay and Uruguay they found this custom prevailed there exactly as first mentioned in the writings of Azara, who stated that the tree grew wild in different parts of Paraguay. In proof of the high estimation in which it was held by the Indians it may be mentioned that the name " caa," which signifies in the Tupi language a tree or plant, was given by way of distinction to mate, that being the tree valued above all others. The use of mate does not appear, however, to have extended to extra-tropical districts, but to have been confined to the more intelligent tribes known now under the name of Guarani Indians. Nevertheless, when these people were driven further north by Europeans, they do not appear to have carried the use of the drug with them, probably thinking it not worth while to obtain it from a distance and from a hostile people when they found a substitute close at hand in the Guarana plant.

The extensive use of mate in South America at the present time is probably due in great measure to the Jesuits, who encouraged its use, finding that it restrained the desire of the Indians for spirituous drinks, while its cultivation, collection and preparation gave employment to converted Indians and brought wealth to the order. In the Jesuit Republic, the Indians were not paid in money but in produce; 4 lbs. of meat, a definite amount of Indian corn and 1 oz. of mate were allowed to each family.

After the expulsion of the Jesuits, the preparation of mate was continued in the Paraguay Republic under the administration of the Dictator Francia and his successors, until the Dictator Solano Lopes was killed in battle with the Brazilians in 1870. An overseer was appointed over the work who also was paid in kind, receiving for each aroba of the tea natural produce of the value of $\frac{1}{5}$ ounce of gold. Since 1870 there has been free trade in the article, which renders an increase of the trade very desirable. At the present time mate is used only by about 12,000,000 of people, and the consumption amounts to about 8,000,000 pounds.

It has been stated that mate is not prepared solely from *I. paraguariensis*, St. Hil., but that the leaves of other species are mixed with it.

In 1842, Sir W. J. Hooker published in the *London Journal of Botany* (vol. i., p. 30) an exhaustive account of yerba mate, together with the characteristics of the different varieties which he considered identical with *Ilex paraguariensis*. This paper strengthened the previous opinion of Miers that probably more than one species was used in the preparation of the tea. The investigations made by Miers and the monk Leandro, Director of the Botanical Gardens in Rio Janeiro, confirmed by Bonpland, indicate that six different species are used for the purpose :—1. *Ilex theezans*, Bonpl., growing in Paraguay, Entre Rios and Brazil; 2. *Ilex ovalifolia*, growing in the neighbourhood of Rio Pardo; 3 *Ilex amara*, Bonpl., on the mountains of Santa Cruz and in the forests of the Brazilian province of Parana; 4. *Ilex crepitans*, Bonpl., in the interior of Santa Cruz and the banks of the Parana river; 5. *Ilex gigantea*, Bonpl., on the banks of the Parana river. This is the " caa-una " of the Guaranis. 6. *Ilex Humboldtiana*, Bonpl., in the province of Rio Grande do Sul. This is the "caa-unina" of the Brazilians. The last four species, more especially *I. amara*, yield the "caa-chira" of the Guaranis and the "caa-una" of the Brazilians. Martius, however, in the 'Flora of Brazil,' states that in the central districts of Paraguay, where the *I. paraguariensis* is especially abundant, only the leaves of this species are used; in other districts the various species of *Ilex* are similarly employed.

It is certain, however, that *I. paraguariensis* is the only species in cultivation, but this is carried on to a very limited extent as the wild plant is still abundant. The Jesuits planted the tree because they found that under cultivation the leaves had a milder and more pleasant taste. For cultivation the seeds are carefully freed by washing from the glutinous matter in which they are imbedded, without which treatment they would not germinate, this office being probably performed in a natural state by birds, since the Indians believe that the seeds will not germinate unless they have been voided by birds. The young plants are taken out of the hotbed when about 6 inches high and planted out about 12 to 15 feet apart, in a damp, somewhat marshy ground, so as to allow of a small trench being made around the plants in which water can collect. They must also be grown under the trees which afford shade, as the young plants are easily killed by a strong sun. When they are about 3 to 6 feet high some of the shade plants are removed, and in four years the leaf harvest can be begun. The young trees should not, however, be entirely deprived of their leaves lest they should not be able to recover. In the seventh year they will yield 30 to 40 kilos of leaves. It is calculated that on 220 square metres of land one thousand six hundred trees can be grown, yielding on an average 35 kilos of leaves per tree, or about 25,454 kilos of leaves, valued at 190,000 marks per 100 square metres. The cultivated plant remains a small bush and never reaches the stature or size of the wild tree. The cultivation of mate has been carried out with much success in the province of Parana by Dr. E. Westphalen, and it promises to be successful in the Dutch colony of S. Leopoldo in the province of Rio Grande do Sul, where the plant grows luxuriantly.

The tree has been planted in the Cape of Good Hope and seems to succeed well there, as well as in Spain and Portugal. The quality of Paraguay tea depends upon the time of year in which it is collected, the leaves possessing most aroma when the fruit is nearly ripe. In the Argentine Republic and in the Brazilian province of Rio Grande do Sul the leaves are collected from February to the end of July. The new shoots are put forth in August, but at that time it would ruin the trees to gather the leaves. In the forest of the Brazilian province of Parana and Santa Catherina the harvest is collected from March to the end of September. In Paraguay it begins in December and continues till August. About a month beforehand the collectors set out in caravans with their wives and children into the forests where the mate trees are abundant, and make their encampment.

The first operation is to prepare a torrefier, which is made in the shape of an arbour. The twigs are cut off from the branches and slightly scorched by drawing them quickly across the fire. The twigs are then collected into bundles suspended over the torrefier, a small fire of dried wood being kept alight beneath. In about two days the drying is completed, the ashes are removed, and in the spot where the fire was an ox-hide is spread out, on which the leaves are beaten from the twigs with a wooden blade. The dried leaves are then powdered and packed in wooden cases made out of hollowed trunks of trees.

In the province of Parana the leaves have lately been dried in large wrought-iron pans, in the same manner as Chinese tea, or in specially constructed ovens in which they can be prepared so as to retain more aroma; they are then powdered by machinery and sifted: this kind of mate obtains a better price.

Another form in which the leaves are prepared is by carefully separating them from the stalks and twigs and roasting them, but this is not so much esteemed as the powder, except in Chili, where the leaves are preferred.

In the South American Republic and the Brazilian province of Rio Grande do Sul, mate is packed in serons of ox-hide holding 30 kilograms, and in half-serons, containing 15 kilograms; this packing gives to the mate a disagreeable flavour which detracts from its value.

In Parana it is packed in cane baskets; these are lined with dried grass, called Jacaes, and contain 50 to 60 kilograms. The mate in leaves is here sold at 280 to 290 reis (about 56 pence), powdered mate is sold in thick and better-woven cane baskets, containing in a half-seron, 15, and as a seron, 60 kilograms, the price being 10 to 12 per cent. more than the leaves.

In the Spanish Republic three different sorts are sold under the following names:

1st. Caá-cuy, or Caá-cuys: these are the new leaves of the scarcely developed shoots. They are of more delicate texture, and of a yellowish colour. They possess an agreeable and pleasant flavour, but are seldom met with in commerce.

2nd. Caá-mirim. This was the chief product in the time of the Jesuits, and consists of the leaves carefully separated from the twigs and stalks, the mid-rib of the leaf being also removed. This kind is chiefly esteemed in Peru, and principally exported there by the Brazilians. It is called Herva mansa.

3rd. Caá-guacu, or Caá-una, or Yerva de Palos, is the most inferior kind, consisting of the large and old leaves with the twigs and fragments of wood, and possessing a strong and bitter flavour.

In Rio Janeiro two sorts are known to commerce, mate in leaf and mate in powder. In order to test the quality of mate, the merchant takes a small quantity in his hand and blows upon it. If the greater portion is blown away he considers that it has been heated too much and thus deprived of its strength. If it is not easily blown away it is then considered of good quality.

Mate has been the subject of several analyses. In 1836, Trommsdorff analysed mate and found tannin, two resins, extractive matter, and a substance which he believed to be an alkaloid, but he possessed too little material for complete investigation.

In 1843 Stenhouse found in mate an alkaloid and proved that it was identical with caffeine.

In 1850, Dr. Rochleder investigated Paraguay tea and found the reactions of mate-tannic acid to be identical with those of coffee-tannic acid.

Lenoble, who, as well as Dr. Rochleder, supposed mate to be produced by *Psoralea glandulosa*, named the crystalline active principle he obtained from it, "psoralein."

He also found in it wax, albumen and volatile oil.

According to Dr. Byasson, mate contains as much caffein as the best Chinese tea. The variety which he experimented upon was caá-guacu. He found also a viscid substance resembling birdlime, soluble in ether; this he considered to be a fatty body of the nature of a compound ether whose alcohol was allied to cholesterine. His analysis was as follows:—

	Grams.
Caffeine	1·850
Substance resembling birdlime, fat substance and colouring matter	3·870
Complex glucoside	2·380
Resin	0·630
Mineral matter	3·920
Malic acid	Not estimated.

Robin has examined several different kinds of mate. The amount of caffein in young leaves dried without special care was 0·02 to 0·03 per cent.

Mate prepared by the Indians and containing twigs and fragments of fruit yielded 0·16 per cent., and mate from the Mission of the Province of Corrientes, 0·14 per cent. The peculiar tannic acid, which Dr. Byasson did not find, varies between 1 per cent. and 1·6 per cent. The ash of young leaves varies from 0·12 to 0·2.

Professor A. W. Hoffmann, of Berlin, found 0·3 per cent. of caffeine. The average of the published analyses indicates about $\frac{1}{2}$ per cent. of caffein, that of Indian tea being 2 per cent. The value of mate, as in the case of tea, depends not merely upon the caffeine but also upon the tannin and aromatic principles. He considered the tannin to be identical in every respect with that found in tea.

The aromatic principle has not been isolated, but by dry distillation a volatile oil is obtained, which belongs to the phenol group and is soluble in alcohol.

In 1877 the mate-tannic acid was examined by Dr. Pedro N. Arata, who found that the tannin of mate, while analogous to that of coffee, was not identical. The chief differences noticed by him are as follows:—Lime water gives with the coffee-tannic acid a small precipitate soluble in excess, but an abundant insoluble precipitate with the tannin of mate. This, however, does not hold good with all samples of mate, the precipitate being sometimes soluble in an excess of the tannin. Coffee-tannic acid gives by dry distillation pyrocatechin, while the tannin of mate yields in addition to pyrocatechin the isomeric body resorcin.

Coffee-tannic acid is soluble in 52·84 vol. of alcohol, while mate-tannic acid requires 73·66 vol.

Dr. Arata considers that coffee-tannic acid may be regarded as dioxyparacinnamylic acid, whilst mate-tannic acid must be classed in the group of oxyphenylpropionic acid.

Soubeiran and Delondre state that mate contains the same essential constituents as the coffee leaf, and in greater amount than the coffee seeds, which I can confirm after numerous experiments with large and small quantities.

In the years 1860 to 1865 I analysed mate and Congonha leaves. My analyses were made with fresh leaves of the *Ilex paraguariensis* from the Orgel Mountains in Neufreiburg, and roasted and unroasted leaves from the province of Parana.

In the air-dried leaves from the Orgel Mountains I found the following substances in 1000 grams.

	Grams.
Stearoptene	0·021
Volatile oil, extracted by ether	0·099
Fat and wax	19·800
Green colouring matter	10·900
Chlorophyll and soft resin	20·966
Brown acid resin	48·500
Caffein	6·398
Bitter extractive matter	2·033
Sugar	39·266
Extractive matter and organic acids	8·815
Mate-tannic acid, pure	27·472
Mate-viridic acid, crystallized	0·024
Albumen, organic acid, inorganic salts, dextrin, etc.	47·660
Moisture	166·660
Cellulose and lose	601·386

In 1000 grams of air-dried little twigs of the *Ilex paraguariensis* from Neufreiburg I found:—

	Grams.
Green soft resin and chlorophyll	9·400
Brown acid resin	19·700
Caffein	2·579
Mate-tannic acid and extractive matter	30·000
Extract, cellulose and water	938·321

In 1000 grams of air-dried leaves from Parana, from which the roasted mate is prepared, I found the following substances:—

	Grams.
Stearoptene	0·019
Volatile oil, obtained by ether	0·179
Fat and waxy substance	18·800
Green colouring matter	10·800
Chlorophyll and soft resin	51·200
Brown acid resin	84·500
Caffein	16·750

	Grams.
Aromatic substance	2·500
Mate-tannic acid, pure	44·975
Mate-viridic acid, crystallized	0·025
Extractive matter	65·130
Saccharine extractive matter, sugar	6·720
Albumen, salts, dextrin, etc.	36·102
Moisture	104·600
Cellular matter	557·700

In 100 grams of commercial mate from Parana I found:—

	Grams.
Volatile oil, obtained by ether	0·026
Caffein	5·550
Chlorophyll and soft resin	6·102
Brown acid resin	25·500
Mate-tannic acid pure	16·785
Pyromate-tannic acid	1·465
Mate-viridic acid, crystallized	0·024
Extractive matter	16·610
Caramel-like extractive matter	1·370
Salts, dextrin, etc.	18·189
Cellular matter and moisture	908·379

The ash of mate analysed by Dr. Busse and Herr Riemann was found to contain potassium, sodium, magnesium, oxide of manganese, calcium, aluminum, iron, phosphoric acid, sulphuric acid, carbonic acid, chlorine, silicic acid; but the analyses vary so much in different samples as to lose some of their value.

I found in leaves of mate gathered in Neufreiburg—

	Per cent.
Oxide of manganese	8·958
Sodium	10·062
Potassium	14·615

Whereas these were not found at all by the above-mentioned analysis in leaves obtained from Rio.

THE ACTION OF CERTAIN VEGETABLE ACIDS ON LEAD AND TIN.*

BY FRANCIS P. HALL.

The enormous and continually increasing use of canned goods—fruit, vegetables, meat, etc.—has led to the discussion, on sanitary grounds, of the possible injurious effect of the material of the can on its contents; and among other chemical questions is that of the effect of various vegetable acids upon the material of the cans, *i.e.*, upon the can itself and upon the solder which may be exposed on the inside. The fear also has arisen lest the tin-plate itself of which the cans are made should, for the sake of greater cheapness, be made not with pure tin, but with an alloy of lead and tin.

The following paper contains the results of experiments on the action of certain acids on tin and on alloys of tin and lead, and also the results of some investigations as to the quality of the tin plate and tin foil in actual use as envelopes for food products.

Action of Vegetable Acids on Alloys of Lead and Tin.

One of the most important things to be considered in investigating the power of an alloy to resist corrosion is the electrical relation of the metals which compose it. Lead and tin are so nearly alike in this respect that their relation to each other may be reversed in different liquids, or even in the same liquid under different circumstances. On this subject chemical literature contains many and quite discordant statements. It seems, however, to be fully established by the experiments of Weber that ordinary vinegar will dissolve lead from an alloy of lead and tin containing only 5 per cent. of lead, and further, that from a dilute acidulated solution of acetate of lead, lead is precipitated by an alloy containing as little as 5 per cent. of tin.

In the following investigation I wished to ascertain quantitatively the action of several of the more common vegetable acids, all quantitative experiments that I had seen being made with acetic acid only.

* *American Chemical Journal.*

To ascertain definitely the effect of alloying on the corrosion of the metals, the amount of lead or tin dissolved when pure must be compared with the amount dissolved, under the same conditions, from an alloy exposing the same surface of the metals in question. To make the experiment, as is usually done, with equal sized pieces of pure metal and alloy is not fair, if we consider the action to be proportional to the surface of metal exposed, because then the united surface of the two pieces of pure metal is twice that of the alloy and the surface of either metal exposed in the alloy is less than that exposed by the piece of pure metal.

To overcome this difficulty I proposed to proportion the size of the pure metal plates according to the composition of the alloy. In order to proportion them more easily and to have them of a size readily comparable with one another, I took into account the specific gravity of the metals in making the alloys. Hence, barring the unequal contraction of the metals on alloying, I had alloys exposing a known surface of lead and tin. I could now expose an equal surface of pure metal to the same acid under the same conditions and compare the action, thus getting a fair idea of the effect of alloying the metals, as well as the action of the acid on a known surface of pure lead or tin.

I made after this plan three alloys — one with equal parts of lead and tin, one with an excess of lead, and one with an excess of tin. These were all I had time to experiment with, but the researches of Weber show that, for acetic acid at least, the action on the alloys increases quite regularly as the proportion of lead increases; therefore the action on alloys containing lead and tin in different proportions than those I took can be inferred with fair accuracy by interpolation.

The alloys were made from pure lead and tin, well stirred when melted, then cast in thin sheets in iron moulds. Afterwards these sheets were rolled into thin strips and trimmed to the size desired. Strips of pure lead and tin were made at the same time. The tin used was Banca tin, containing 99·78 per cent. of tin, a trace of lead and a trace of copper.

For acids I used a solution of glacial acetic acid in distilled water, which, on titration with a standard solution of ammonia, proved to have a strength equal to 5·75 per cent. of acetic acid; also solutions of crystallized tartaric and citric acids, which neutralized the same amount of ammonia.

The tartaric and citric acids contained, as they always do, a trace of lead, but the amount was much too small to appreciably influence the results.

Strips of the alloys 1·2 inch wide and 12 inches long were cut out, exposing, therefore, counting both sides, 28·8 square inches or one fifth of a square foot. Pieces of pure lead and tin were taken of the same width, but varying in length to suit the composition of the alloy to which each corresponded. These strips of metal were rubbed until perfectly bright, washed with a little dilute alcohol, heated in a drying closet, and when cool weighed. Immediately after weighing they were put into separate beakers each containing 200 c.c. of acid. The long strips were coiled and kept off the bottom of the beaker by a ⟍⟋ of glass rod. In each case the liquid covered the metal by more than an inch, so that the air did not take part directly in the action. Each beaker was covered with a watch glass.

After standing for two weeks in a place where the temperature varied from 25° to 35° Centigrade, the contents of the several beakers were examined. The most notable change was that the acid containing the tin, as well as that containing the alloys, had a decided yellowish tint, while that containing the lead was perfectly clear and colourless. The metal in all cases was more or less tarnished, but the tin much more noticeably so than the lead. Two of the alloys in the acetic acid were sprinkled with little black crystals. These crystals were evidently metallic; they were carefully collected, washed with alcohol, dried and analysed. The result of the analysis is given later. The smallest of the pieces of lead in the tartaric acid was covered with small transparent crystals; these were set aside for further examination. The pieces of tin were covered with a dusty powder, but there was not enough of it to analyse.

When the contents of each beaker had been carefully examined, the strips of metal were lifted out, washed with a jet of water, dried with a soft towel, and, after remaining a while in a drying closet, weighed. The loss of weight served as a rough check on the subsequent analysis of the solutions. Next, the metal in solution was precipitated by sulphuretted hydrogen. The lead caused dense black precipitates, much finer in the tartaric and citric acid than in the acetic. The tin in the acetic acid came down of a dark brown colour, showing the stannous salt, while that in the tartaric acid gave, at first, merely a yellow coloration. After standing some time, however, a flocculent, apparently hydrated precipitate settled out. The same seemed to be the case with the citric acid solutions, but on closer examination an almost transparent precipitate could be seen, and it settled much quicker than in the case of the tartaric acid. These same peculiarities of the precipitates of sulphide of tin were noticed throughout the whole investigation. It was also invariably the case with the alloys that the precipitates in acetic acid were dark brown, while those in tartaric and citric acids were light coloured and flocculent.

After some experimenting I found the best way to separate the sulphides of lead and tin in the solutions was to carefully decant as much as possible of the liquid through a filter, neutralize what remained with ammonia water, add a little yellow ammonium sulphide, and heat; then collect the sulphide of lead on the filter used before. The tin was determined in the alkaline filtrate. The sulphide of lead was converted into the sulphate before weighing; the sulphide of tin into the oxide in the usual manner. In no case was either metal determined by difference.

The results obtained are given in the form of tables.

TABLE I.

Kind of acid.	Surface exposed, in sq. inches.		Percentage composition.		Loss of weight, in grams.	Found in solution, in grams.		Percentage of dissolved metals.		Total amount dissolved (in grams) from	
	Lead.	Tin.	Lead.	Tin.		Lead.	Tin.	Lead.	Tin.	Alloys.	Pure metals.
Acetic . .	7·2	—	100·0	—	0·4320	0·4216	—	—	—	—	—
,, . .	7·2	21·6	34·1	65·9	0·4525	0·0432	0·3312	11·54	88·46	0·3744	0·7122
,, . .	—	21·6	—	100·0	—	—	0·2906	—	—	—	—
,, . .	14·4	—	100·0	—	0·5470	0·5444	—	—	—	—	—
,, . .	14·4	14·4	60·8	39·2	0·5145	0·0558	0·3552	13·57	86·42	0·4110	0·8242
,, . .	—	14·4	—	100·0	0·2820	—	0·2798	—	—	—	—
,, . .	21·6	—	100·0	—	0·6195	0·6137	—	—	—	—	—
,, . .	21·6	7·2	80·84	19·16	0·6570	0·4887	0·1589	75·46	24·54	0·6476	0·8073
,, . .	—	7·2	—	100·0	0·2135	—	0·1936	—	—	—	—
Tartaric . .	7·2	—	100·0	—	—	0·0452	—	—	—	—	—
,, . .	7·2	21·6	34·1	65·9	0·0280	0·0029	0·0269	9·73	90·27	0·0298	0·0664
,, . .	—	21·6	—	100·0	0·0210	—	0·0212	—	—	—	—
,, . .	14·4	—	100·0	—	0·6605	0·0586	—	—	—	—	—
,, . .	14·4	14·4	60·8	39·2	0·0385	0·0042	0·0332	11·23	88·77	0·0374	0·0750
,, . .	—	14·4	—	100·0	0·0150	—	0·0164	—	—	—	—
,, . .	21·6	—	100·0	—	0·0655	0·0654	—	—	—	—	—
,, . .	21·6	7·2	80·84	19·16	0·0345	0·0080	0·0269	22·92	77·08	0·0349	0·0787
,, . .	—	7·2	—	100·0	0·0115	—	0·0113	—	—	—	—
Citric . .	7·2	—	100·0	—	0·3540	0·3521	—	—	—	—	—
,, . .	7·2	21·6	34·1	65·9	0·1690	0·0165	0·1461	10·15	89·85	0·1626	0·4785
,, . .	—	21·6	—	100·0	0·1175	—	0·1264	—	—	—	—
,, . .	14·4	—	100·0	—	0·4355	0·4348	—	—	—	—	—
,, . .	14·4	14·4	60·8	39·2	0·1725	0·0210	0·1355	13·42	86·58	0·1565	0·5439
,, . .	—	14·4	—	100·0	0·1080	—	0·1111	—	—	—	—
,, . .	21·6	—	100·0	—	0·4870	0·4875	—	—	—	—	—
,, . .	21·6	7·2	80·84	19·6	0·2305	0·0982	0·1221	44·58	55·42	0·2203	0·5946
,, . .	—	7·2	—	100·0	0·1030	—	0·1071	—	—	—	—

The first two columns of Table I. give the amount of surface of each metal exposed both as pure metal and in the alloy. The last two give the total weight of metal, lead and tin, dissolved from the alloy, and from an equal surface of the same metals exposed in the pure state. But although the surface exposed was the same, the unalloyed metals were exposed to twice as much acid, each being in a separate beaker with 200 c.c. of the acid. This might have been righted by proportioning the acid to the surface exposed, but this did not occur to me until too late. It will be noticed how often the amount dissolved when unalloyed is equal to twice that dissolved from the alloy.

The alloys Nos. 1 and 2 in the acetic acid were the ones on which the small black crystals before mentioned were found. The crystals on No. 1 weighed 0·0970 gram, and gave on analysis 0·0931 gram of lead, or 91·6 per cent. Those on No. 2 weighed 0·0620 gram, and gave 0·0586 gram of lead, or 94·45 per cent. They were evidently, therefore, crystals of lead. This amount of lead might have been considered as having been in solution, but it is not included in the amount given in the tables. Weber* noticed similar crystals in his experiments, and explained their presence by supposing that, at the surface of the liquid where the oxygen of the air and the acid both acted on the metal, so much lead was dissolved that it was precipitated again by the tin of the alloy below the surface. As, in my experiments, the metal was kept entirely covered by the acid, this could hardly have been the case.

The transparent crystals found on the smallest piece of lead in the tartaric acid were nearly, if not quite, insoluble in water. Under the microscope they appeared to be hexagonal, and very much like small quartz crystals. They were found, on comparison, to have the same form as crystals of tartrate of lead. From this and from a few qualitative tests I decided that they must be tartrate of lead. The crystals adhered so firmly to the lead that they could not be removed,—therefore, the loss of weight, as well as the lead in them, could not be determined.

The results of the experiment agree in all essential

* *Dingl. Polyt. Journ'* ccxxxii., 153, 264.

points with those statements which I have found that have been supported by actual experiment. Those statements which would have us suppose that alloying with tin increased the corrosion of lead seem to be founded on the case of some stray tank or pipe, rather than on a well-conducted research. Moreover, it does not appear, as is often supposed to be the case, that the alloy is more acted upon than either of the metals.

It was suggested that the galvanic action would influence more the rapidity of the corrosion than the total amount of metal dissolved; hence that the effect would be more clearly marked at the end of two days than at the end of two weeks, but experiment showed that this is not the case. For this experiment I used only one of the alloys, namely, that containing the most tin: the results are recorded in Table II. While the amount of

TABLE II.

Kind of acid.	Surface exposed, in sq. inches.		Percentage composition.		Loss of weight, in grams.	Found in solution, in grams.		Percentage of dissolved metals.		Total amount dissolved (in grams) from	
	Lead.	Tin.	Lead.	Tin.		Lead.	Tin.	Lead.	Tin.	Alloys.	Pure metals.
Acetic . .	7·2	—	100·0	—	0·0515	0·0497	—	—	—	—	—
„ . .	7·2	21·6	34·1	65·9	0·0460	0·0046	0·0387	10·62	89·38	0·0433	0·0896
„ . .	—	21·6	—	100·0	0·0400	—	0·0399	—	—	—	—
Tartaric . .	7·2	—	100·0	—	0·0400	0·0374	—	—	—	—	—
„ . .	7·2	21·6	34·1	65·9	0·0120	0·0012	0·0124	8·82	91·82	0·0136	0·0470
„ . .	—	21·6	—	100·0	0·0255	—	0·0096	—	—	—	—
Citric . . .	7·2	—	100·0	—	0·0625	0·0599	—	—	—	—	—
„ . .	7·2	21·6	34·1	65·9	0·0215	0·0015	0·0218	6·44	93·56	0·0233	0·0817
„ . .	—	21·6	—	100·0	0·0120	—	0·0218	—	—	—	—

action is not exactly proportional to the time of exposure, it is not far from being so in the case of acetic acid, and in the case of citric and tartaric acids it is evident that the action is very slight at first and increases appreciably as time goes on.

In these experiments, although the metal was covered with the acid and the beaker with a watch-glass, the air had more or less free access to the surface of the liquid. To see what effect the air had on the corrosion, and to approach more nearly the conditions of a sealed can, I took some glass stoppered bottles and repeated the experiment in them. I weighed the strips of metal as before and placed them in the bottles, then heated the bottles on steam cups, and while hot filled them with the acid, also heated to boiling to expel any air. The bottles were at once tightly stoppered. As they cooled a few of them leaked a little, but as it was nearly full of liquid very little air could enter. They were put in the same place as in the former experiments, and left for two weeks. On being examined at the end of this time there was evidently much less corrosion than in the case of the corresponding experiments in open beakers. There was no discoloration, and no crystals formed. That the air had been pretty well excluded could be seen from the way the stoppers stuck in the bottles even after they could be turned with ease. The same difference in the character of the precipitates of sulphide of tin was noticed as before.

The results are given in Table III.

TABLE III.

Kind of acid.	Surface exposed, in sq. inches.		Percentage composition.		Loss of weight, in grams.	Found in solution, in grams.		Percentage of dissolved metals.		Total amount dissolved (in grams) from	
	Lead.	Tin.	Lead.	Tin.		Lead.	Tin.	Lead.	Tin.	Alloys.	Pure metals.
Acetic . .	7·2	—	100·0	—	0·0900	0·0866	—	—	—	—	—
„ . .	7·2	21·6	34·1	65·9	0·0365	0·0052	0·0289	15·25	84·74	0·0341	0·1332
„ . .	—	21·6	—	100·0	0·0430	—	0·0446	—	—	—	—
Tartaric . .	7·2	—	100·0	—	0·0365	0·0343	—	—	—	—	—
„ . .	7·2	21·6	34·1	65·9	0·0085	0·0018	0·0084	17·65	82·35	0·0102	0·0400
„ . .	—	21·6	—	100·0	0·0080	—	0·0057	—	—	—	—
Citric . . .	7·2	—	100·0	—	0·0560	0·0510	—	—	—	—	—
„ . .	7·2	21·6	34·1	65·9	0·0250	0·0018	0·0249	6·74	93·25	0·0267	0·0644
„ . .	—	21·6	—	100·0	0·0120	—	0·0134	—	—	—	—

It will be noticed that the corrosion was considerably less. For convenience I give a table showing the comparative results obtained in open and closed vessels.

TABLE IV.

Dissolved from	By acetic acid.		By tartaric acid.		By citric acid.	
	Open.	Closed.	Open.	Closed.	Open.	Closed.
Lead .	0·4216	0·0886	0·0542	0·0343	0·3521	0·0510
Alloy.	0·3744	0·0341	0·0298	0·0102	0·1628	0·0267
Tin .	0·2906	0·0446	0·0212	0·0057	0·1264	0·0134

The acids used were of about the strength of good vinegar. It would naturally be supposed that less strong acids, such as usually occur in canned goods, would cause correspondingly less corrosion. This does not seem to be the case; an incomplete series of experiments seems to indicate that a dilute acid, if used in sufficient quantities, causes much more corrosion than would be inferred from its strength.

To try now the action on the cans themselves, and also the effect of the solder, I took three cans that had been emptied and put 200 c.c. of acid into each—acetic acid in one, tartaric acid in another, and citric acid in the third. I covered these cans as well as I could by tying two thicknesses of paper over each, but of course they were practically open cans; moreover the acid did not nearly fill them. They would represent, therefore, a can that had been partly emptied and sent away, rather than a fresh one. When examined at the end of two weeks, the tinning up as far as the acid reached was entirely taken off, except in the acetic acid. Th. citric acid had a yellowish colour, and a quantity of white powder was deposited on the bottom of the can. I emptied the acid from the cans and added a few drops of chlorhydric acid, fearing that the organic acid was not sufficient to hold up the sulphide of iron. The addition of chlorhydric acid and a little warming dissolved the white powder in the citric acid, and at the same time destroyed the yellow colour. On passing sulphuretted hydrogen through the solutions, a very large precipitate was obtained. This I filtered off, washed, and treated with ammonium sulphide; the residue was collected on a filter, dissolved in strong chlorhydric acid, and after evaporation the lead was precipitated as sulphate.

The tin was determined in the ammonium sulphide solution. The result was as follows:—

Acetic acid dissolved 0·4178 gram of tin and 0·0117 of lead.

Tartaric acid dissolved 1·0430 gram of tin and 0·0873 of lead.

Citric acid dissolved 0·6828 gram of tin and 0·1559 of lead.

In addition to the lead and tin there was a good deal of iron dissolved.

This shows that corrosion takes place very rapidly after a can is opened, and that a can once opened should be emptied at once. One would have supposed that the acetic acid would have acted more than the others, and it probably would if the conditions in the different cans had been exactly the same. It is probable that more solder was exposed in the cans treated with tartaric and citric acids; at any rate the lead must have come from the solder, as the tin from which the cans were made proved, on being tested, to be free from lead.

On the Quality of Commercial Tin Plate.

Having seen the action of some of the more common vegetable acids on lead and tin, and the alloys of the same, we come to the tin plate itself.

The tin plate used in America is entirely imported, most of it from England. The two principal kinds are "Bright plate" and "Terne plate." Bright plate is, or should be, tinned only with pure tin. It is divided into several grades, according to the thickness of the tinning and the quality and heaviness of the iron which forms the basis, but in all these grades the tinning is supposed to be pure tin. Terne plate, on the other hand, is known to contain large quantities of lead, and is often called lead plate, there being no attempt to pass it for tin, at least by respectable persons.

Tinware and fruit cans are made from bright plate, while terne plate is used altogether for roofing. Of course the boundaries are sometimes overstepped; those who are very particular use bright plate for roofing, and those who are too avaricious may make tin ware out of terne plate. This last, I think, however, is very seldom the case, and the heavy nature of terne plate unfits it for canning.

Knowing these divisions of tin plate, the questions before us now are: Is bright plate, especially that used in canning, always tinned with pure tin? and, How commonly is terne plate used where it will come in contact with food?

I procured some specimens of plate through the kindness of one of the largest importing houses in Boston. These I tested by several methods. With the bright plate, taking small pieces, I could find no lead at all, and only after taking half a square foot did I find a trace. This was no more than would be found in most English bar tin. I now tested a number of cans from various sources, as well as the worst-looking tinware from the so-called five cent stores, but not once did I find enough lead to show an intentional adulteration. Neither have I found any well instituted attack on the character of the tin plate in the United States. A good deal has been said and many suspicions thrown out, but the only statements of analyses that I have seen are in a Board of Health report of a Western State.* The author found lead so invariably in all tin articles that came into his hands that one cannot help suspecting that the methods of analysis were unreliable. He even observes that he found a considerable quantity of lead in what was sold for pure tin—a thing quite possible, it is true, but not likely to happen with dealers to whom a chemist would naturally go for pure supplies.

* 'Mich. Board of Health Report,' 1878, p. 29.

Even if the tin of the can is pure, there remains the solder, which always contains a large quantity of lead, and is used very freely. There remains, also, the fact that the vegetable acids act considerably upon tin itself. There are many published statements as to the presence of tin in canned goods, and the careful inspection of the inside of a can which has contained an acid fruit shows quite clearly in many cases that corrosion has taken place. Moreover, although my experiments tend to show that the amount dissolved when the air is excluded is much less than when open, still it is an appreciable quantity; and if, as seems to be the case, the amount increases with the time, that dissolved from an old can must be considerable.*

The terne plate, which is that most often used for roofing, cannot be considered quite harmless in cases where the water from the roof is used for household purposes. But as the tin roof as well as the whole house is generally covered with a paint containing far more lead than the terne plate itself, it would be absurd to complain while we use white lead to such an extent as at present.

I made a rough analysis of the tinning of terne plate by dissolving it off with chlorhydric acid, precipitating the lead and tin as sulphide and separating them with sulphide of ammonium. The result was as follows:—One-fifth of a square foot gave 1·1650 gram of lead and 0·4469 gram of tin, which would make the tinning consist of 72·27 per cent. of lead and 27·73 per cent. of tin. Terne plate can be readily told by its dulness; it comes also in larger sheets than bright plate.

Although constantly on the watch for tinware made of terne plate, I have been able to find none. I am informed on good authority, however, that it is sometimes used for that purpose, but conclude that such use must be rare in this section of the country.

On Commercial Tin Foil.

Tin foil is so much used now-a-days on chocolate, compressed yeast, cheese, and the like, that I thought the analysis of a few samples might not be amiss. Here at the outset we have a good proof of adulteration, from the fact that the price of most foil is but little more than half the price of pure bar tin.

I collected a number of samples from different importers and manufacturers. They varied greatly in thickness, colouring, and design, but I had reason to suppose that many were the same in composition. I took what I thought was a fair sample of them as regarded composition, and analysed them.

The method used was that usually used for solders, the oxidation with nitric acid. It was not thought necessary to correct for the trace of lead retained by the oxide of tin; neither were traces of copper or other metals sought for, which even if present would hardly influence the character of the foil, at least as far as sanitary purposes were concerned. The results of the analyses will be found in Table V. I give in the table the size of the piece of foil taken from analysis, its weight, and the weight of the lead and tin found in it, as well as the percentage composition. Only the first three foils were sold for pure tin. Some were sold as "composition foils," but generally, unless special inquiry was made, nothing was said of their composition.

* It is hardly to be supposed that the proportion indicated by the above experiments continues indefinitely.

TABLE V.

No.	Amount taken. Size in sq. in.	Weight in grms.	Amount found, in grms. Tin.	Lead.	Percentage. Tin.	Lead.
1	6	0·2285	0·2275	—	99·53	—
2	6	0·4260	0·4227	—	99·23	—
3	6	0·5950	0·5929	—	99·65	—
4	6	0·5150	0·1162	0·3945	22·56	76·60
5	6	0·9080	0·0902	0·8152	9·94	89·95
6	6	0·7140	0·1642	0·5464	23·00	76·41
7	6	2·0785	0·0839	1·9860	3·86	95·75
8	6	1·8580	0·1172	1·7360	6·31	93·43
9	6	0·3030	0·1125	0·1819	37·44	60·03
10	2·25	0·4720	0·1078	0·3678	22·84	77·94
11	3	0·8005	0·2004	0·5969	25·03	74·55
12	6	1·4940	—	1·2240	—	81·92

In order to see if I had had a fair sample of the foils in general use, and to see which of them were most used on articles of food, I took several foils that had been in actual use and analysed them. The results appear in Table VI. It will be seen that each corresponds very nearly to some one in Table V. Nos. 21, 23, and 28,

TABLE VI.

No.	Amount taken. Size in sq. in.	Weight in grms.	Amount found, in grms. Tin.	Lead.	Percentage. Tin.	Lead.
21	6	0·2650	0·2653	—	100·10	—
22	6	0·5145	0·5130	—	99·70	—
23	6	0·2560	0·2559	—	99·96	—
24	6	1·1175	0·1111	1·0040	9·94	89·87
25	—	1·1600	0·2570	0·8733	22·15	75·27
26	—	0·7915	0·1645	0·5793	20·77	73·19
27	6	0·4435	0·4419	—	99·63	—
28	2	0·4850	0·0938	0·3879	19·34	79·99

were on chocolate; Nos. 22 and 27 on different kinds of compressed yeast; Nos. 25 and 26 on "Neuchâtel" cheese; No. 24 on the outside of a box of troches. No. 23 was on a small cake of chocolate bought at a street stand, while No. 28 was an embossed foil and on a very fashionable cake of chocolate. No. 25 was very brittle and showed signs of being acted upon. The cheese was quite acid to litmus.*

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DIALYSIS CONDUCTED WITH EMPLOYMENT OF CHLOROFORM WATER, AND ON DIALYSED ALBUMEN.†

The process of dialysis has, during late years, been frequently employed in the study of albuminoids. The results were, however, often unsatisfactory, on account of the insufficiency of the conditions under which it was conducted. The failures may be attributed to the following three causes:—1. The liability of the substances to decompose; 2. the employment of parchment paper; and 3. the difficulty of examining the dialysed substances.

The first difficulty was attempted to be overcome by executing the dialysis at the lowest possible temperature, in the shortest possible time, and by frequent change of the external liquid and the parchment paper. But each experimenter was thereby made directly dependent upon temperature and time, and therefore was never in absolute control of the experiment. In regard to parchment paper, every one who has carried on the process of dialysis knows how difficult it is always to obtain a good and uniform article. London furnished the best paper for this purpose, which was much superior to the German. But even the English paper could not always be relied on, particularly if large surfaces were needed. If we also take into consideration the feeble resistance of the paper and the necessity of frequently renewing it and of working only with small quantities of liquids with avoidance of pressure, it is surprising that this medium has been so persistently retained.

The investigations of the author being such as to necessitate the avoidance of any decomposition in the substances operated on, and to guard against loss by softening or tearing of the paper, he discarded parchment paper altogether, and selected animal bladder or gut. These were first soaked in water, then deprived as much as possible of fatty particles, and finally treated with several successive portions of ether. The prepared bladders or gut were then preserved under ether, in which they keep perfectly for years. In this manner, any desired stock of purified membranes may always be at the disposition of the operator, and one and the same bladder may even be used for several experiments.

As dialysing menstruum (external to the membrane), the author uses chloroform water, obtained by shaking water with chloroform in excess, and subsequently allowing to settle; also pure ether.

[While the author has in view merely the operation of dialysis performed upon solutions containing albuminoids, and with special reference to the subsequent analysis of the dialysed substances, yet the *practical applicability* of the *improvements* described by the author *to many technical operations of dialysis* will at once suggest itself to the reader.—ED. N. R.].

The applicability and advantages of chloroform water as dialysing menstruum is based upon the remarkable antiseptic properties of chloroform even in minute quan-

* The use of a foil containing about 75 per cent. of lead for wrapping the so-called Neuchâtel and other soft cheeses is certainly reprehensible. Owing to the acid in, or developed in, the cheese the foil becomes crumbly, and even when the cheese is first covered with greased paper, particles of the oxidized foil are very likely to become attached to the cheese as it is used. Attention has been repeatedly called to this matter abroad, among others by Wittstein (*Dingler's Polyt. Journ.*, 208, p. 341), who found appreciable amounts of lead in cheese thus wrapped.

† "Die chemische Dialyse unter Anwendung von Chloroformwasser oder Aether, und ihre Bedeutung für die chemische Analyse eiweisshaltiger Substanzen aus dem Thier- und Planzenreich. Von Heinrich Struve."—*Journal f. prakt. Chem.*, 1883, 231. Reprinted from *New Remedies*, July.

tities. This property of chloroform is well known, but it does not seem to have been sufficiently known that the same property attaches to chloroform water.

In the year 1849, Dr. Augend drew attention to the antiseptic properties of chloroform, particularly when compared with ether (*Journ. de Chim. Méd.*). He cited the following experiments:—Three vials with well ground stoppers were selected; a few drops of ether were poured into the first, a few drops of chloroform into the second, and the third vial was left uncharged. A piece of meat was then placed in each vial, and the latter closed. After a few moments already, the following appearances were noticed:—The meat in the vial charged with chloroform had assumed a yellowish-red colour; no change was observed in the vial containing the ether. After one week, the meat in the uncharged vial exhibited no change; in the vial with ether, the meat had assumed a dark tint, and in that with chloroform the meat appeared as if it had been boiled. On opening the vials, it was found that the meat in the first two vials was putrid, and had a fetid odour; that in the chloroform atmosphere was found unaltered, except that it had an odour of chloroform and a disagreeable taste.

These results induced Th. Schmidt, the chemist of the Kaukasian Mineral Water Administration in Piütiporsk, in 1866, to make a new series of experiments with the modification that chloroform water was substituted for chloroform. The results were perfectly satisfactory, a number of animal and vegetable specimens having been preserved for months without alteration in this manner. The author reported on the subject in 1867 at the meeting of the Russian Balneological Society in Piütiporsk, and recommended the use of chloroform water as an excellent vehicle for preserving histological specimens.

The author of the present paper has followed Schmidt's suggestion, and has used chloroform water with uniform success. Its utility and peculiar effects become evident from the examples cited by the author.

In autumn, 1871, some ripe and quite fresh grapes (with the stems and a few leaves) were suspended in glass jars filled with chloroform water and closed with ground-glass stoppers. After a few moments, the action of the water upon the grapes became noticeable. Currents were noticed to proceed from the surface of the grapes, gradually descending towards the bottom, and rendering the water faintly yellow. After a few days the chloroform water in one of the jars was renewed; in the others, a few drops of chloroform were added, and the water stirred up. The action of the menstruum upon the grapes (and leaves) proceeded regularly; the tint of the light-coloured grapes and of the green leaves gradually became brownish, then brown, while the tint of the blue grapes remained unaltered. In some of the jars, the menstruum was regularly renewed every eight days; 200 c.c. of the old menstruum were evaporated and tested for sugar in order to obtain data for the estimation of the rate at which the process advanced. It was thus ascertained that all the sugar was extracted after the menstruum had been renewed about twelve times. From this period the menstruum was but rarely renewed, and in some cases has been left unchanged for four years without any signs of decomposition showing themselves.

The author further describes a series of experiments made for the purpose of studying the successive stages of development of the silk-worm. The several specimens were arrested in their growth by being immersed in chloroform water, and after the water had been once renewed, preserved in the liquid without change.

If the substance to be subject to dialysis is not already inclosed in a natural membrane, or otherwise forms a natural unit, it must be inclosed in a membrane (animal bladder or gut), which is to be tied with white silk and suspended in a glass vessel partly filled with chloroform water. Dialysis will then immediately begin, and the process may be followed in all its details without the risk of decomposition. It is only necessary that the vessel be *well closed*, and that the dialysing menstruum (the chloroform water) always retain the odour of chloroform.

If larger quantities of a substance are to be subjected to dialysis at one operation, it is to be feared that not enough chloroform water can penetrate through the membrane in time to prevent decomposition of the whole mass. In such cases it is well to add a definite volume of chloroform water to the substance itself before placing it in the dialyser.

With the above-described process it will be found that all water-soluble substances will diffuse more or less rapidly, while all substances insoluble in water will remain behind unaltered in chemical nature or form.

The author very properly remarks that in many or perhaps most cases the dialytic process is much more complicated than it would appear at first sight. The principal process, that which alone is open to our observation, takes place at the point of contact of the dialysing menstruum and the membrane. Inside of the latter, however, within the substance to be dialysed, other dialytic processes occur between the contents of any single cells and the surrounding liquid. In consequence thereof, the cells not only lose their water-soluble contents, but also absorb more or less of the dialysing menstruum which produces contractions, coagulations, and other physical changes of the remaining contents of the cells, many of which may be followed and studied with the aid of the microscope.

[The practical application of the author's process is well illustrated by his experiments on egg-albumen, which may be the means of placing at the disposal of photographers and others requiring very *pure albumen* the desired article.]

DIALYSED EGG-ALBUMEN.

It is well known that egg-albumen consists of large, tender, cell-like envelopes, containing a pale-yellowish albuminoid liquid of an alkaline reaction. In order to separate this liquid, the envelopes must be cut (with shears), the separated liquid diluted with water, strained and pressed through linen, and afterwards filtered. But the filtration of such a liquid is a very tedious operation, and never yields a pure product, which is also acknowledged by Hoppe-Seyler, who states that the cellular membrane of egg-albumen has not yet been properly isolated.

If perfectly fresh egg-albumen—such as is obtained immediately after the breaking of the egg-shell and separation from the yolk—be subjected to dialysis in a bladder, with chloroform-water as menstruum, the *albumen will be found to dialyse with remarkable rapidity* until the last traces have passed through the membrane. It is only necessary to renew the chloroform water from time to time, and to test for the end of the process by taking a small volume of the dialysate and evaporating. If this leaves only a trace of a residue, the aqueous solution of which scarcely reacts with tannin, and which leaves only faint traces of ash, the process may be regarded as terminated.

The different diffusates or dialysates are perfectly clear, and have an alkaline reaction. When heated, and even when boiled, *no coagulation* takes place; but traces of hydrosulphuric acid are given off which may be detected by acetate of lead, and may be more amply developed by acetic acid. If the clear solution, however, be treated with acetic acid *before being boiled*, albumen will separate, but without the escape of hydrosulphuric acid, even on boiling.

All these diffusates may be evaporated on the water-bath without any coagulation or opalescence; and if the concentrated liquid be finally completely dried in a rarefied atmosphere over sulphuric acid and chloride of calcium, the albumen is obtained in form of a glassy, faintly-yellowish mass, which is completely soluble in water.

The author has also experimented with *ether* as dialysing menstruum. In this case he observed that the solution and extraction of substances soluble in ether contained in the interior of the object suspended in the liquid (as grapes, cherries, small animals, etc.) was accompanied by an expulsion of all water, together with the substances soluble in the latter. [In fact, the author arrived at the same conclusions which were already in 1876 made the basis of a process for extracting the soluble substances from fresh drugs. The process was devised by Legrip under the name of "dietheralysis," and is described in *New Remedies*, 1876, 168 (from *Répert. de Pharm.*). Mr. Schmidt appears to have remained in ignorance of the existence of this article. As the latter portion of Mr. Schmidt's paper is less likely to be of practical interest to our readers, though very much so to physiological chemists, we content ourselves with referring for further details to the original.—Ed. N. R.]

FREE FATTY ACIDS IN VEGETABLE OILS.

According to E. Schmidt and H. Römer (*Archiv der Pharmacie*) free fatty acids occasionally occur in larger or smaller quantities as constituents of normal vegetable oils.

The oil contained in the seeds and seed-vessels of *Cocculus indicus* consists chiefly of free stearic acid and small quantities of other fatty acids rich in carbon. The menisperm of commerce is in fact nearly pure stearic acid. "Nutmeg butter" contains from 3 to 4 per cent. of free myristic acid, and a small quantity of another acid, perhaps identical with stearic. The oil obtained by extracting dried laurel berries with hot alcohol, distilling off the alcohol, and washing the residue with hot water, exhibits a perceptible amount of free fatty acids, which cannot be separated from one another, but probably consist partly of palmitic acid.

PREPARATION OF LACTIC ACID.*

BY H. KILIANI.

The author recommends the following process: 500 grms. of cane sugar are heated to 50° for three hours, with 250 c.c. of water and 10 c.c. of sulphuric acid, in a flask holding about 2 litres. To the colourless or at most faintly-yellow solution of invert sugar is added, after cooling, 400 c.c. of a caustic soda solution (containing 1 part NaOH in 1 part OH_2), in quantities of 50 c.c. at a time. This ley at first forms a slimy layer at the bottom, and a fresh portion is not added until a homogeneous mixture has been promoted by agitation. The flask is judiciously cooled by cold water during the addition of the soda ley. The mixture easily becomes coloured, and if the alkali be rashly added the development of heat is so great as almost to cause the fluid to boil. In this way the amount of the yield, indeed, is not particularly affected, but highly-coloured products are formed, and the zinc salt subsequently obtained is by no means pure. Lastly, the mixture is heated to 60° or 70°, until a sample, heated to boiling with Fehling's solution, causes no separation of cuprous oxide, and only a green tint. The calculated quantity of sulphuric acid (obtained by mixing 3 parts of sulphuric acid with 4 parts of water and standardizing by titration with the soda solution used) is allowed to flow into the cooled mixture. As soon as the acid fluid is at the ordinary temperature, a crystal of Glauber's salt is dropped in, and the flask is immersed in cold water until a thin crystalline crust has formed on the sides. This is loosened by violent shaking. The cooling and shaking are continued until further formation of crystals ceases. The mixture is now allowed to stand aside from twelve to twenty-four hours until the contents of the flask appear as a cake of crystals saturated with a reddish fluid. Alcohol of 90 per cent. strength is now added, the mixture being shaken meanwhile, until no further precipitation takes place. The separated Glauber's salt is thrown on to a suction filter, and completely washed with a little more alcohol. One half of the filtrate is neutralized with zinc carbonate, on the water-bath, filtered while boiling hot and mixed with the other half. On cooling, crystallization commences at once, as a rule, and is finished when the solution has stood for about thirty-six hours. The lactate of zinc so obtained can be easily freed from the mother liquor by decantation, and especially by hard pressure, so that it is pure after once recrystallizing. The weight of the crystals obtained amounts to 30 or 40 per cent. of the sugar used, and the concentrated mother liquor yields a further quantity of zinc salt. Should a small portion of the mother liquor of the second crystallization, on shaking with ether, yield to the latter free lactic acid, half of the solution is again boiled with excess of zinc carbonate, in order to obtain more crystals, on the addition of the other half of the filtrate.

* From *Ber. Deutsch. Chem. Ges.*, 1882, p. 699; *Dingl. Polyt. Journ.*, 246, 443. Reprinted from the *Journal of the Society of Chemical Industry.*

MICROSCOPICAL SEPARATION OF WHEAT AND RYE-MEAL.

In the Reports of the Botanical Society of Brandenburg, L. Wittmack makes the following statement with regard to the microscopical distinctions between wheat-meal and rye-meal. The amount of starch gives no certain character, nor is the size of the starch-grain in itself sufficient; the maximum size of those of rye is 42 to 52 μ (micromillimetres), of those of wheat 28 to 35 μ. Better characters are the following:—

	Wheat.	Rye.
Average thickness of skin in μ	43 to 50	31 to 40
Length of epidermal cells of skin	116 to 150	136 to 400
Breadth of epidermal cells of skin	20 to 28	26 to 62
Porous pitting	Very close	Less close
Length of subepidermal transverse cells	114 to 192	72 to 90
Breadth of subepidermal transverse cells	14 to 17	11 to 14
Thickness of walls of transverse cells	5·8 to 8·7	3·3 to 5·0
Pitting	Very dense and conspicuous	Less dense, inconspicuous
Average larger diameter of starch cells	56 to 72	40 to 64
Average shorter diameter of starch cells	32 to 40	24 to 40
Diameter of isodiametrical starch cells	40 to 48	32 to 36

The denseness of the pitting in the transverse cells of wheat gives them a chaplet-like appearance. The shell or pericarp is often difficult to meet with in the finer kinds of meal.

Good characters are also obtained from the hairs. Before grinding both ends are removed from the grain; the embryo end on account of the oil which it contains, the opposite apex on account of its hairs; but a few hairs are still to be found in the meal, which yield the following characteristics:—

	Wheat.	Rye.
Length of hairs in μ	120 to 742	50 to 420
Diameter of the largest hairs	15 to 21	9 to 17
Diameter at the bulbous base	28	23
Diameter of the smallest hairs	9 to 10	8
Diameter at the bulbous base	14	11 to 14
Thickness of the wall of the hair	7	3 to 4
Breadth of the cell cavity	1·4 to 2 (rarely 5)	7

Wheat has therefore thick-walled hairs with narrow cell cavity; rye thin-walled hairs with wide cell cavity.

The Pharmaceutical Journal.

SATURDAY, AUGUST 18, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

THE INTERNATIONAL PHARMACEUTICAL EXHIBITION IN VIENNA.

ONE of the many beneficial results flowing from the wonderful increase in the facilities for travelling which has marked the last half-century is that it has developed to a large extent the desire for an interchange of ideas between the different countries of the civilized world, and especially of those which from their bearing upon the welfare of every community may be looked upon as cosmopolitan. Science, in the broad sense of the word, has been peculiarly active in this respect, and the advance in knowledge resulting from the establishment of points of contact between many minds, as, for instance, in the numerous exhibitions that have followed more or less closely the great one held in Hyde Park, in 1851, has not been found inconsistent with that other kind of remuneration, which, although not usually considered to be of so high a standard, must always constitute an important factor in any social movement. Amongst other branches of knowledge that have profited by the establishment of such international relations is Pharmacy, and it has been a source of pleasure to us to have been enabled from time to time to contribute to some extent towards bringing about this end. Until quite recently that personal acquaintance which so vastly increases the interest of men in the sayings and doings of each other was almost exceptional as between the pharmacists of Great Britain and of other countries. But the last decade has seen an improvement in this respect, which not only made the International Pharmaceutical Congress held in London two years ago a possibility, but also ensured its success, and we venture to say that the influence of that meeting has already produced a beneficial effect on the interests of pharmacy in this country, and we believe it will continue to do so for a long time to come.

While numerous other branches of technical art and industry have received the advantages that are to be derived from international exhibitions, pharmaceutical exhibitions have hitherto been of a more local character. If, however, we consider the rapid progress that is being made in the sciences and industries connected with the arts of medicine and pharmacy, as well as the keener trade competition between different countries which has resulted from increased facilities of communication, it will be evident that there is ample scope for such opportunities of comparing the condition of the industries connected with those arts in various countries. By such means it is possible to appreciate more thoroughly the necessity for turning to practical account the increased knowledge which science places at the disposal of manufacturers if they desire to avoid being driven out of the market by competitors of other nationalities more alive to the advancement of their interests.

It will be our pleasing duty now to place before our readers some account of an International Pharmaceutical Exhibition lately opened in Vienna, the first of its kind, and we hope of a series of successors in other countries. The proposition to carry out an international exhibition in connection with pharmacy originated with Dr. A. HELLMANN, a pharmacist in Vienna. A motion had been brought forward at the General Meeting of the Austrian Pharmaceutical Society in 1881, by Herr NEDWED, of Gratz, and Herr HELL, the President, to hold an exhibition of the pharmaceutical products of Austria, when Dr. HELLMANN suggested, as an amendment, that the exhibition should be international. This proposal was eventually adopted and in pursuance of it an Executive Committee was appointed to enter into communication with the pharmaceutical societies of other countries; but, with few exceptions, it received little definite support at the outset. By the 1st of May last one hundred and eighty applications had been made for an aggregate space of one hundred and fifty-eight square metres, and upon this basis, which was subsequently much extended, it was decided to carry out the Exhibition. For the purpose of ensuring the scientific character of the Exhibition, and keeping in view its proper object, applications were addressed to a large number of scientific institutes, museums, libraries, etc., soliciting support in the contribution of objects for exhibition. In this direction the Committee has been successful in obtaining many interesting objects from the Austrian Imperial and Royal University, the Court Library, the Library of the College of Physicians, the Medical Faculty in Vienna, the Oriental Museum, the German National Museum in Nuremberg, the Medical Department of the Austrian Ministry of War, and various corporate bodies. It was decided, in accordance with the principles laid down at the outset, to exclude all secret preparations, and to limit the admission of specialties to a few which were of reasonable and scientific character. Having made such progress as warranted the expectation that the success of the undertaking was assured, the Executive Committee addressed to the Archduke CARL LUDWIG a request that he would become the patron of the Exhibition, which he readily assented to. Upon the application of the Committee, Delegates to the Exhibition Commission were also nominated by the Imperial Ministry of Education, the Vienna Chamber of Commerce, the Lower Austrian Industrial Association, and the Vienna Town Council. In order to facilitate the transport of articles for exhibition the Imperial Finance Ministry granted exemption from import duty on goods sent by foreign exhibitors, under the condition that they should be sent back again upon the close of the Exhibition, and the Austrian railway authorities undertook the return carriage of these goods free of charge. Lastly, a Sub-Committee, consisting of Professor Dr. Godeffroy, Dr. Heger, Dr. Hellmann, and Herr Klinger, was entrusted with the preparation of a Catalogue.

The Exhibition is held in the handsome "Floral Hall" of the Horticultural Society, situated in the Park Ring, and a first glance at it shows that it is a decided success as an exhibition, though it must be admitted that on further examination its international character is less marked than would be desirable. This, however, is but a first attempt in that direction, and serves at least to show the utility of such opportunities for comparing from time to time the progress made by different countries and to enable those interested in such an effort to judge as to the best way of carrying it out at some future time in a more extended form. The Executive Committee has also set an exceedingly good example, in spite of numerous difficulties and unforeseen hindrances, in securing the opening of the Exhibition in a thoroughly complete condition punctually upon the day originally fixed. The Catalogue, too, in its completeness and the promptness of its appearance, proves to be a decided exception to the general custom, which postpones the appearance of such books until after they cease to be capable of rendering useful service.

The opening of the Exhibition took place on Saturday, the 11th instant, and long before ten o'clock, the hour fixed for the ceremony, a large number of visitors had assembled in the Hall. The representative of the Archduke Carl Ludwig, Herr von Eybesfeld, the Minister of Education, was received by the President of the Exhibition Commission, Herr von Waldheim, who in suitable words explained the objects of the Exhibition and the considerations which had led to its being undertaken, as desirable not only in the interest of pharmacy but also of the general public. He said that, consistently with the objects of exhibitions held from time to time during the last ten years, it was intended to demonstrate not only to practical pharmacists, but also to the members of the medical profession with which pharmacy was so closely connected for the benefit and service of suffering humanity, the scientific efforts, the discoveries and improvements that have been made in the art of pharmacy, as well as the progress achieved in those branches of trade with which pharmacy has the most intimate relations. In highly complimentary terms he expressed the sense of the obligations the Vienna pharmacists were under to the various public bodies and private individuals who had rendered their assistance in the organization of the Exhibition which they had the honour of carrying out, and more especially to his Imperial Highness for having honoured them by becoming the patron of their efforts. In reply, Herr von Eybesfeld said that, looking upon medicine and its gifted sister and assistant, pharmacy, and those scientific arts which were of greatest service for the public health, he was glad to have such an opportunity of studying the achievements of pharmacy, and of taking a retrospective view of its past history, which presented so many points of interest. Centuries ago it was chiefly in the monasteries that this art was cultivated, and in still more remote periods the physician of the time considered it his business to read the stars and to envelope all his proceedings with mystery. Astrology and alchemy were the associates of pharmacy until the light of science dispelled the clouds of superstition and raised the rude magic of the middle ages to that height of scientific development that the art of preparing medicines had now attained, and of which that Exhibition promised to furnish evidence. As the Latin words upon pharmacists' vessels are understood everywhere and are an indication that pharmacy is an art common to all countries and nationalities in the service of humanity, so the Commission had risen above all differences of nationality and language in uniting to carry out a work of general utility by making that Exhibition international. From this point of view the promoters of the Exhibition might be assured of the sympathy and countenance of His Imperial Highness the Archduke, and in his name he declared the Exhibition opened. The Vice-Burgomaster, Dr. Prix, then expressed his sense of gratitude to the Committee for having organized the first International Exhibition in the city of Vienna, and his hearty wishes that the undertaking would be a success. The several members of the Commission were then presented to the Minister of Education, after which the official inspection of the Exhibition was proceeded with.

The Second reading of the Medical Acts Amendment Bill was on the paper for Thursday, but it had not been reached at the time of our going to press. Mr. Sclater Booth has given notice of the following addition to clause 63:—"For the purpose of compiling the said Pharmacopœia there shall be established a Pharmacopœia Committee consisting of six medical practitioners, to be nominated by the Medical Council, and five pharmaceutical chemists, four to be nominated by the Council of the Pharmaceutical Society of Great Britain (one of the four to be resident in Scotland) and one by the Council of the Pharmaceutical Society of Ireland." In view of the probability of the Bill being read a second time within the next few days, the Secretary has issued instructions to local secretaries and others to have the petitions respecting this Amendment presented to Parliament immediately.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

Detection and Estimation of Phenol.*

BY C. THOMPSON.

I. *The Detection of Phenol.*

There is not much difficulty in detecting the presence of phenol, or carbolic acid, as it is more generally termed. The principal methods in use for testing for phenol, are as follows:—

1. *The Solubility Test.*—This consists in seeing whether any of the sample is soluble, either in water or in an alkaline solution.

2. *Lex's Ammonia Test.*†—The liquid is mixed with a quarter volume of ammonia, a few drops of bleaching solution (1 to 20 water) added, then warmed, not heated to boiling; if phenol be present a blue coloration occurs; if the solution is very dilute, the colour will be green, becoming red on addition of sulphuric or hydrochloric acid.

This is said to detect 1 part in 3000.

3. *The Ferric Chloride Test.*—Put solution in a Nessler glass, add 2 or 3 drops of Fe_2Cl_6. A blue coloration is produced if phenol be present. The colour alters very rapidly. One part in 2000 can be detected by this method.

4. *Plugge's Reaction.*‡—This depends on the action of $HgNO_3$ on a solution containing phenol. When such a solution is added to a solution of $HgNO_3$, it slowly reduces the mercury, evolves a smell of salicylol, and at the same time the solution acquires a deep red colour. The author of this process declares it to be a most delicate one, being able to detect 1 part phenol in 60,000 or even in 200,000 parts of water.

5. *Pollaci's Test.*§—When a solution of phenol is oxidized by means of sulphuric acid and bichromate of potash, a brown coloration is produced, and if the solution be strong, a precipitate will be formed.

6. *Landolt's Bromine Reaction.*—This test, which is described later on, in connection with the estimation of phenol is the best and most certain means of detecting the presence of phenol.

II. *Estimation of Carbolic Acid.*

Until a comparatively recent date, phenol was estimated either by the "solubility" test or by the "ferric chloride," but since the introduction by Landolt, of bromine as a test for phenol, the two former have somewhat fallen into disuse, owing to the greater accuracy which can be obtained by the use of bromine.

First, as regards the "solubility" method. This may be worked either with water or an alkaline solution.

The sample to be examined is shaken up with sufficient water or alkaline solution to dissolve it, were it all phenol, and the amount of oil undissolved is measured.

With pure water there exists a difficulty, as the insoluble portion will partly rise to the top, partly sink to the bottom, and part again stick to the sides of the tube. This may be overcome by adding olive oil to the sample, which dissolves the impurities. Should not be added until after shaking up with water.

Making the test with a solution of fixed alkali presents fewer difficulties, but as some of the impurities not phenol dissolve in the alkali, the results are generally too high.

In either case the results are usually too high, as the crude phenol may hold a considerable quantity of water, which by this method is counted as phenol.

The ferric chloride test is a colorimetic one. To apply it, make a solution, say of 10 grams to the litre, filter it to clear it, and then comparing the colour obtained in 10 c.c. of this solution by the addition of two or three drops of ferric chloride, with the colour obtained in a solution of phenol of known strength in the same amount of reagent. The difficulty is that solutions of crude samples often afford a very different colour from that obtained with pure phenol; moreover the colour alters very rapidly as to give great difficulty in making a satisfactory estimation.

This method cannot be used with carbolates of lime or similar preparations.

In 1871, Landolt (*Deut. chem. Gcs. Ber.*, iv., 750–773), whilst testing for phenol in a well water, found that bromine water was a far more delicate test than any then known (1 in 43,700; Pollaci, 1 in 15,000). The addition of bromine water to a solution of phenol gives an immediate white precipitate of tribromphenol, according to the equation:—

$$C_6H_5-HO+Br_3=C_6H_2\begin{cases}Br_3\\HO.\end{cases}$$

Landolt used this for the estimation of phenol by filtering and drying and weighing the precipitate. This is open to one great objection, as pointed out by Koppeschaar, that since the tribromphenol melts at 91°, some of it is lost in drying at 100° C., so that it has to be dried over H_2SO_4, or else *in vacuo*, thus taking some time. Excess of Br must be added or else the precipitate redissolves in the solution of phenol.

Weight of phenol present $=\frac{28\cdot4}{100}$ of the weight of $C_6H_2Br_3HO$.

In 1876, Dr. Koppeschaar (*Zeitsch. Anal. Chem.*, 233—245) proposed a volumetric method for the estimation of phenol, based upon Landolt's reaction, which he says is uncertain. He gives two methods; in the first, he uses a standard solution of Br water, the strength of which is ascertained by the use of a solution of $Na_2S_2O_3$ of such strength that 1 c.c. = 1 c.c. of a solution of KI (5 grams to the litre). Br water should be such that 50 c.c. after the addition of 5 c.c. of the KI solution require from 18 to 20 c.c. $Na_2S_2O_3$.

Suppose a = number of c.c. used for this; 4 grams of the crude phenol are weighed up, dissolved in 1 litre of water; 25 c.c. of this are taken, put in a $\frac{1}{2}$ litre flask, filled with Br water up to the mark, well shaken, allowed to stand quarter of an hour, rinsed into a beaker containing 10 c.c. KI solution. Iodine set free, determined by $Na_2S_2O_3$ and starch solution.

Let b = number of c.c. used, then percentage of phenol $=0\cdot61753\ (9\cdot5\ a-b)$; process only fairly accurate, variation of 2 per cent. in results.

Bromine solution must be restandardized every day at least.

In second process he uses a solution of a mixture, 5 parts bromide, 1 part bromate of potassium or sodium, preferably latter. The strength of his solution was such that 50 c.c. mixed with 10 c.c. KI solution after decomposition with HCl (5 c.c. diluted with 100 c.c. H_2O) required from 86 to 95 c.c. $Na_2S_2O_3$ solution.

Let a = number of c.c.

To conduct this process 25 c.c. of solution of phenol to be examined, and 100 c.c. of the solution of the mixture of NaBr and $NaBrO_3$ are run into a 250 c.c. bottle, 5 c.c. HCl added, well shaken, stand quarter of an hour, rinsed into a beaker after addition of 10 c.c. KI solution, and treated with $Na_2S_2O_3$ and starch solution.

Let b = number of c.c. required. Then percentage of phenol $=0\cdot61753\ (2\ a-b)$.

Four results:—

99·2.
99·5.
99·3.
99·5.

* Read before School of Pharmacy Students' Association, June 28, 1883.
† *Ber. der deut. chem. Gesell.*, iii., 457.
‡ Plugge, *Fres. Zts. f. anal. Chem.*, xi., 173.
§ Pollaci, *Gaz. Chim. Ital.*, iv., 8.

Advantages over use of Br water, always having a standard solution at hand.

Since Koppeschaar's process several modifications have been published, only a few of which have any merit, *e.g.*, Dr. Waller's, Giacosa's, and Seubert's.

First, as regards Dr. Waller's* process. The originality here is in the addition of a solution of alum in dilute sulphuric acid to the solution.

The following is his process:—

Three solutions required.

1. A solution of pure phenol, 1 per cent.
2. A solution of Br, 30 c.c. = 10 c.c. phenol solution.
3. Solution of alum in dilute H_2SO_4 crystals of alum shaken up with dilute sulphuric acid (100 c.c. to 1 litre water).

Process.—Ten grams is dissolved in 1 litre of water, filtered through dry filter, and 10 c.c. taken; run into a 6 to 8 ounce stoppered bottle, 30 c.c. alum solution added, and in a similar bottle are placed 10 c.c. standard phenol solution with 30 c.c. alum solution.

Br water is now run in from a burette, the bottle being shaken after addition of a very few c.c. Towards the end precipitation is rather slow, but when the phenol is quite saturated a *very* slight excess of Br gives a decided yellow tint to solution. If precipitation does not readily separate the addition of some of the precipitate from standard phenol will cause it to quickly separate.

As the effect of Br on the homologues of phenol, such as creasol, phenol, etc., is most likely the same as on phenol; these, if present, will be reckoned as phenol.

Aniline, toluidine, if present, should be removed by treatment with alkali, etc.; these will not be found in ordinary commercial carbolic acid, but usually are in dead oils.

Giacosa's† process is very similar to Waller's, except that he does not use alum solution, and determines the point of saturation by means of a solution of KI in starch. He uses a 1 per cent. solution of phenol and a Br solution of same strength as Waller.

Instead of adding the Br water to the phenol solution the order is reversed, the Br solution being placed in a beaker and the phenol poured in, stirring quickly all the time. As long as any excess of Br is present, the supernatant liquid will be yellow and turbid, but on adding the phenol solution drop by drop the point of saturation will be indicated by the solution becoming clear and colourless.

Neither of these processes can be quite accurate, owing to the liability of loss of bromine, more especially in the Giacosa's method. Also there is the trouble of retitrating the Br solution every day.

Waller says that the variation is not more than 0·1 to 0·2 c.c. on 10 c.c. of standard phenol solution.

A method giving rather less trouble, inasmuch as it saves the bother of restandardizing, is to use a solution of the mixture recommended by Koppeschaar. This was proposed by Seubert (*Chem. Soc. Journ.*, 1882, p. 106). He uses a solution of KBr and $KBrO_3$, and phenol run in until a drop after filtration no longer gives any coloration to KI and starch paper. Necessary to filter because $C_6H_2Br_3HO$ has the power of liberating iodine.

After working on these processes it struck me that as good a way as any was to make a standard solution of NaBr and $NaBrO_3$ (using a 1 per cent. solution of pure phenol to standardize it with) of such a strength that 100 c.c. on addition of 5 c.c. HCl saturate 10 c.c. of a 1 per cent. solution of pure phenol. The plan I have adopted is to weigh up 1 gram of substance, and dissolve in 100 c.c. H_2O; then place in an 8-oz. stoppered bottle, 100 c.c. of the standard solution of NaBr and $NaBrO_3$, and 10 c.c. of the sample treated as above, add 5 c.c. HCl, stopper, and shake it vigorously; allow it to stand quarter of an hour, then titrate back with a solution of pure phenol, 1 c.c. of which = 1 milligram.

* *Chem. News*, xliii., p. 150.
† *Gaz. Chem. Ital.*, 1881, 541.

SOCIETY OF ARTS.

Solid and Liquid Illuminating Agents.*

BY LEOPOLD FIELD, F.C.S.

Lecture II.

Adhering to the plan of commencing *ab ovo*, we will apply ourselves in this lecture to the study of those substances which can be used for illumination in a crude manufactured form, or, rather, with unchanged chemical composition. Tallow, beeswax, and sperm wax are the chief of such naturals, and we will discuss them accordingly.

I have already referred to the distinction drawn by Apuleius between *cerei* and *sebacei;* also to the fact of wax candles having entered into certain rites of heathen worship. Partly from the smaller supply, chiefly though, no doubt, from the superiority of its appearance, hardness of grain, and sweeter odour, the wax candle has ever lorded it over the unsavoury tallow dip, associated with kitchen and garret, while the wax taper suggests cathedral and boudoir. In days before gas and Argand lamps, people's rank was not unfrequently gauged by the class of candle they affected. "Wax candles in the school-room!" says Mrs. Elton, in 'Emma.' Lord Bacon, in his 'Natural History,' extols wax lights as lasting longer than tallow candles, because "wax is more firm and hard." Tallow, however, can never be regarded as a good illuminant. Look at this clumsy apparatus of tray and snuffers, with the candle guttering in long winding sheets, every drop on the brass candlestick being marked by a green spot of "verdigris" (stearate of copper); and the long red point of the unconsumed wick protruding from the dull brown flame, exhaling nauseous odours, both from unburnt and burnt tallow. One would have imagined that such a candle would have fallen a victim to popular execration when Chevreul and Young provided their cheap and beautiful substitutes. But no, tallow candles are still burnt in tons—miners, cobblers, and other traditional craftsman adhere to the light of their fathers—and so we cannot avoid entering into the details of their manufacture. It may be, perhaps, that the recommending qualities of tallow to certain classes are, the readiness with which it adapts its form to circumstances, enabling it to be stuck into any crevice, without bending, as cheap paraffin will, and the large wick, keeping alight in draughty places, and giving a bulky flame, without much smoke.

Referring to old manuals of candle-craft, I find blendings of tallows recommended; certain proportions of beef and mutton fat. The best brand for the purpose is known as P.Y.C., which, I believe, means Petersburg Yellow Candle (tallow implied). This article has lost its prestige of late years by the enormous imports of Australian substitute, and now appears to serve rather as a basis of speculation than in any commercial capacity. However, the tallow should naturally be as hard as possible, without risk of cracking, which result can only be attained by experienced selection. The fat from various portions of the animal is rendered, *i.e.*, boiled well with salt (or acid) water till the fibrous portions have settled out, and the tallow swims white and sweet on the top. Of this, with no more ado, candles are made. A truly ancient form of tallow candle is the rushlight. As it is now, so it must have been thousands of years ago; it being impossible to figure a more primitive stage of existence than you see here. A rush, deftly stripped of its skin, of which a slender streak is left to act as a kind of backbone to the tender pith. A number being thus prepared, are allowed to become thoroughly dry, by hanging in an airy loft. They are then tied by the tops in little bundles of four or six, which are held in the hand, being kept apart by the intervention of the fingers. Thus disposed, they are discreetly immersed in the tallow, of a temperature just high enough to preclude solidification in

* Cantor Lectures: Delivered Monday, February 5th, 1883. Reprinted from the *Journal of the Society of Arts*.

bulk, yet to ensure a sufficient portion adhering to the cold rushes. After two or three dippings, the candle is complete. It remains now to let it harden and whiten, to which end it returns to the aforesaid loft, and in about a month of favourable weather is ready for sale. I had considerable difficulty in obtaining these specimens of rushlights, although my inquiries were made in the most out of the way country places. In Hampshire, I came across this instrument, which is really interesting, and which I am told is still used in the Isle of Wight farms. A small deal strip is stuck upright at angles to a broader piece of wood, which acts as a firm basis. The upright board is furnished at the top with a rude iron clamp, which holds the long rush, dipped once or twice into grease. The rush, as you see, is held at an angle of 30° to the basis, on which the end rests, the ash droping on the table. A more primitive candlestick and light cannot be conceived. But the rushlight itself I found, singularly enough, in the heart of London, where, imprisoned in a tall gauze shade, it still illumines, in perfect safety from fire, many a humble sick chamber. One very good quality of this light is the absence of snuff; the wick consuming as it reaches the air, leaving nothing but a slight feathery ash.

I cannot say when cotton wick was introduced. Oakum (*stuppa*) and papyrus (*scirpa*) were the ancient substitutes; but most probably, with us, the wicks were made of linen, gradually giving way to cotton, as that material became more familiar. All candles were "dipped," "rolled," or "poured," till the Sieur de Brez, in the 15th century, introduced the "mould" candles, which rapidly asserted a position of superiority. Of these we cannot speak till the last lecture, and with regard to dipping, not much remains to be told. The principle remains the same; but the pressure of increased consumption, concurring with superior mechanical skill, brought about several improvements in the method of working. The wicks were hung on hoops, and a row of three hoops on one arm of a revolving wooden star, so contrived that only three hoops at a time should pass over the kettle. Once in position, the craftsman depressed the arm with the three hoops pendant, which were withdrawn, on release, by the antagonistic weight of the opposite spoke. So with all the arms in rotation, and by the time the first came round again, the candles would be ready for another dip. The whole arrangement was suspended to one arm of a scale beam, which indicated when the candles had attained the legitimate thickness.

This was a great saving of labour, but still each individual wick had to be cut and fastened to the hoop. A good method of obviating this is shown in this retangular iron frame. To one corner I fasten the end of a wick on this reel. Adjusting the frame to a simple revolving appliance, I turn the handle rapidly, and you see the wick wound upon the frame. It is then secured tightly by a little clamp at either end, and a number of these frames adjusted to the revolving spokes already described. After one immersion, the wicks are rigid enough for independent action. Accordingly, a sharp knife is drawn along either row, at the base. Now, you see, the rudimentary candles swing loose, the lower part of the frame is removed, and the dipping proceeded with *en règle*.

Another form of tallow candle is the "flat candle," a kind of twin, or two candles joined side-ways, and flattened. This is much affected by cobblers, for no reason that I can see, except as alleged by a sutorial interlocutor of long experience, that it gives twice the light of an ordinary candle—in which, as it has two wicks, there is, perhaps, nothing remarkable.

The great fault of tallow candles, dips or moulds, is their tendency to gutter, and to exhale evil odours when blown out; also, the necessity for snuffing them. The first two vices are ineradicable, lying at the root of the composition of tallow itself. Being a mixture of hard stearin and soft elaidin, the latter melts first, and consequently overruns the hard cup formed by the former, producing the domestic phenomenon of "winding sheets." Again, each of the commixts is a compound of fatty acid, stearic and elaic, with glycerine. This conbination has to be split up, which operation, consuming heat, dims the light to begin with; and the malcombustible glycerine is vapourized as *acrolein*, a highly pungent compound. It remained for Chevreul to purge the candle from this abomination; Mr. Palmer, however, took the wick in hand, and, by a happy invention, rendered snuffing unnecessary. He introduced a fine thread (technically called "the doctor"), impregnated with impalpably powdered bismuth, into the body of the wick, which, further was not twisted after the ordinary fashion, but consisted of a number of parallel threads bound together by another one wound round them. The bismuth fuses into a little ball, the weight of which draws the wick laterally out of the flame into contract with the air, having performed which duty, the bead oxidizes, and volatilizes away. Here you have one of "Palmer's Metallic Wick Candles," burning side by side with an ordinary dip, and the difference in burning renders comment superfluous. Mr. Palmer has very kindly supplied me with a number of wicks and candles of different structure and for various purposes. In this large candle there are three convolute wicks. These were wound spirally round a rod, clamped at the top; the rod introduced into a mould, as here shown—the mould then filled with tallow, and allowed to cool, when the rod was withdrawn, leaving the wick round a tubulated passage up the centre. This kind of candle was much used in the candle lamp, of which I have here a very old specimen. You see the three wicks, untwisting as they burn, each with its bright little head. The flame is large, but owing to the reasons alleged before, not luminous in proportion.

Later on, I hope to give you some numerical values of the luminosity of candle flames, which will show you the great difference in the burning of stearin with, and stearic acid without, glycerine.

We have talked enough of tallow now, and shall discover nothing more to its advantage. By pressure, the softer elain may be, to a great extent, removed; look at this brilliant, blue-white substance, which you would hardly know to be tallow; and, again, at this mould candle made from it, burning without guttering, and with a metallic wick. Still the light is dim and the smell evil. In our fourth lecture you will see, though, how the coarsest tallow can be made, by the chemists' art, to rival paraffin in brilliancy of light, spermaceti in whiteness, and wax in cleanliness, sweetness and hardness.

Wax next demands our consideration. Here I must call your attention for a moment to the manner in which I divided the various substances that subscribe to the definition of fats. This is quite arbitrary on my part, but I am emboldened by the fact that every authority on the subject has followed his own ideas, and given his own definitions. Fats proper, I think, are such bodies as yield glycerine upon saponification. According to this definition, very few of the bodies we shall have to discuss can be called fats. But I have given the word a broader signification, and propose to extend the name to embrace all substances which possess both lubricity and inflammability, and leave a more or less permanent transparent stain upon paper. By taking, for the nonce, this view, we are enabled to include the paraffins, olefins, and waxes; also turpentine and camphor, with their isomeric essential oils. Oils themselves have long been divided into *fixed* and *volatile*, the latter being also termed *essential*. With these we have nothing to do; they are all isomeric either with turpentine, as lemon, bergamot, orange, and many other well-known essences; or with camphor, as rosemary, lavender, rue, and that class of perfumes. Turpentine and camphor may have to be mentioned in the lecture on lamps, but quite *en passant*.

The term *wax* used to be applied solely to beeswax, but of late years the introduction of paraffin, solid and liquid, has led to the name being employed to distinguished the first, paraffin proper, from the oil. So the white solid rejoiced in the designation, "paraffin wax," until the cognomen being dropped altogether, we find certain companies advertising their goods simply as "wax candles," a confusion of names which must be deprecated, as tending to mislead; perhaps, however, this is the end in view.

Wax may be defined as bodies of a certain viscid plasticity when warmed, consisting of fatty acids of the series $C_nH_{2n}O_2$, either free, or in combination with an alcohol radicle; they do not yield glycerine upon saponification, which is effected with difficulty, and the soap formed is sparingly soluble in water. Following these lines, we have the following genuine waxes of interest to us:—

		Origin.
Animal...	Beeswax	*Apis.*
	Spermaceti	*Physeter macrocephalus.*
	Pih-la	*Coccus sinensis*
Vegetable	Carnauba wax.	*Copernicia cerifera*
	Myrtle ,,	*Myrica cerifera*
	Palm ,,	*Ceroxylon andicola*
	Japan ,,	*Rhus succedanea.*

We will take these seriatim. *Beeswax* is the gift of the ordinary bee. It has long been an open question whether the wax was in the pollen of the flower, the bee acting as a mere vehicle, or whether the insect evolved the wax by some process best known to itself. When, on experiment, it was found bees who were fed entirely on sugar continued to produce wax, the question was considered settled; namely, that the wax was as genuine a bee product as the silk of the worm. But later investigations show that, after two or three days' sugar diet, the bees fail to supply any more wax, and ultimately die. Carefully considering all I have been able to find upon this subject, I am inclined to think that pollen is necessary for the formation of wax; in the first place, it nourishes the bee, containing nitrogen, which sugar does not; and, secondly, itself containing wax, probably gives the initiatory to the wax-producing organs. It is a fact, that a colony of bees, deprived of pollen, will take eighteen ounces of honey to produce an ounce of wax; whereas, with a proper supply of "bee bread," only fifteen ounces will be consumed in making the same quantity. The wax exudes from between the lower rings on the abdomen of the bee, and is worked up between the fore paws, for though of high melting point (145° F.), it becomes plastic at 90°, and can be readily moulded. The composition of beeswax has been fruitful subject of discussion among chemists, who have obtained results of startling discrepancy. This is, doubtless, due rather to the adulteration of the wax before analysis than variation in the substance itself; it being generally found that substances of animal origin are very uniform in composition. Mr. Otto Hehner has recently made a most exhaustive investigation of a great number of different waxes, and comes to the conclusion that the average composition is—

Cerolein.........	(?)
Myricin......	88
Cerotic acid	12
in	100 parts of wax.

These two constituents may be easily separated by boiling the wax with alcohol, when the cerotic acid dissolves, leaving the myricin, which is a true typical wax, being a palmitate of myricyl $\left.\begin{matrix}C_{16}H_{31}\\C_{30}H_{61}\end{matrix}\right\} O_2$: it is finely crystalline. Perhaps, if there be *cerolein*, it is that which, by its abundance or exactness, gives the characteristic qualities to all these different waxes. On this stand there are over forty varieties, from every country at all noted for that product, and yet an experienced eye and nose will pick you out and assign most of them to their native lands. Here we have bright yellow wax from Holstein and Denmark, the golden produce of Senegambia, the particoloured mixture from Australian hives, and the soft, dark ceral of Mogador. This gamboge-tinted specimen comes from Mexican woods; this is wasp-wax soft and dirty looking; this again, almost white, comes from Brazil. According to Mr. Hehner, whatever the physical properties and appearance of these multichroic specimens their composition varies but little. Even that little he inclines to attribute to man and the advance of civilization rather than to any fault on the part of the bee. Of old, if the sable bee-owner had not sufficient tale of wax, he artlessly introduced a stone or lump of iron, or a bone or two to make up the weight, or, at most, stirred in a quantity of coarse sand. But now every conceivable fat, cheap paraffin (imported for the purpose), palm oil dregs, etc., are employed as adulterants, not detected till the bleaching ground or candle, by defective performance, exposes the deception. There is no remedy. The agent who collects the tributary supplies from a hundred homesteads mixes all the lots, and the hundred agents' deliveries are again thrown together. What help is there? But, by careful sampling, a keen buyer manages to escape with about 75 per cent. of pure wax. This comes to the factory as you see it, and, in its present form, is useless. The first step is to "clear it down"—which is much the same as "rendering"—boiling with a little weak acid and water which separates all dross, and leaves the wax clean though dark in colour. The next operation is that of bleaching. This may be done in two ways; by air or chemical action. The latter can only be applied to wax that is not intended for candles; the grain becomes highly crystalline, and the burning power deteriorates. Why this is I cannot say as yet; we must look to Mr. Hehner's researches for the future explanation. To whiten the wax chemically it is treated with sulphuric acid and bichromate of potash, whereby ozone is liberated, and that discharges the colour. As the chromium salts impart a powerful green tint to the wax it has to be boiled considerably with further libations of acid water till, finally, it assumes this appearance. Observe how short and friable the grain here—you will see the crystalline structure upon closer inspection. If I were authorized to hazard an explanation it would be, that in the gentle performance of atmospheric bleaching the *cerolein* (presuming such to exist) only is destroyed; by the violent attack and heat of the chromic acid, the myricin is split up into acids, palmitic and cerotic. In brief experiments I have found that air-bleached wax dissolves in alcohol to pretty nearly the same extent as when crude, while the chemically whitened body is far more soluble than before, which, if correct, points to a great increase in the quantity of acid, and decrease in myricin. My assistant is now performing the operation of chemical decolorizing. Observe the deep green colour, and great heat, sufficient, as you see, to boil alcohol. After the lecture I will show you the small cake of wax, not entirely blanched, but much whiter than before.

To bleach beeswax atmospherically requires time and fair weather. The melted wax is allowed to trickle through a slit pipe over a drum revolving in water. This divides it into ribbons, which are rescued from the water by a rake, and spread on long canvas sheets—about forty feet by three feet. Here they sojourn during the fine summer days, being discreetly tossed and turned, and sprinkled judiciously with water till the colour is discharged from the outer film. Again melted and divellated it undergoes another exposure, and yet, perhaps, another, according to its nature, till of the yellowish-white peculiar to itself. It is then run into cakes and stored for use. We may as well follow it to the end, and see how it is made into candles. A very favourite method in olden days was to apply the wax, made plastic in hot water, to the wick with the hand, by kneading and manipulation, reducing it to proper form. But this was a lengthy process, and the water was difficult to expel, producing spluttering. The candles were also dipped like tallow-lights; but this method would only answer in short cases, and the generality of wax lights are passing long. Moulding, somehow, will not answer with wax; the candles refuse to leave the moulds, or crack while doing so. So now they are "poured." Round this wooden hoop you will notice a number of strings, to each of which, by means of a little wax, my assistant will join a wick. The hoop is now hung over a cauldron of melted wax, "and, be very careful, I pray you," says an old manualist, "of the temperature, lest, all too hot, the wax refuse to adhere to the wick; or too chill, hardens before the whole length be run." Dipping a ladleful from the cauldron the operator revolves the hoop with one hand while he pours the fluid material over the wicks with the other. After three or four revolutions, that hoop is laid aside and another taken in hand. On this frame the candle is arranged *in crescendo*, showing the increment gained after each pouring. At a certain period the candles are reversed, as the tendency is naturally to thicken at the lower extremity. Being now of tolerably even diameter, though unsightly, they are plucked from the strings, and laid in a row of about six upon a marble slab sprinkled with water. The maker then proceeds to roll them under a board upon which he throws all his weight, and by this the still plastic substance is rendered of a smooth and even surface. With knife and gauge the candles are cut to the required length, and their tops trimmed with a piece of wood. Hand labour, you see, throughout, and requiring much skill and experience. A well-made wax candle should show rings like a tree, where the different layers have been superfused.

To make the little Christmas tapers and wax spills a method called "drawing" is employed. Here the wick is wound off one drum on to another. In its passage it passes through a basin of melted wax, coloured with pigment, leaving which it passes through a die perforated with holes varying in diameter from $\frac{1}{30}$ to $\frac{1}{2}$ inch. The wick passes and re-passes till sufficiently thick. The large sizes are cut into tapers for Christmas-trees, the thin wicks into lengths of about 8–12 inches, and are made up into bundles of assorted colours. To "feather" the ends, to facilitate lighting, they are dipped into hot water and "flipped" over the arm, the melted wax flying off, and the ends dispersing.

Considering the expense of the raw material, also the skilful labour and time required for its manufacture, it is not surprising that wax candles should be dear, and highly prized. They have long been the currency for paying spiritual debts, and many tons of candles are devoted to this purpose. For carriage lamps, where a hard substance is required to resist the upward pressing spring, wax "moons" were long the only ones adopted, till ozokerit literally "took the shine" out of wax in light and hardness. Many quaint and obsolete customs were connected with the candle, as "selling by candle," when the bid was knocked down after a certain length had burnt; "excommunication by candle"—

"The priest called for candle, for bell, and for book,"

where the grace and time for penitence were adjudged by the same measure.

The introduction of cheaper substitutes has enabled many to reconcile piety and economy. Vegetable waxes are as taintless as beeswax, and, being some of them harder, last longer. Of these the name is legion, and we can only consider the most important; but, first, we must devote some little time to the beautiful rival of beeswax, spermaceti, itself a true wax.

Spermaceti (*Wallrath*, Germ.; *Blanc de balaine*, Fr.) is written in old works *sperma ceti*, testifying to the belief then current that it was the spawn of the whale. The history of the rise of this industry is fraught with interest. Till nearly 1700, men's ideas concerning the nature of the substance were very vague. Sir Thomas Browne excuses his ignorance on the plea that "the learned Hoffmann says, '*nescio quid sit.*'" In 1686, doubts were set at rest by the finding of a dead whale on the coast of Norfolk, from which unmistakeable spermaceti was taken. When this solid came to be employed in candle manufacture, for which it is so eminently adapted, I do not know. It seems for a long time to have been employed in pharmacy alone. Thomas Browne, for instance, lauds it as a "ground for compound oyls and balsams," and another old *savant* prescribes it in all cases "where acrimonious humours are to be obtunded;" and so in many others. It is still very largely blended in unguents, as I need not remind you; but, of course, now its chief use is for candles.

The black or Greenland whale fishery was carried on long before the haunts of the sperm or cachalot whale had been discovered. The earliest mention made of the latter is by one Mr. Norwood (1667), who, talking of the Bermudas black whale fishery, "has heard from credible persons of another whale having great teeth—from which they got, as it lay dead on the beach, a quantity of *sperma ceti*;" and Mr. Stafford, several years after, speaks of the difficulty and danger of catching the sperm whale, "such is its fierceness and swiftness."

But the matter was not allowed to drop there. America took to the chase so kindly that, between 1775 and 1779, she sent out nearly five hundred ships to both north and south Atlantic Oceans, which brought in over 30,000 tons of oil. Mr. Burke remarked witheringly on the sloth of the English in this matter, as compared with the activity of their cousins. "No sea, but is vexed with their fisheries, no climate that is not witness of their toils." This appears to have taken effect, for, in 1776, the Government offered a large bounty to the largest cargo of sperm oil brought home under certain specified conditions. From this time forward the cachalot whale must have been surprised to find himself the recipient of such marked attentions. In the year 1786, above 326 tons of pure sperm oil were introduced into England. The bounty was increased, and almost immediately afterwards the great step was taken of doubling Cape Horn, hitherto an unaccomplished feat, and carrying the war into the Pacific, the real home of the sperm whale. The captures now doubled and quadrupled. In 1819, Mr. Enderby, who had already received two bounties for two ships which had made voyages of most unprecedented good fortune, fitted out the *Syren.* This vessel chose the new hunting grounds of the Japan sea, and with such judgment that, after two years' absence, she returned with the enormous cargo of 346 tons of sperm oil. The trade being now fairly started, the Government discontinued the bounty. But the impetus given received no check—the gain of sale was sufficient inducement; and the cargoes increased in number and tonnage, till 1831, when 7065 tons came into British ports.

It is difficult for even a fertile imagination to overpaint the advantage which accrued to trade, science, and navigation, through the enthusiastic following up of this exciting fishery. We shall find a parallel, perhaps, in the palm oil trade, though of a different scope. When one considers the vast extent of water over which these leviathans roam at will, and the remote fastnesses to which they fly from their pursuer, also the enormous yield got from their carcases without other expenditure than the fire to "try down," and the barrels to hold the oil, it needs no dilating to show how universal benefit must result.

The details of the fishery are known to everyone. Not quite so well, perhaps, the difference between the three whales—the "right," the "sperm," and the "bottlenose." There are, of course, innumerable species of this order of mammalia, ranging from the seal to the porpoise, all of which yield oil; but we can only give the most cursory consideration to the above-named three. The Greenland, or "right" whale (*Balæna grœnlandicus*), also known as the "black whale," yields whale-oil, which, in many ways, differs from sperm oil. This balæna inhabits northern latitudes chiefly, but is found astray in many southern regions. He is toothless; his mouth is furnished with whalebone, and his head is rounded, the skull being of an entirely different form to that of the cachalot. His fat is also more readily saponified, and deposits little solid on cooling; the lighting and lubricating properties also are far inferior. The cachalot, or sperm whale (*Physeter macrocephalus*), so called from its enormous head—nearly 14 feet high by 25 feet long—is a denizen of the south. His skull is long, depressed and pointed. The great bulk of the head consists of a dense cellular tissue infiltrated with spermaceti. This is called the *junk*, and is surmounted by the *case*, which holds nearly a ton of very fine oil and sperm. This is termed the *head matter*, and it is still asserted, in most books on the subject, that this is the only source of spermaceti. The error—for such it is—has arisen from the fact of the head matter being full of the sperm crystals when taken from the head; while the body oil does not deposit till after melting and cooling out. The *blubber* surrounds the whole body in a layer of about 18 inches thick. It is a fine fat, much resembling the fat of hot roast beef, and is hardly solid at ordinary temperatures. This is stripped off the whale, and packed into barrels unless "tried down" on board ship. Trying down means simply melting, to clear down the fibre and skin from the oil. This soon deposits thick scales of sperm, and arrives at the factories in a semi-solid condition; in winter the barrels have to be steamed, to extract the contents. The mass then undergoes several filtrations and pressings. At first it is run into long bags of hair or canvas, and allowed to filter simply by its own weight; any pressure at that stage tending to force the only semi-solid sperm through the fibres. This process is called "bagging." When as much oil has filtered out as possible, the flaky mass is tranferred from the long bags to square ones, which, placed between boards in layers, are subjected to pressure by superposed weights, gradually increasing till a certain limit. Hydraulic pressure is then applied, in the cold at first, afterwards with the aid of heat, the sperm having been melted and cast into moulds once or twice during the different pressings. Finally, the almost white wax is warmed and agitated with a little caustic potash, which removes the last traces of colour, and then is cast into blocks. Thus purified, spermaceti is an almost blue-white glistening semi-crystalline substance, melting at 113° F. Messrs. Bicknell, the well-known sperm finers, who kindly placed their factory at my disposal for the above information, have prepared this block of sperm for exhibiting the crystals. The interior has been run out while warm, leaving the splendidly serrated interior displayed. They are not true crystals—as far as I know, no distinct form has been isolated—but are, nevertheless, highly structural and characteristic. It is my belief that palmitate of cetyl itself would be crystalline, but that the inseparable constituents prevent this.

The constitution of sperm has received a good deal of attention, though, like all the fats, very difficult to ascertain exactly. It mainly consists, as I said, of cetyl palmitate $\left.\begin{matrix}C_{16}H_{31}\cdot\\C_{16}H_{33}O\end{matrix}\right\}O\cdot$ which on distillation, yields a peculiar substance, called *ethal* (cetyl alcohol, $C_{16}H_{33}OH$) the alcohol of cetene $C_{16}H_{32}$. On long boiling with potash, sperm, like other waxes, forms a quasi-soap, but yields no glycerine, cetyl being liberated instead.

Owing to the pure condition to which it can be brought, and the uniformity of its constitution, sperm makes the finest candles we have for regularity of flame. Having large wicks, to allow of quicker consumption of the easily melting wax, the flame of a sperm candle of ordinary size is greater than those of others. For these reasons, the spermaceti candle, burning 120 grains per hour, has been chosen as the standard measure of light over all the scientific world.

The "bottle nose" whale has been a subject of much doubt, and great though surreptitious utility. The *Balæna rostrata* of Fabricius (Hunter, *Phil. Trans.*, 1787) is the true bottle nose whale. It is smaller than the balæna and cachalot, seldom exceeding 30 feet. Although, no doubt, thousands of these fish have been caught, and their oil sold as sperm oil, it is only quite recently, that the oil has been made a distinct commercial article. Messrs. Bicknell have taken the matter in hand, and extracted, after much experiment, real spermaceti therefrom, of a slightly higher melting point than the cachalot sperm. Mr. Allen has published several communications concerning this oil, on which I may have more to say when we speak of oils proper.

I will now pass on to the vegetable waxes the importance of which entitles them to a brief consideration. There are four that may fairly be deemed regular visitors of the British markets. The first for beauty and purity, is *Chinese wax*, or *pela*.* This exquisite substance has a longitudinal crystalline fibre, much resembling pure stearine, and yet with something of the flakiness of sperm about it. It is a cerotic *ether*, having the seldom varying composition $\left.\begin{matrix}C_{27}H_{53}O\\C_{27}H_{55}\end{matrix}\right\}O$, cerotate of ceryl, corresponding to the true cerotic ether $\left.\begin{matrix}C_{27}H_{53}O\\C_2H_5\end{matrix}\right\}O$, or cerotate of ethyl. It melts at 180° F., and can be crystallized unchanged from boiling alcohol. The maker of this beautiful compound is a certain little insect, the *Coccus sinensis*, inhabiting China. The body of the grown insect varies in diameter from $\frac{1}{3}$-$\frac{2}{5}$ inch. Its cultivation demands as much care as that of the silkworm. The cocoons with eggs are attached carefully to certain trees. After a short time the young insects emerge, and commence operations on the bark; this speedily becomes covered with a white waxy film, in which the insects imbed themselves; the branches are then scraped carefully of the adhering crust, which is readily purified, by boiling, from the dirt and insects. Some portions of the wax, with the incerated chrysales, are kept for breeding purposes. The trees on which this insect feeds are for the most part, probably all, themselves wax producers. Its favourite pasture appears to be the *Rhus succedanea*, from the root of which Japan wax is obtained. This circumstance renders it doubtful whether the insect could produce wax upon any tree, given proper climate. My opinion is, that the wax is the result of a mutual understanding between the two—a product to which insect and tree are equally essential factors.

The amount of this wax realized is very large, averaging about 200 tons. This the Chinese consume all themselves, the price not allowing it to compete with equally useful English products. A little comes over now and then, but the sales are never large. Its chief use is to "break the grain" of spermaceti, the two crystallizations neutralizing each other; but as cheaper substances answer equally well, there cannot be much demand. But the Chinese, who eat all the animal fat they can get, are very glad of the material for their candles. Their *lobchocks* are made from it; this one is, quite characteristically, thicker at the top than the base, tapering downwards, and coloured bright scarlet.

Carnauba, or stone-wax.—This peculiar wax is intensely hard, and its melting point very high—too high for utility, as regards candles at least (185° F.). It is, however, I believe, used largely on the Continent as an adulterant or, perhaps legitimately, a hardening mixture, and enters largely into the composition of varnishes, heel-balls, etc. The colour varies from light yellow to deep grey green, and it can be bleached to an intense white. Carnauba wax is found adhering as a thin film, like varnish, to the leaves, stalks, and the berries especially, of a Brazilian palm, the *Copernicia cerifera*. From these the wax is boiled off, and skimmed into moulds. When congealed, its likeness to stone is so great that, were it not for the low sp. gr. (·999), one might easily class it with minerals. The composition of stone-wax is very uncertain. Lewy, a great authority on waxes, finds it to contain 80 per cent. of carbon; and Allen vouches for the presence of a notable

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* Chinese, Chung-pih-la. Insect white wax.

quantity of free myricyl or melissic alcohol $\left.\begin{matrix}C_{30}H_{61}\\H\end{matrix}\right\}O$. The quantity produced is very large, but I am not in possession of trustworthy statistics.

The next, and last, of the true waxes is *myrtle wax* (myrica tallow). This soft green substance is formed on the berries of the *Myrica cerifera*, an American tree shrub. The berries grow in small clusters along the stem, and, when ripe, are covered with a tolerably thick rind of the wax, which is removed by boiling. This substance is also used chiefly in adulteration, though, from the very low melting point (123° F.), the use must be limited. The composition is chiefly palmitic and myristic acids, with a little glycerine, but has never been accurately determined. *Japan wax*, also called "tree wax," ought properly to rank as a fat, being a palmitate of glycerine, which latter it yields upon saponification. It is derived from the roots of several trees of genus *Rhus*, chiefly from the *Rhus succedanea* of the East Indies. The use of this wax as an adulterant is checked by its disagreeable odour—otherwise, it is a very useful substance; it enters largely into the composition of vegetable wax candles, much used as a substitute for those of genuine beeswax. Its sp. gr. is about ·999, the m.p. 120° F. There are several other waxes, of great use in their native countries, as *palm wax*, from the stem of the *Ceroxylon andicola*, Brazil, and *ocuba wax*, from the *Myrica ocuba* of the same country; also Andaquies wax, Cuba wax, and others of uncertain animal origin. The two first-named furnish a large portion of the candle power of northern South America.

I shall have to defer to next lecture the consideration of vegetable oils and fats, which are also very numerous. For the present, I will conclude with drawing your attention to this unique collection of all kinds of waxes, with a number of different candles with crude wicks, made by island savages as they best knew, for the most part of which I am indebted to the courtesy of Mr. Holmes, of the Pharmaceutical Society's Museum.

ROYAL INSTITUTION OF GREAT BRITAIN.

Some of the Questions involved in Solar Physics.*

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

The lecturer introduced his subject by drawing attention to the circumstance that the idea of the sun being an exceedingly hot body was of very modern date; that both ancient and modern writers up to the early portion of the present century attributed to him a glorious and supernatural faculty of endowing us with light and heat of the degree necessary for our well-being; whilst even Sir William Herschel had attempted to find an explanation in justification of the time-honoured conception that the body of the sun might be at a low temperature and inhabitable by beings similar to ourselves, which he did in surrounding the inhabitable surface by a non-conducting atmosphere—the penumbra—to separate it from the scorching influence of the exterior photosphere.

It was not till the views of Kant, the philosopher, had been developed by La Place, the astronomer, in his famous 'Mécanique Céleste,' that the opinion gained ground that our central orb was a mass of matter in a state of incandescence, representing such an enormous aggregate as to enable it to continue radiation into space for an almost indefinite period of time.

The lecturer illustrated by means of a diagram the fact that of all the heat raidiated away from the sun, only $\frac{1}{2250000000}$ part could fall upon the surface of our earth, vegetation and force of every kind being attributable to this radiation; whilst all but this fractional proportion apparently went to waste.

Recent developments of scientific research had enabled us to know much more of the constitution of the sun and other heavenly bodies than had formerly been possible. Comte says in his 'Positive Philosophy' (Martineau's translation of 1853) that "amongst the things impossible for us ever to know was that of telling what were the materials of which the sun was composed;" but within only seven years of that time Messrs. Bunsen and Kirchhoff published their famous research, showing that by connecting the dark Fraunhofer lines of the solar spectrum with the bright lines observed in the spectra of various metals, it was possible to prove the existence of those substances in the solar photosphere, thus laying the foundation of spectrum analysis, the greatest achievement of modern science. Dr. Huggins and others applying this mode of research to other heavenly bodies, including the distant nebulæ, had extended our chemical knowledge of them in a measure truly marvellous.

Solar observation had thus led to an analytical method by which chemistry had been revolutionized; and it would be, in the lecturer's opinion, through solar observation that we should attain to a much more perfect conception of the nature and effect of radiant energy in its three forms of heat, light and actinism, than we could as yet boast of. The imperfection of our knowledge in this respect was proved by the circumstance that whereas some astronomers and physicists, including Waterston, Secchi, and Ericsson, had, in following Sir Isaac Newton's hypothesis, attributed to the sun a temperature of several millions of degrees Centigrade, others, including Pouillet and Vicaire, in following Dulong and Petit, had fixed it below 1500° C. Between these two extremes, other determinations, based upon different assumptions, had fixed the solar temperature at between 60,000° and 9000°.

The lecturer having conceived a process by which solar energy may be thought to a certain extent self-sustaining, had felt much interested for some years in the question of solar temperature. If the temperature of the solar photosphere should exceed 3000° C., combustion of hydrogen would be prevented by the law of dissociation, as enunciated by Bunsen and Sainte Claire Deville; and his speculative views regarding thermal maintenance must fall to the ground. To test the question, he in the first place mounted a parabolic reflector on a heliostat with a view of concentrating solar rays within its focus, which, barring comparatively small losses by absorption in the atmosphere and in the metallic substance of the reflector, should reproduce approximately the solar temperature. By introducing a rod of carbon through a hole at the apex of the reflector until it reached the focus its tip became vividly luminous, producing a light comparable to electric light. When a gas burner was arranged in such a way that the gas flame played across the focal area, combustion appeared to be retarded, but was not arrested, showing that the utmost temperature attained in the focus did not exceed materially that producible in a Deville oxy-hydrogen furnace, or in the lecturer's regenerative gas furnace, in which the limit of dissociation is also reached.

Having thus far satisfied himself, his next step was to ascertain whether terrestrial sources of radiant energy were capable of imitating solar action in effecting the decomposition of carbonic acid and aqueous vapour in the leaf-cells of plants, which led him to undertake a series of researches on electro-horticulture, extending over three years, a subject he had brought before the Royal Society and the Royal Institution two years ago. By these researches he had proved that the electric arc possessed not only all the rays necessary to plant-life but that a portion of its rays (the ultra-violet) exceeded in intensity the effective limit, and had to be absorbed by filtration through clear glass, which, as Professor Stokes had shown, produced this effect without interference with the yellow and other luminous and intense heat rays. He next endeavoured to estimate the solar temperature by instituting a comparison between the spectra due to different known luminous intensities. Starting with the researches of

* Read Friday, April 27, 1883.

Professor Tyndall on radiant energy, supplementing them by experiments of his own on electric arcs of great power, and calling to his aid Professor Langley, of the Alleghany Observatory, to produce for him a complete spectrum of an Argand burner, he concluded that with the temperature of a radiant source, the proportion of luminous rays increased in a certain ratio; whereas in an Argand gas burner only $2\frac{1}{2}$ per cent. of the rays emitted were luminous and mostly red and yellow, the most brilliant portion of a gas flame emitted 4 per cent., as shown by Tyndall, the carbon thread of an incandescent electric light between 5 and 6 per cent., a small electric arc 10 per cent., and in a powerful 5000-candle electric arc as much as 25 per cent. of the total radiation was of the luminous kind. Professor Langley, in taking his photometer and bolometer up the Whitley mountains, 18,000 feet high, had proved that of the solar energy not more than 25 per cent. was luminous, and that the loss of solar energy sustained between our atmosphere and the sun was chiefly of the ultra-violet kind. These rays, if they penetrated our atmosphere, would render vegetation impossible, as proved by the lecturer's own experiments above referred to. It was thus shown that the temperature of the solar photosphere could not materially exceed that of a powerful electric arc, or, indeed, of the furnaces previously alluded to, leading him to the conclusion already foreshadowed by Sainte Claire Deville, and accepted by Sir William Thomson, that the solar temperature could not exceed 3000° C. The energy emitted from a source much exceeding this limit would no longer be luminous, but consist mainly of ultra-violet rays, rendering the sun invisible, but scorching and destructive of all life. A diagram of the spectra alluded to, which was exhibited by the lecturer, showed the gradual advance of the luminous band.

Not satisfied with these inferential proofs the lecturer had endeavoured to establish a definite ratio between temperature and radiation, which formed the subject of a very recent communication to the Royal Society.* The experiment consisted in heating, by means of an electric current, a platinum or iridio-platinum wire, a metre long, and suspended between binding screws; the energy of the current was measured by two instruments—an electro-dynamometer, giving it in ampères, and a galvanometer of high resistance giving the electromotive force between the same points in volts. The product of the two readings gave the volt-ampères, or Watts of energy communicated to the wire, and dispersed from it by radiation and convection. A reference to the lecturer's paper on the "Electrical Resistance Thermometer," which formed the Bakerian Lecture of the Royal Society in 1871, would show that the varying electromotive force in volts observed on the galvanometer was a true index of the temperature of the wire while being heated by the passage of the current. By combining his former experiments on the dependence of resistance upon temperature, with his recent one, a law of increase of radiation with temperature was established experimentally up to the melting-point of platinum; this, when laid down in the form of a diagram, gave very consistent results expressible by the simple formula—

$$\text{Rad}^{\text{tn}} = Mt^2 + \phi t$$

M being a coefficient due to substance radiating.

Sir William Thomson had lately shown that the total radiating energy from a unit of surface of the carbon of the incandescent lamp amounted to $\frac{1}{67}$th part of the energy emitted from the same area of the solar photosphere, and taking the temperature of the incandescent carbon at 1800° C. (the melting-point of platinum, which can just be heated to the same point), it follows in applying Sir William Thomson's deductions to the lecturer's formula that the solar photosphere does not exceed 2700° C., or, adding for absorption of energy between us and the sun about 2800° C., a temperature already arrived at by the lecturer by a different method. The character of the curve was that of a parabola slightly tipped forward, and if the ratio given by that curve held good absolutely beyond the melting-point of platinum, it would lead to the conclusion that at a point exceeding 3000° C. radiation would become, as it were, explosive in its character, rendering a surface temperature beyond that limit physically difficult to conceive.

Clausius had proved that the temperature obtainable in a focus could never exceed that of the radiating surface, and Sainte Claire Deville that the point of dissociation of compound vapours rises with the density of the vapour atmosphere. Supposing interstellar space to be filled with a highly attenuated compound vapour, it would clearly be possible to effect its dissociation at any point where, by the concentration of solar rays, a sufficient focal temperature could be established; but it was argued that the higher temperature observable in a focal sphere was the result only of a greater abundance of those solar vibrations called rays, within a limited area, the intensity of each vibration being the outcome of the source whence it emanated: thus, in the focal field of a large reflector the end of a poker could be heated to the welding-point, whereas in that of a small reflector the end of a very thin piece of wire only could be raised to the same temperature. If, however, a single molecule of vapour not associated or pressed upon by other molecules could be sent through the one focus or the other dissociation in obedience to Deville's law must take place irrespective of the focal area; but, inasmuch as the single solar ray represented the same potential of energy or period of vibration as numerous rays associated in a focus, it seemed reasonable that it should be as capable of dealing with the isolated molecule as a mere accumulation of the same within a limited space, and must therefore possess the same dissociating influence. Proceeding on these premises, the lecturer had procured tubes filled with highly attenuated vapours, and had observed that an exposure of the tubes to the direct solar rays or to the arc of a powerful electric light affected its partial or entire dissociation; the quantity of matter contained within such a tube was too slight to be amenable to direct chemical test, but the change operated by the light could be clearly demonstrated by passing an electric discharge through two similar tubes, one of which had, and the other had not, been exposed to the radiant energy from a source of high potential. If space could be thought filled with such vapour, of which there was much evidence in proof, solar rotation would necessarily have the effect of emitting such vapour equatorially by an action of circulation which might be likened to that of a blowing fan. When reaching the solar photosphere, by virtue of solar gravitation this dissociated vapour would, owing to its increased density, flash into flame, and could thus be made to account in great measure for the maintenance of solar radiation, whilst its continual dissociation in space would account for the continuance of solar radiation into space without producing any measurable calorific effect.

Time did not permit him to enter more fully on these subjects, which formed part of his solar hypothesis, his main object on this occasion having been to elucidate the point of cardinal importance to that hypothesis, that of the solar temperature.

* 'Proc. of the Royal Society,' vol. xxxv., p. 166.

Correspondence.

W. Wright.—*Melilotus arvensis.*

"*Marigold.*"—(1) *Sagina apetala*; (2) *Lotus major*; (3) *Plantago Coronopus*; (4) *Melampyrum sylvaticum*; (5) *Chrysanthemum segetum*; (6) *Hypericum pulchrum.*

J. Smith.—A paper on the antiseptic properties of cinnamic acid, by Mr. J. B. Barnes, will be found in *Pharm. Journ.*, [3], xiii., 447.

Cymro.—Try Professor Bentley's new work, 'Students' Guide to Structural, Morphological and Physiological Botany,' published by Messrs. Churchill.

INTERNATIONAL PHARMACEUTICAL EXHIBITION IN VIENNA.

Pharmaceutical Organization in Austria.

It is worthy of note that the first international pharmaceutical exhibition, which has just closed, was held in the capital of a country where the conditions under which pharmacy is carried on present many distinctive characters, and as the Catalogue of the Exhibition is prefaced by a few short chapters giving much interesting information upon the subject, the opportunity is a favourable one for laying before the readers of this Journal a brief account of the organizations connected with and regulating the practice of the art of pharmacy in the Austro-Hungarian empire. As is now almost universally the case to a greater or less degree in civilized countries the right of supplying medicines to the public is in Austria vested in persons possessing diplomas of qualification as pharmacists; but instead of admission to the body and registration being under the control of a central national authority, as is usually the case, they are here under the supervision of local chartered corporations, consisting of those pharmacists who are engaged in business in the district, and partaking somewhat of the nature of trade guilds or colleges. Such a corporation is termed the "Apotheker-Gremium" of the district, and the general management of pharmaceutical affairs in that district is in the hands of the President and Directors of this body, who are elected to their offices at regulated periods. Any pharmacist carrying on business must of necessity be a member of the Gremium of the district and must remain so as long as he continues in business there. If, however, he removes to another district his membership must be transferred to the Gremium of that locality.

As illustrating the character of these local corporations the Vienna Apotheker-Haupt-Gremium, although not the largest, may be referred to more in detail. Its early history, dating back for several centuries, cannot be traced with precision, its archives reaching back only to the year 1796. At the present time it consists of sixty-four members, and its business is conducted by two directors, assisted by a council of seven members. At least three meetings are held every year, at which reports upon the condition of affairs are presented, necessary votes are taken and any business of moment is discussed. The Register of owners of pharmaceutical establishments belonging to this Gremium dates back to the year 1796. The Register of pupils who have passed its examinations goes back to the same year, and in the interval of eighty-seven years, according to this Register, 526 pupils have been admitted into the Vienna Gremium, or on the average six in each year. The property of the Gremium consists of a library fund amounting to £300, which is augmented by the monthly subscriptions of members. All the best new publications connected with pharmacy are purchased, as well as the pharmaceutical and medical periodicals, together with old books for completing the library. The Benevolent Fund amounts to about £2200, which is partly invested in the offices of the Gremium and partly in a loan to the Austrian Apotheker-Verein. The interest of this fund, added to the annual subscriptions from the members, serve for casual relief as well as for pensions to aged members, their widows and orphans, and to incapacitated assistants of the Gremium or their widows. The annual income of the Gremium, consisting of the monthly subscriptions of the members, as well as the fees for registration of new members, as owners, lessees or managers, amounts to about £700. Out of this fund £20 is applied annually in the form of grants to industrious poor pharmaceutical students in the Vienna University, through the medium of the Vienna Pharmaceutical Society. In addition, the Gremium possesses a library of several thousand volumes and collections of minerals, drugs and herbaria, for the use of students. In connection with the Vienna Gremium there is a Mutual Sick Assurance Club, to which all the members belong.

One very important duty of the Vienna Gremium is that of providing the supply of medicines for the hospitals and public institutions upon the plan introduced by Dr. von Karajan. This duty has now been carried out since 1870 by the Gremium for the Imperial General Hospital, the Lunatic Asylum, the Lying-in Hospital, the Foundling and Orphan Asylums and the Wieden Hospital; and since 1871 for the Rudolph Hospital. The good results of this arrangement are evident from the fact that the Lower Austrian governmental departments and the directors of the three hospitals and associated institutions in that province entered into a contract with the Vienna Gremium for a supply of medicines for ten years. At the end of that period a new contract was entered into for three years, with a further provision for continuing the contract from year to year. Respecting the advantages of this arrangement, which is being further adopted by all the large institutions in Vienna, it may reasonably be expected that when a corporation such as the Vienna Apotheker-Haupt-Gremium undertakes the supply of medicines to public institutions, with the view of carrying it out less as a business than as an affair of honour, it will be impossible for the latter, all due allowance being made for the integrity of individual purveyors, to offer an equal guarantee for the proper execution of the work.

The two chief officers, as the representatives of the Gremium, have the conduct of this work, assisted by a committee consisting of ten members of the Gremium, but all the members of the Gremium participate equally in any resulting profit. Raw materials and the products of chemical factories are purchased wholesale, while strictly pharmaceutical as well as galenical preparations, and many of the more modern pharmaceutical articles, such as surgical dressings, are prepared on a large scale in the laboratory established for the purpose by the members of the Gremium in the pharmacy of the General Hospital. A thoroughly qualified and trustworthy staff carry out the details of the work so as to satisfy in a conscientious and economical manner the requirements of the hospital authorities and the medical officers of those institutions for the benefit of the patients and the credit of the pharmaceutical body.

At the present time there are in the Austrian empire about 1280 pharmaceutical establishments, the owners of which, except in the Tyrol and Dalmatia, are locally associated in such corporations as have here been already described. Each of these corporations has a president, who is chosen for three years. Regular meetings have to be held, and up to the end of the year 1874 they were attended by a Government commissioner. The business of the President of the Gremium is to represent the interests of pharmacy in relation to the various state authorities, to keep a register of its members, consisting of the owners, occupiers and managers of the pharmacies in the district; also a register of assistants and pupils, and to provide for their admission and examination. The President of a Gremium is also the person to whom Government decrees and other communications concerning its members are addressed. Besides the conduct of the finances, it is the business of the President to settle any disputes that may arise between members of a Gremium, and also to take part in the yearly inspection of pharmaceutical establishments.

The pharmacists are distributed throughout the different provinces of the empire as follows, and the numbers represent the extent of the Gremium in each case:—

Bohemia	324
Moravia	112
Silesia	36
Galicia	229
Bukowina	20
Styria	59
Carniola	21
Istria	32
Goertz	20
Carinthia	18
Tyrol	101
Vorarlberg	6
Salzburg	11
Upper Austria	59
Lower Austria	114
Vienna	64
Trieste	21
Dalmatia	33

The pharmaceutical establishments are of three kinds:—

(1) Those that can be disposed of unconditionally. All these date back prior to the year 1775, and their transfer from one owner to another had been officially recognized before that date.

(2) Those identified with a particular house, constituting a part of the house and its value, and therefore registered as such in the territorial records. These can only be transferred to another house by consent of those concerned and with the permission of the Government.

(3) Those which appertain to individuals and become extinct upon the death of the owner. In these cases, however, the widow may continue the business so long as she abstains from marrying again. The son has a preference in continuing the business only when his father was a citizen and when he has acquired the necessary qualifications. In any case a new concession is requisite, except in so far that for the benefit of the widow or of children under age the business may be carried on under the old concession, provided a qualified and responsible manager is appointed.

The oldest pharmaceutical establishments in the Austrian empire probably date back to the end of the thirteenth century, both in Vienna and in Prague. The establishment of new pharmacies in the larger towns took place gradually, but only by permission of the authorities, and since 1433 it has been a condition that the dispensatories according to which medicines were prepared, as well as the scale of charges, should be submitted to the Vienna faculty for approval. The first local association of pharmacists in the kind of college already described, was founded in Vienna, in 1457.

Pharmaceutical education in Austria is carried out in accordance with a Government decree of June, 1859. In order to obtain the degree of "Master of Pharmacy," which is necessary for the independent conduct of a pharmacy, the candidate must produce evidence of having passed the lower gymnasium course; also of having been engaged during three years as a pupil in a public pharmaceutical establishment, and of having passed the examination of the Gremium of his district; further, of having been an assistant during at least two years in a pharmacy, and, lastly, of having gone through the two years' pharmaceutical curriculum of an Austrian university and of having passed the three examinations connected with it satisfactorily. During the first session of the curriculum the candidate has to attend lectures upon elementary physics, mineralogy and general chemistry, extending over five hours every week. In the second session he must attend lectures on zoology, organic chemistry and botany. During the second year he has to attend lectures on pharmaceutical chemistry and pharmacognosy, and occupy himself in practical work in the laboratory for at least ten hours a week throughout the year. The first special examination, which has to be passed at the end of the first year's curriculum, is conducted by the professors, the subjects being elementary physics, zoology, botany and mineralogy. The chairman of the Board, consisting of four professors, is either the Dean, or the professor that has precedence of seniority. The examination lasts for a hour and an half. The second special (practical) examination, which can be passed in the last months of the second year's study, before the medical faculty, comprises the making of two pharmaceutical preparations under the supervision of the professor of chemistry and other members of the examining board. The carrying out of chemical analysis, qualitatively and quantitatively, the procedure adopted in these chemical operations and the results, have to be described by the candidate in the form of a written essay and submitted to the examiners. The examining board in this case consists of the President of the Medical Educational Faculty, the Professor of Chemistry, and, in Vienna as well as Prague, the Dean of the Faculty, while in other universities a practical pharmacist is especially nominated for this purpose. The third and last special examination includes pharmacognosy, general inorganic and organic chemistry, pharmaceutical chemistry and the laws affecting medicine and pharmacy. In pharmacognosy the candidate has to name several drugs, to recognize their quality, and mention their ordinary substitutions, impurities, and adulterations, and detect these if present. The examining board consists of the President of the Medical Educational Faculty, the Professor of Chemistry for pharmacists and of a pharmacist nominated for the purpose, or in Vienna and Prague, the Dean of the medical professors. This examination also lasts an hour and a half. In the reports on these examinations the candidates are grouped in three classes, as "qualified," "qualified with distinction" and "unqualified." When a candidate fails in one subject, he cannot present himself again for examination until the end of three months, and only after six months when he fails in two subjects. When he passes he is sworn and receives the diploma of "Master of Pharmacy."

In order to obtain the degree of "Doctor of Pharmacy" it is necessary to have obtained a higher grade in the public gymnasium, to have satisfied all the otherwise prescribed requirements as to pupillage and practical experience, to have attended the lectures for the "Master of Pharmacy," and to have passed the three special examinations with distinction; further, to have attended for a third year the lectures on general and pharmaceutical chemistry, to have given considerable attention to practical work, to have carried out two selected chemical operations as well as delivered a lecture upon them, and to have written a dissertation upon some chemical or similar subject. The chemical operations have to be begun by the candidate in the presence of the whole examining board, and completed under the supervision of the professors.

In addition to the above described organizations and educational regulations, which are compulsory, there are in Austria various associations connected with pharmacy which are of a voluntary character. First in order of importance is the General Austrian Apotheker-Verein, the institution of which is due to the late Professor Ehrmann, who, in 1827, conceived the idea of establishing a pharmaceutical laboratory, a technical journal and a body suitable for the better representation of the class and for the assistance of needy pharmacists. At that time the plan received no favourable countenance from the Apotheker-Gremiums, and it fell to the ground. Nevertheless, Dr. Ehrmann persevered in the attempt to carry out his views and in 1846 he received permission to publish a pharmaceutical journal. When the events of 1848 gave opportunity for the establishment of a free association in Austria, Dr. Ehrmann took advantage of the circumstance and in conjunction with his co-editor, Herr Sedlazek, again brought forward the proposition to establish a pharmaceutical society. His suggestion now received considerable support from those who recognized the utility and necessity of such a body, but nevertheless the Government authorities withheld their consent, on account of the state of siege under which Vienna was then placed. Somewhat later, Dr. Ehrmann again revived the subject at a meeting of the Olmutz Apotheker-Gremium and eventually the establishment of an association was sanctioned by the Moravian authorities about 1855, with Dr. Ehrmann as President and Herr Carl Schrotter as Vice-President. Many of the pharmacists in Lower Austria and Styria became members of this association, the objects of which were to promote the interests of the class, to furnish temporary assistance in cases of sickness or grant annuities such as would induce talented and useful individuals to devote themselves to the business, and to render assistance to widows and orphans of its members. After the Moravian Apotheker-Verein had continued in existence for some time it was resolved to apply to the Government to sanction the establishment of a General Austrian Apotheker-Verein. This was not granted at the time, but eventually the efforts made in this direction were successful, and in the year 1861 assent was given to the statutes drawn up for the regulation of such a society. The inauguration of this body took place the same year, in the Imperial Academy of Sciences in Vienna, the number of pharmacists who took part in its establishment as "founders" amounting to 84, while the number of ordinary members amounted to 176, including 48 assistants. The objects of this body were the same as those already mentioned in connection with the Moravian association, and it was proposed in addition to hold annual meetings affording opportunities for those outside the body to become acquainted with its proceedings. After some time, by the labours of its members, scientific collections were accumulated and premises were taken for their exhibition in Vienna, a journal also being published there, under the title of the "*Zeitschrift des allgemeinen österreichischen Apotheker-Vereines*," as the organ of the association. But in a short space of time the collections had increased to such an extent as to constitute a basis for the foundation of a School of Pharmacy, a project which was carried out by the establishment of a chemical laboratory, and after some further lapse of time, through the friendly co-operation of the Vienna Apotheker-Gremium, the premises which are now occupied by the association were purchased and adapted for its purposes, with the approval of the Minister of Religion and Education. The expenses attending upon this proceeding were provided for partly by a grant of £500 from the Government, and partly by donations from Austrian pharmacists. The establishment of the association now comprises a museum, a library, a lecture room, two laboratories, a hall for meetings, a botanic garden, and offices for the publication of the journal. The association at present consists of 70 honorary members, 50 corresponding members and 508 founders and ordinary members. The number of students attending the lectures in the school has risen from 12 in the year 1874–5 to 34 in the year 1882–3. The laboratory for study and analytical chemistry has been equally successful.

Another voluntary association is the Austrian Pharmaceutical Society, established with Government sanction in 1873, its object being to promote the interests of pharmacy in Austria and to improve the position of those belonging to the body by mutual intercourse, as well as to furnish assistance to needy members or their widows and orphans. The society is managed by a council, and in its general character and the nature of its proceedings bears a close resemblance to the British Pharmaceutical Conference. A weekly journal is published in connection with it under the title of the *Pharmaceutische Post*. In addition there are in Vienna two other associations of pharmacists, the "Hygeia," numbering 281 members, which is an association for rendering mutual assistance, and the Vienna Pharmaceutical Union, with 115 members, which is somewhat of the nature of a club. Another pharmaceutical association of a similar character, under the name of "Progressus," is situated in the town of Gratz.

THE NEW PHARMACOPŒIAS FOR THE UNITED STATES AND GERMANY.

(*Continued from p.* 103.)

HYOSCYAMINÆ SULPHAS, U.S.P. (new).—The researches of Ladenburg have evidently been taken into account in respect to this salt. The formula adopted, $(C_{17}H_{23}NO_3)_2 \cdot HSO_4$, is the same as that for sulphate of atropine. The salt is described as occurring in "small golden-yellow or yellowish-white scales or crystals, or a yellowish-white amorphous powder, deliquescent on exposure to air;" whilst sulphate of atropine is "a white, indistinctly crystalline powder, permanent in the air." It may be remarked that, according to Ladenburg, in the free alkaloids these characters are reversed, hyoscyamine forming smaller or less perfect crystals than atropine (*Pharm. Journ.*, [3], x., 751). Hyoscyamine and its salts resemble atropine and its salts in many of their reactions, as in non-precipitation by a 5 per cent. solution of platinic chloride. The alkaloids differ however in respect to their gold salts; the precipitate obtained with atropine and chloride of gold, when recrystallized from boiling water acidulated with hydrochloric acid, forming minute crystals, becoming lustreless on drying, and that with hyoscyamine forming brilliant lustrous golden-yellow scales.

Iodinum, U.S.P.; Jodum, P.G.—In both works a ferrocyanide test has been inserted for the detection of a cyanide contamination, which is said to be sometimes derived from the protein substances of seaweed used in the manufacture.

Iodoformum, U.S.P. (new); P.G.—Iodoform was already contained in the P.G., and has now been included in the U.S.P. This is one of the many cases in which the "solubilities" given in the two works scarcely bear comparison. Thus although iodoform is not perceptibly soluble in water, the U.S.P. represents its solubility in "alcohol" containing 9 per cent. of water as 1 in 80, whilst the P.G. gives its solubility in a "spiritus" containing 4 per cent. more water as 1 in 50. In both works, too, the solubility in "ether" is given as 1 in 5·2, notwithstanding that the U.S.P. "ether" contains about 20 per cent. more alcohol than the P.G. "ether."

Lithium. Salts of.—In the P.G. only one salt of lithium, the carbonate, is official. The U.S.P., which previously, like the B.P., contained only the carbonate and the citrate, now includes five, the benzoate, bromide, carbonate, citrate and salicylate.

Lithii Benzoas, U.S.P. (new).—"A white powder or small shining scales, permanent in the air, odourless or having a faint benzoin-like odour, of a cooling and sweetish taste and a faintly acid reaction." Soluble in 4 parts of water and 12 parts of alcohol at 15° C., and 25 parts of boiling water and 10 parts of boiling alcohol. Under this salt tests are given for the residue after ignition, which are common also to the other organic salts of lithium. After the residue has been dissolved in dilute hydrochloric acid, filtered and evaporated to dryness, 1 part should be completely soluble in absolute alcohol, and the solution when ignited should burn with a crimson flame; the addition of an equal volume of stronger ether should not produce any precipitate (alkaline salts). Some of the residue dissolved in a small quantity of water should not give a precipitate with a 5 per cent. solution of oxalate of ammonia and should remain unaffected by hydrosulphuric acid, or sulphide of ammonium. It has been pointed out by Shuttleworth (*Pharm. Journ.*, [3], v., 682), that lithium benzoate can be obtained in crystals by setting aside the solution after decomposition of the carbonate with benzoic acid, instead of evaporating to dryness and powdering. The crystalline form, in flat elongated prismatic crystals containing one molecule of water, was adopted by the Paris Society in 1877 (*Pharm. Journ.*, [3], viii., 46).

Lithii Bromidum, U.S.P. (new).—A very deliquescent, white granular salt, very soluble in water and in alcohol. For methods of preparing it, see *Pharm. Journ.*, [3], vi., 22; viii., 46.

Lithii Carbonas.—The solubility of this salt in hot or cold water is given in the U.S.P. and the P.G. as 1 in 150, in the B.P. as 1 in 100.

Lithii Citras.—The U.S.P. still orders the anhydrous salt, defining it as a white deliquescent powder, notwithstanding that Sandford, Umney, and others have pointed out (*Pharm. Journ.*, [3], vi., 214) that it can now be conveniently produced in crystals that are not deliquescent.

Lithii Salicylas, U.S.P. (new).—This is described as a white deliquescent powder, odourless, or nearly so, having a sweetish taste and faintly acid reaction, and very soluble in water and alcohol.

Magnesia.—It will be remembered that hitherto in the U.S.P. and P.G. the official magnesia and carbonate have been the light forms. Heavy magnesia is now added in the U.S.P. under the title "magnesia ponderosa," the name "magnesia" being retained for what in the B.P. is called "magnesia levis." A recommendation in the preliminary Report to substitute the heavy varieties of both the oxide and the carbonate for the light has not been adopted.

Magnesii Citras Granulatus, U.S.P. (new); Magnesium Citricum Effervescens, P.G. (alt.).—These two preparations are practically the same. The U.S.P. directs 11 parts of magnesium carbonate to be mixed intimately with 33 parts of citric acid and enough distilled water to make a thick paste, which is to be dried at a temperature not exceeding 30° C., and then reduced to a fine powder. This is to be thoroughly mixed with 8 parts of powdered sugar, 37 parts of sodium bicarbonate, and 15 parts of citric acid previously reduced to a very fine powder. The whole is then moistened with sufficient alcohol, in which it is almost insoluble, and rubbed through a No. 20 tinned-iron sieve to form a coarse granular powder, which should be dried in a "moderately warm" place. The product is soluble, with copious effervescence, in 2 parts of water at 15° C. The alteration from the P.G., 1872, consists in a large increase in the proportion of the effervescing mixture.

Magnesii Sulphis, U.S.P. (new).—"A white crystalline powder." This is the form obtained by passing sulphurous oxide through water holding magnesium carbonate in suspension, and which was adopted by the Paris Society (*Pharm. Journ.*, [3], viii., 47). It can be obtained in larger crystals by a process of double decomposition, but it has been pointed out by Rother (*Pharm. Journ.*, [3], v., 544), that such crystals are dissolved with extreme slowness by water. The powder is soluble in 20 parts of water at 15° C.

Mangani Sulphas, U.S.P.; Manganum Sulfuricum, P.G. (new).—Sulphate of manganese, which was already in the U.S.P., has been added to the P.G. Peroxide of manganese has been dismissed from the P.G.

Morphine and Salts.—The U.S.P. retains the uncombined alkaloid and the acetate and hydrochlorate, but the acetate has been dismissed from the P.G. Both the U.S.P. and P.G. include the sulphate, the former giving its solubility in water at 15° C. (59° F.) as 1 in 24 (the same as that of the hydrochlorate), and the latter as 1 in 14·5 Mr. Dott, who recently discussed this question in an able paper (see vol. xiii., p. 401) gives the solubility in water at 60° F. of the hydrochlorate as 1 in 24, and of the sulphate as 1 in 23.

(*To be continued.*)

APPARATUS FOR SOLAR DISTILLATION.*

BY JOSIAH HARDING, M. INST. C.E.

The total absence of potable water in many parts of the world, to which the existence of valuable mineral deposits attracts a considerable population, has called for the invention of some artificial means of supplying this, the greatest of all the necessaries of life. Perhaps in no part of the world has more attention been given to the subject than in the northern part of Chile, "the desert of Atacama." This region was traversed by Indian posts in the time of the Incas, the runners being supplied with water at various points on the road, with an immense expenditure of labour. The water was carried long distances, in large earthenware jars; and the inconvenience was reduced to a minimum by the care bestowed in laying out the roads, so as to take the greatest advantage of the fresh-water springs at the foot of the Andes.

About thirty years since the method of procuring fresh water from the sea by distillation was commenced. The original form of apparatus, and one that is even now largely in use, consisted merely of a Cornish boiler, the steam from which passed through a coil of wrought-iron pipes in an open tank, often of wood. Various improvements have been made from time to time, principally in the direction of enclosing the coils and conducting the steam given off to secondary, and thence to tertiary, condensers, similar to the apparatus designed by the late Dr. Normandy. The ordinary consumption of coal per unit of water in the original open condensers is about one-sixth, but with several condensers and an air-pump on the last, a ratio of one-sixteenth is regularly obtained in daily work.

A serious inconvenience attending this method of production arises from the excessively bad quality of the water for use in a steam boiler, as it contains about 14 per cent. of salts—the principal of which are chloride of sodium and the sulphates of lime, soda, and magnesia. The freight on coals from the port, too, is enormous, amounting, at the time when the apparatus was designed, to from three to three and a half dollars per hundred pounds. Taking into consideration the loss on the road, and the expense of repairs to boilers, condensers, etc., the cost of water was about four cents per gallon.

With a view to overcoming this difficulty, an apparatus for the distillation of water in Las Salinas, by the action of the sun's rays, was designed by Mr. Charles Wilson in 1872. Las Salinas is situated about seventy miles inland from the port of Antofogasta, and is about half-way on the road to Caracoles, a great silver district, requiring, when in full work, the employment of about eight hundred carts and four thousand mules, which passed through Salinas, on an average, about once a week. The site selected for the establishment was a smooth plain, with an inclination of about 1 in 100 towards the old watercourse, in which are wells for salt water. The apparatus consists essentially of a number of long shallow troughs, filled with water, and covered by a sloping glass roof. The water is evaporated by the sun's rays passing through the glass; the vapour is condensed on the under surface of the glass, runs down to grooves cut in the wooden frame, and thence, by a system of pipes, to the fresh-water tank. There are in the establishment at Salinas sixty-four frames, each 200 feet long by 4 feet broad, giving a total area of 51,200 square feet of glass. Each frame is composed of two principal parts, the water-trough and the roof. The trough is constructed of three longitudinal sleepers, 4 inches by 4 inches, of which the planking ($1\frac{1}{2}$ inch thick) is laid. The sides are composed of timbers, bolted to the sleepers at every 6 feet, the whole being carefully jointed inside with putty, to render it perfectly watertight, and having an inclination of about 1 inch in the total length in the direction of the wash-out plug. The roof is constructed in ten lengths of 20 feet each. The sides are of pine, with the upper edge properly cut to receive the glass, and a groove for conveying the condensed water to the outlet-pipes, which are placed at the lower end of each section, the groves having an inclination of 2 inches in 20 feet, in addition to the inclination of the trough. The end frames of the 20-feet sections of the roof, excepting those which coincide with the ends of the troughs, are carried down to a little below the water-level, to prevent the escape of vapour in the joint, there being, in fact, no outlet for the vapour, excepting by the small lead pipes which carry off the condensed water. The ridge is supported by the end frames and intermediate uprights, resting on the bottom of the trough. The sash-bars are movable, so as to suit varying widths of glass.

The salt water is admitted by a 1-inch brass cock at the higher end of the trough, and a wooden plug for washing out is provided at the lower end. There is also, at the lower end, an overflow pipe, the point of which is turned down below the water, to prevent the escape of vapour. The salt water is pumped from the wells by a windmill into a tank at the upper end of the grounds, sufficiently large to contain about four days' supply. The water from the tank is distributed to the various troughs by a 2-inch wrought-iron pipe, with the necessary connections. The fresh water is collected from the small lead pipes into a $1\frac{1}{2}$-inch wrought-iron pipe running between the troughs, and connecting with a 2-inch main-pipe at the end, which leads to the storage tanks. To increase the evaporation, the bottoms of the troughs are blackened with logwood and alum, and are washed out every second day, by running salt water through them.

When first set to work, the establishment produced daily, in summer, upwards of 5000 gallons of fresh water, about equal to 1 lb. of water per square foot of glass; but after the opening of the railway the owners grew careless, and allowed the troughs to get out of repair, so that, through leakages and insufficient cleansing, the production gradually fell off to about one-half of the above. When not properly attended to, crystals of sulphate of soda and lime (Glauberite) form in the troughs, directly diminishing the production, and indirectly leading to loss by leakage when the crystallization takes place between the planks, and so forcing open the joints. When properly maintained, the cost of water, including interest on capital, renewals of glass, etc., amounted to less than 1 per cent. per gallon. The principal item of expense is the renewal of glass broken by whirlwinds, which are very frequent in the locality. The staff consists of a clerk, who keeps the accounts, sells the water, and manages the business generally; and of a glazier, and two labourers for cleaning and repairs, and at intervals a carpenter to restore the woodwork.

The frames being laid on the ground, it is difficult to discover a leak, and the wood in the sides of the roof, between the fresh-water groove and the salt water is apt to crack in the part above the level of the salt water, and cause a loss of fresh water by its leaking back into the trough. The first defect could be remedied, at a moderate cost, by raising the longitudinal timbers on cross-sleepers placed 4 or 5 feet apart, and the second defect by lining the grooves with thin sheet-lead or tin. In the warm vapour under the glass, iron is very quickly destroyed. The temperature of the water in the troughs at noon (when the thermometer stands at 80° in the shade), is from 140° to 150° Fahrenheit. The distillation usually begins at about 10 a.m. and ends at about 10 p.m.

Some experiments were made, but very incompletely, to try the effect of warming the water in a boiler before it entered the troughs, especially for use during the night and early morning. From the little that was done, it appeared probable that good results might be expected. On cloudy days the production is less than one-half, about 40 per cent., of that on sunny days Cloudy days are, however, very rare.

* Abstract of a paper read before the Institution of Civil Engineers.

The total cost of the establishment, with pumps, windmills and tanks, was about 50,000 dollars, or 1 dollar per square foot of glass. This is much more than it would have been if the glass had been ordered direct from England, as in that purchased on the coast the broken glass is more than 50 per cent. of the whole. The freight on the material was a very large item; but, unfortunately, no details of the expenditure of the capital exist. An approximate estimate of the cost of such an establishment, under similar conditions, would be about 80 cents for each pound of water required daily.

Las Salinas is about 4300 feet above sea-level, and, from experiments tried in various parts, it is found that the water produced per foot of glass increases with the height above the sea. On the coast the production is about 25 per cent. less than in Salinas, probably in some degree owing to the greater number of cloudy days.

THE ATTACHMENT AND BITE OF THE LEECH.

BY G. CARLET.

The generally received opinion respecting the mechanism of the attachment of the leech is in accordance with the statement of Moquin-Tandon, that when the leech wishes to apply its oral sucker, it first projects the centre of it as a kind of cushion against the body it has chosen; then lowering the edges of the sucker from within outward, it finishes by solidly fixing the whole of its surface, and that an almost similar action takes place with the anal sucker.*

This mechanism has been studied by placing leeches on a glass plate and examining, through the glass, what occurs at the moment of application of the suckers. It has been found, however, by M. Carlet,† that this method of observation, though it might seem quite rational, does not give good results, because of the rapidity with which the attachment is effected; indeed, if the observers had waited until the leech had lost a little of its power of adherence, it would have been seen that the attachment of the suckers was not made in so complete a manner, and that one or more bubbles of air remained in the centre of each sucker, which would not have occurred if the centre had been fixed before the sides.

In studying the question afresh M. Carlet has had recourse to a graphic method. If a leech is placed on a piece of smoked paper, it advances, as on other surfaces, by the application of its two suckers, which serve it alternately as points of support. He has found it possible with care, to make the animal itself register the series of acts involved, and describes them as follows:—

A. The fixing of the posterior sucker is made very simply and quickly, first by the contact of the periphery, which describes on the blackened paper a white circle round a black disc, then by the lowering of the centre of the sucker, which adheres to the paper and causes the black spot to disappear.

B. The fixing of the anterior sucker is made in a much more complicated manner and less quickly.

(1.) The leech begins by exploring the place where it intends to fix itself with the two edges of the upper lip; these impress in white on the blackened paper, so as to form two lines converging forward.

(2.) The anterior part of the upper lip is lowered, and is seen to design a curvilinear angle opening backward.

(3.) The lower lip is then applied to the blackened surface, producing a curvilinear angle with a black centre.

(4.) The pharynx begins to be lowered and the triangular contour of the sucker widens in taking the circular form, so as to trace upon the paper a white circle, the centre of which remains black, showing that there has not yet been any contact with the centre of the sucker.

(5.) Lastly, the sucker touches the paper with its centre, and the complete adhesion is shown by an entirely white circle.

Instead, therefore, of beginning by fixing the centre of the sucker, and afterwards lowering the edges of that organ, as has been assumed without sufficient proof, the leech begins by fixing the edges, and afterwards lowering the centre, which adheres last. The detachment, which commences at the edges, finishes at the centre of the sucker.

M. Carlet has also been engaged in studying the bite of the leech, about which little was known beyond the fact that it is effected by means of three denticulated jaws of which the anatomy alone has been well studied.

According to M. Carlet,* immediately after the attachment, the anterior part of the body of the leech is brusquely erected so as to simulate a horseshoe posed on the ground. This position, which immediately precedes the bite, is obtained by the contraction of the longitudinal muscular fibres of the raised part, which serves then as a point of support to the muscles of the jaws. As soon as these enter into action they are seen to proceed by three projections, then three depressions, which succeed each other with perfect regularity.

Direct observation of these movements may be made upon compressing lightly the pharyngeal region between two fingers. M. Carlet has succeeded in making them register themselves, and has thus ascertained that they follow each other, without cessation, at the rate of two contractions a second.

In order to study the mode by which the bite is effected M. Carlet applied some leeches to the shaved skin of a rabbit, and by detaching them from it at various times was enabled to make the following observations:—

(1.) Upon carefully raising, by means of a hook, a point of the circumference of the sucker as soon as the part surmounting it was erected, it was seen that the skin was like a teat, and upon complete removal of the leech it was seen that this teat had not yet been punctured. This phase, which the author calls the preliminary stage of the bite, has no relation to the attachment, for, if a leech is made to progress on a leaf of very thin paper no indentation can be perceived under the paper corresponding to the attachment of the suckers.

(2.) If the leech were detached immediately after the movements of the pharyngeal region had given the signal of the action of the jaws, there were found on the skin three unconnected equidistant linear incisions.

(3.) If the leech were not detached until some moments after the commencement of the bite, three rents were observed, figuring a trefoil, the folioles of which were not in contact with each other. If, at the same moment, instead of the leech being detached, it was divided with a cut of the scissors in the œsophagal region, it did not cease to bite, but there was no immediate outflow of blood by the œsophagal orifice.

(4.) If this fragment of the leech, which continued to bite, were detached as soon as the blood commenced to escape by the section of the œsophagus, it was seen that the three folioles of the trefoil had joined together in the centre, so as to produce, by drawing back the shreds of the skin, a wound having the form of a triangle, the three medians of which correspond to the three jaws.

(5.) It was possible sometimes, when a leech was in the act of biting, to raise a portion of the sucker long enough to be able to observe the movement of the jaws easily. These were then seen to turn away one from the other at the same time that they penetrated into the wound, and afterwards to approach each other as they were raised.

To sum up, the denticules of the jaws are not strong enough to produce at a single cut a wound which causes the blood to flow and they act by many repetitions. They may be compared to a scarificator with three equidistant dentate blades, which turn away one from the other at the same time that they penetrate the skin. In making the instrument work several times successively in the same place, a sufficiently exact idea of the pharyngeal armature and of the mechanism of the bite of the leech may be obtained.

* A. Moquin-Tandon, 'Monographie de la famille des Hirudinées,' 2e éd., p. 55.

† *Comptes Rendus*, vol. xcvi., p. 448.

* *Comptes Rendus*, vol. xcvi., p. 1244.

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A PROPOSAL FOR THE ESTABLISHMENT OF TECHNICAL JURIES.

THE report of the litigation between the Baden Aniline and Soda Manufacturing Company and Messrs. LEVENSTEIN, which was published in a recent number of this Journal, furnishes an illustration of a class of cases that must be always a source of considerable perplexity to the judges who have to try them. In the majority of cases which come into the law courts a just decision depends upon the application of well-defined principles of law to facts which, however much obscured by prejudice and misrepresentation, are familiar in kind to and therefore easily weighed by the judicial mind when once established. But in technical disputes, where the import and bearing of the facts deposed to by witnesses can only be properly estimated by experts, and are certainly frequently unappreciated and misunderstood even by the counsel for the litigant on whose behalf they were put forward, judges have undoubtedly a much more difficult problem to solve before they can arrive at a correct decision. Take for instance the case referred to, where the point in dispute was the infringement of a patent protecting certain processes for the production of the "sulpho acids of oxyazonaphthalene," a subject concerning which many chemists even would be unprepared to speak without previously reading it up. After a considerable number of scientific witnesses had been heard the learned judge sought to help himself to light upon one point that appeared to lend itself to ocular demonstration; but even here he was foiled, and felt compelled to call in Professor ROSCOE to his aid. Nevertheless, the learned judge had apparently to base his decision eventually upon his ability to recognize nice shades of resemblance or distinction between chemical reactions, of which, it is not disrespectful to say, he probably had no conception before the trial began.

But this inconvenience, which probably could hardly be overcome without a wide extension of the utilization of assessors, is greatly intensified, when, as is sometimes the case, the questions of fact that might perplex the trained intellect of a judge have to be pronounced upon by the ordinary special juryman. Nor is there a probability that it will become more infrequent now that scientifically worked out processes are so widely displacing the rule of thumb in every important manufacture. It has been pointed out that in such cases the members of a jury, when they agree upon a verdict, are more likely to be unduly influenced by the counsel who can make his points clear to them, or by an opinion expressed by the judge, than in cases where little or no technical knowledge is required. Hence the number of such verdicts that are reversed on appeal, and the growing tendency of suitors to avoid this risk by adopting one of the alternative procedures either before a judge sitting without a jury or by arbitration. Probably both of these modes present points of advantage, though, from the causes before mentioned, the plan of leaving the decision to a single judge cannot be deemed altogether satisfactory, and those who have had many of such cases under their notice must have been struck with the tendency shown by judges themselves to break through the web woven around them by experts, and to give a premature decision upon a point of law, whilst it cannot be said that the public has yet been educated to the point of placing, as a rule, as much confidence in arbitrators as in juries.

The subject has been fairly discussed in a communication recently submitted by Mr. EWING MATHESON to the London Chamber of Commerce, in which he recommends the formation of a class of technical jurymen or assessors, and the establishment of properly organized courts of arbitration. Neither of these suggestions has all the charms of novelty, but we think they are worthy of a fuller consideration than they have yet received, and upon the former especially, most of the readers of this Journal are very well qualified to pronounce an opinion. In dealing with the primary question as to how a better class of jurymen is to be obtained, Mr. MATHESON argues that the difficulty does not lie in any lack of the class of men required, either in London or other important centres, but rather in the mode of selecting them so as to best secure the confidence of suitors and not to press too hard upon the jurymen themselves. The classes which he would propose to utilize in the organization of a body of technical jurymen would be the members of those learned societies, membership of which implies more than an amateur knowledge, as distinguished from those that can be entered by payment of a fee, and university graduates in science. Mr. MATHESON evidently looks with longing eyes upon the members of the medical profession, who would from their training form admirable technical jurymen; but he recognizes that their avocation forbids their being called upon, and we may remark that the same exemption would apply in the case of the many pharmaceutical chemists who are members of the learned societies. He thinks, however, that it would be worth considering whether those engaged in certain kinds of practice, an interruption of which would inconvenience only themselves, and those who had retired from practice, might not be included in a technical jury list with very great advantage to the community. We should have more faith in this suggestion if it indicated more clearly that the service should be optional, rather than dependent upon some arbitary distinction between members of the same class.

It is thought that from the classes above indicated a body of ten thousand technical jurymen might be selected, or, allowing for deductions on account of age, infirmity and absence, a panel of at least five thousand men might be secured, and assuming an average of one hundred trials yearly in which the services of such jurymen would be required, the plan would involve service once every five years. It is not proposed that all the members of a jury shall be specially interested in the science bearing on the case,—for instance, that disputes about engineering patents shall be settled by a jury of engineers, or electric light contentions by a jury of electricians,—it being thought that the wider basis and variety of a jury made up of the various classes would be an advantage, whilst each member would possess in his own training a special fitness for comprehending the arguments in a technical dispute.

It will be evident, however, that before such a scheme could be brought within the range of practical politics many points will have to be settled, amongst others whether technical jury service should be compulsory or voluntary, whether it should be considered supplemental to or an equivalent for ordinary jury service, and whether it should be specially remunerated. The scheme will have to experience the preliminary winnowings and siftings that fall to the lot of all projected improvements, and it is quite possible, notwithstanding a certain amount of merit, that it may disappear in the process.

The Medical Acts Amendment Bill was on Wednesday last withdrawn by the Government. It had been hoped that the second reading would have taken place on Tuesday and in that case it was intended to have proceeded with the Bill. But it was not reached on that day, and on the next, in reply to questions, the Premier said that the loss of the opportunity was fatal to the chances of the Bill passing this session, and later in the evening the order for the second reading was read and discharged.

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The clause submitted by the Board of Trade to the Council of the Society at its last meeting was incorporated into the Patents for Invention Bill which has since passed through Parliament. In reply to a question in the House of Commons on Monday last, the Solicitor-General stated that tradesmen who displayed the Royal Arms on trade labels, shop fronts and in other ways, but without any word or words implying that they made such assumption by authority would not render themselves liable to penalty under that clause.

* * *

The Select Committee on the Petroleum Bill has reported to the House of Lords recommending its withdrawal. The Committee is of opinion that the evidence it has collected will enable the Home Office in the early part of next session to present such a Bill as will provide for the safety of the public.

* * *

A revised Circular of Instructions to Superintendents of Mercantile Marine Offices respecting the Medical Scale for Merchant Ships has recently been issued by the Board of Trade. The principal alteration from the previous Scale consists in the incorporation of a "Scale of Medical Comforts," giving the quantities to be shipped for every hundred passengers where the length of the passage is one hundred days, or upwards. One half these quantities have to be shipped when the length of the passage is under that time. In the Scale of Medicines two fresh articles have been introduced, "Red Cross Antiseptic Fluid," and "Cerealine." Although the nature of those two articles may be guessed at, the names appear to indicate that they are specialties of particular manufacturers. We think this to be greatly regretted; for all the articles in a compulsory list like this should be sufficiently defined under recognized names that disclose their composition to enable them to be readily identified and supplied.

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According to a statement in the *British Medical Journal* twenty-six baronetcies have been conferred upon members of the medical profession during the last hundred years, namely four by George III., two by George IV., two by William IV., and eighteen by our present Queen. Four of these have already become extinct. Of the eighteen medical baronets created during the present reign, and of whom eight survive, eleven were physicians, five were surgeons, and two obstetric physicians. All the eight medical baronets now living practise in London.

* * *

According to a report by Mr. Consul Cameron the crop of bark from the Dutch Government cinchona plantations in Java is increasing year by year, that for 1882 amounting to 230,000 Amsterdam pounds (17½ ounces nearly) against 165,000 pounds in 1881. Experiments made last year to ascertain the percentage of alkaloid contained in the bark from young Ledgeriana trees raised from seed produced by plants grown in the island showed that the bark from a plant four years old, when bearing the true type of the mother stem, yields 9 to 11·75 per cent. of quinine, being an improvement on the parent trees. There were at the end of the year 3,305,200 cinchona trees in the Government nurseries and plantations, of which 820,700 were young Ledgeriana trees in the nurseries, and 694,900 older ones in the plantations. The exports of bark from the private plantations in Java during 1882 was 181,354 Amsterdam pounds, a quantity that is likely soon to be considerably increased.

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We regret to have to record the death at Dorchester, on the 4th inst., of Mr. T. W. H. Tolbort, who was one of the earliest "Bell Scholars," he having been chosen, together with Dr. Tilden, at the institution of the Jacob Bell Memorial Scholarships, in 1861. Mr. Tolbort did not, however, continue long in the ranks of pharmacy, but having shortly afterwards passed the Indian Civil Service Examinations at the head of the list, he entered the Bengal Civil Service, and at the time of his death held the office of Deputy Commissioner at Umballa.

Proceedings of Scientific Societies.

ROYAL INSTITUTION OF GREAT BRITAIN.

Thoughts on Radiation, Theoretical and Practical.*

BY PROFESSOR TYNDALL, D.C.L., F.R.S., M.R.I.

Scientific discoveries are not distributed uniformly in time. They appear rather in periodic groups. Thus, in the two first years of this century, among other gifts presented by men of science to the world, we have the Voltaic pile; the principle of Interference, which is the basis of the undulatory theory of light; and the discovery by William Herschel of the dark rays of the sun.

Directly or indirectly, this latter discovery heralded a period of active research on the subject of radiation. Leslie's celebrated work on the Nature of Heat was published in 1804, but he informs us, in the preface, that the leading facts which gave rise to the publication presented themselves in the spring of 1801. An interesting but not uncommon psychological experience is glanced at in this preface. The inconvenience of what we call ecstacy, or exaltation, is that it is usually attended by undesirable compensations. Its action resembles that of a tidal river, sometimes advancing and filling the shores of life, but afterwards retreating and leaving unlovely banks behind. Leslie, when he began his work, describes himself as "transported at the prospect of a new world emerging to view." But further on the note changes, and before the preface ends he warns the reader that he may expect variety of tone, and perhaps defect of unity in his disquisition. The execution of the work, he says, proceeded with extreme tardiness; and as the charm of novelty wore off, he began to look upon his production with a coolness not usual in authors.

The ebb of the tide, however, was but transient; and to Leslie's ardour, industry and experimental skill, we are indebted for a large body of knowledge in regard to the phenomena of radiation. In the prosecution of his researches he had to rely upon himself. He devised his own apparatus, and applied it in his own way. To produce radiating surfaces, he employed metallic cubes, which to the present hour are known as Leslie's cubes. The different faces of these cubes he coated with different substances, and filling the cubes with boiling water, he determined the emissive powers of the substances thus heated. These he found to differ greatly from each other. Thus, the radiation from a coating of lampblack being called 100, that from the uncoated metallic surface of his cube was only 12. He pointed out the reciprocity existing between radiation and absorption, proving that those substances which emit heat copiously absorb it greedily. His thermoscopic instrument was the well-known differential-thermometer invented by himself. In experiment Leslie was very strong, but in theory he was not so strong. His notions as to the nature of the agent whose phenomena he investigated with so much ability are confused and incorrect. Indeed, he could hardly have formed any clear notion of the physical meaning of radiation before the undulatory theory of light, which was then on its trial, had been established.

A figure still more remarkable than Leslie occupied the scientific stage at the same time, namely, the vigorous, original and practical Benjamin Thompson, better known as Count Rumford, the originator of the Royal Institution. Rumford traversed a great portion of the ground occupied by Leslie, and obtained many of his results. As regards priority of publication, he was obviously discontented with the course which things had taken, and he endeavoured to place both himself and Leslie in what he supposed to be their right relation to the subject of radiant heat. The two investigators were unknown to each other personally, and their differences never rose to scientific strife. There can hardly, I think, be a doubt that each of them worked independently of the other, and that where their labours overlap, the honour of discovery belongs equally to both.

* Read Friday, March 16, 1883.

The results of Leslie and Rumford were obtained in the laboratory; but the walls of a laboratory do not constitute the boundary of its results. Nature's hand specimens are always fair samples, and if the experiments of the laboratory be only true, they will be ratified throughout the universe. The results of Leslie and Rumford were in due time carried from the cabinet of the experimenter to the open sky by Dr. Wells, a practising London physician. And here let it be gratefully acknowledged that vast services to physics have been rendered by physicians. The penetration of Wells is signalized among other things by the fact recorded by the late Mr. Darwin, that forty-five years before the publication of the 'Origin of Species,' the London doctor had distinctly recognized the principle of Natural Selection, and that he was the first to recognize it. But Wells is principally known to us through his 'Theory of Dew,' which, prompted by the experiments of Leslie and Rumford, and worked out by the most refined and conclusive observations on the part of Wells himself, first revealed the cause of this beautiful phenomenon. Wells knew that through the body of our atmosphere invisible aqueous vapour is everywhere diffused. He proved that grasses and other bodies on which dew was deposited were powerful emitters of radiant heat; that when nothing existed in the air to stop their radiation, they became self-chilled; and that while thus chilled they condensed into dew the aqueous vapour of the air around them. I do not suppose that any theory of importance ever escaped the ordeal of assault on its first enunciation. The theory of Wells was thus assailed; but it has proved immovable, and will continue so to the end of time.

The interaction of scientific workers causes the growth of science to resemble that of an organism. From Faraday's tiny magneto-electric spark, shown in this theatre half a century ago, has sprung the enormous practical development of electricity at the present time. Thomas Seebeck, in 1822, discovered thermo-electricity, and eight years subsequently bars of bismuth and antimony were first soldered together by Nobili so as to form a thermo-electric pile. In the self-same year Melloni perfected the instrument and proved its applicability to the investigation of radiant heat. The instrumental appliances of science have been well described as extensions of the senses of man. Thus the invention of the thermopile vastly augmented our powers over the phenomena of radiation. Melloni added immensely to our knowledge of the transmission of radiant heat through liquids and solids. His results appeared at first so novel and unexpected that they excited scepticism. He waited long in vain for a favourable report from the academicians of Paris; and finally, in despair of obtaining it, he published his results in the *Annales de Chimie*. Here they came to the knowledge of Faraday, who, struck by their originality, brought them under the notice of the Royal Society, and obtained for Melloni the Rumford medal. The medal was accompanied by a sum of money from the Rumford fund; and this, at the time, was of the utmost importance to the young political exile, reduced as he was to penury in Paris. From that time, until his death, Melloni was ranked as the foremost investigator in the domain of radiant heat.

As regards the philosophy of the thermopile, and its relation to the great doctrine of the conservation of energy, now everywhere accepted, a step of singular significance was taken by Peltier in 1834. Up to that time it had been taken for granted that the action of an electric current upon a conductor through which it passed, was always to generate heat. Peltier, however, proved that, under certain circumstances, the electric current generated cold. He soldered together a bar of antimony and a bar of bismuth, end to end, thus forming of the two metals one continuous bar. Sending a current through this bar, he found that when it passed from antimony to bismuth across the junction, heat was always there developed, whereas when the direction of the current was from bismuth to antimony, there was a development of cold. By placing a drop of chilled water upon the junction of the two metals, Lenz subsequently congealed the water to ice by the passage of the current.

The source of power in the thermopile is here revealed, and a relation of the utmost importance is established between heat and electricity. Heat is shown to be the nutriment of the electric current. When one face of a thermopile is warmed, the current produced, which is always from bismuth to antimony, is simply heat consumed and transmuted into electricity.

Long before the death of Melloni, what the Germans call "Die Identitäts Frage," that is to say, the question of the identity of light and radiant heat, agitated men's minds and spurred their inquiries. In the world of science people differ from each other in wisdom and penetration, and a new theoretic truth has always at first the minority on its side. But time, holding incessantly up to the gaze of inquirers the unalterable pattern of nature, gradually stamps that pattern on the human mind. For twenty years Henry Brougham was able to quench the light of Thomas Young, and to retard, in like proportion, the diffusion of correct notions regarding the nature and propagation of radiant heat. But such opposing forces are, in the end, driven in, and the undulatory theory of light being once established, soon made room for the undulatory theory of radiant heat. It was shown by degrees that every purely physical effect manifested by light was equally manifested by the invisible form of radiation. Reflection, refraction, double refraction, polarization, magnetization, were all proved true of radiant heat, just as certainly as they had been proved true of light. It was at length clearly realized that radiant heat, like light, was propagated in waves through that wondrous luminiferous medium which fills all space, the only real difference between them being a difference in the length and frequency of the ethereal waves. Light, as a sensation, was seen to be prodnced by a particular kind of radiant heat, which possessed the power of exciting the retina.

And now we approach a deeper and more subtle portion of our subject. What, we have to ask, is the origin of the ether waves, some of which constitute light, and all of which constitute radiant heat? The answer to this question is that the waves have their origin in the vibrations of the ultimate particles of bodies. But we must be more strict in our definition of ultimate particles. The ultimate particle of water, for example, is a *molecule*. If you go beyond this molecule and decompose it, the result is no longer water, but the discrete *atoms* of oxygen and hydrogen. The molecule of water consists of three such atoms tightly held together, but still capable of individual vibration. The question now arises: Is it the molecules vibrating as wholes, or the shivering atoms of the molecules that are to be considered as the real sources of the ether waves? As long as we were confined to the experiments of Leslie, Rumford, and Melloni, it was difficult to answer this question. But when it was discovered that gases and vapours possessed—in some cases to an astonishing extent—the power both of absorbing and radiating heat, a new light was thrown upon the question.

You know that the theory of gases and vapours, now generally accepted, is that they consist of molecular or atomic projectiles darting to and fro, clashing and recoiling, endowed, in short, with a motion not of vibration but of translation. When two molecules clash, or when a single molecule strikes against its boundary, the first effect is to deform the molecule, by moving its atoms out of their places. But gifted as they are with enormous resiliency, the atoms immediately recover their positions, and continue to quiver in consequence of the shock. Held tightly by the force of affinity, they resemble a string stretched to almost infinite tension, and therefore capable of generating tremors of almost infinite rapidity. What we call the heat of a gas is made up of these two motions—the flight of the molecules through space, and the quivering of their constituent atoms. Thus does the eye of science pierce to what Newton called "the more secret and noble works of Nature," and make us at home amid the mysteries of a world lying in all probability vastly further beyond the range of the microscope than the range of the microscope, at its maximum, lies beyond that of the unaided eye.

The great principle of radiation, which affirms that all bodies absorb the same rays that they emit, is now a familiar one. When, for example, a beam of white light is sent through a yellow sodium flame, produced by a copious supply of sodium vapour, the yellow constituent of the white beam is stopped by the yellow flame, and if the beam be subsequently analysed by a prism, a black band is found in the place of the intercepted yellow band of the spectrum. We have been led, as you know, to our present theoretic knowledge of light by a close study of the phenomena of sound, which in the present instance will help us to a conception of the action of the sodium flame. The atoms of sodium vapour synchronize in their vibrations with the particular waves of ether which produce the sensation of yellow light. The vapour, therefore, can take up or absorb the motion of those waves, as a stretched piano-string takes up or absorbs the pulses of a voice pitched to the note of the string. I will now show you the action of sodium vapour, in a way and with a result which startled and perplexed me on first making the experiment, more than twenty years ago. You know that the spectra of incandescent metallic vapours are not continuous, but formed of brilliant bands. I wished, in 1861, to obtain the brilliant yellow band produced by incandescent sodium vapour. To this end, I placed a bit of sodium in a carbon crucible, and volatilized it by a powerful voltaic current. A feeble spectrum overspread the screen, from which I thought the sodium band would stand out with dominant brilliancy. To my surprise, at the very point where I expected this brilliant band to appear, a band of darkness took its place. By humouring the voltaic arc a little, the darkness vanished, and in the end I obtained the bright band which I had sought at the beginning. On reflection the cause was manifest. The first ignition of the sodium was accompanied by the development of a large amount of sodium vapour, which spread outwards and surrounded, as a cool envelope, the core of intensely heated vapour inside. By the cool vapour the rays from the hot were intercepted, but on lengthening the arc the outer vapour in great part was dispersed, and the rays passed to the screen. This relation as to temperature was necessary to the production of the black band; for were the outside vapour as hot as the inside, it would, by its own radiation, make good the light absorbed.

An extremely beautiful experiment of this kind was made in this theatre by Professor Liveing, with rays which, under ordinary circumstances, are entirely invisible. Professor Dewar and Professor Liveing have been long working with conspicuous success at the ultra-violet spectrum, and with Professor Dewar's aid I will now show you this spectrum, as it was shown last week by Professor Liveing. Using prisms and lenses of a certain kind, and a powerful dynamo machine to volatilize our metals, we cast a spectrum upon the screen. You notice the terminal violet of this spectrum. Far beyond that violet, waves are now impinging upon the screen, which have no sensible effect upon the organ of vision; they constitute what we call the ultra-violet spectrum. Professor Stokes has taught us how to render this invisible spectrum visible, and it is by a skilful application of Stokes's discovery that Liveing and Dewar bring the hidden spectrum out with wondrous strength and beauty.

You notice here a small second screen, which can be moved into the ultra-violet region. Felt by the hand, the surface of this screen resembles sandpaper, being covered with powdered uranium glass, a highly fluorescent body. Pushing the moveable screen towards the visible spectrum, at a distance of three or four feet beyond the violet, light begins to appear. On pushing in the screen, the whole ultra-violet spectrum falls upon it, and is rendered visible from beginning to end. The spectrum is not continuous, but composed for the most part of luminous bands derived from the white-hot crucible in which the metals are to be converted into vapour. I beg of you to direct your attention on one of these bands in particular. Here it is, of fair luminous intensity. My object now is to show you the reversal, as it is called, of that band which belongs to the vapour of magnesium, exactly as I showed you a moment ago the reversal of the sodium band. An assistant will throw a bit of magnesium into the crucible, and you are to observe what first takes place. The action is rapid, so that you will have to fix your eyes upon this particular strip of light. On throwing in the magnesium, the luminous band belonging to its vapour is cut away, and you have, for a second or so, a dark band in its place. I repeat the experiment three or four times in succession, with the same unfailing result. Here, as in the case of the sodium, the magnesium surrounded itself for a moment by a cool envelope of its own vapour, which cut off the radiation from within, and thus produced the darkness.

And now let us pass on to an apparently different, but to a really similar result. Here is a feebly luminous flame, which you know to be that of hydrogen, the product of combustion being water vapour. Here is another flame of rich blue colour, which the chemists present know to be the flame of carbonic oxide, the product of combustion being carbonic acid. Let the hydrogen flame radiate through a column of ordinary carbonic acid—the gas proves highly transparent to the radiation. Send the rays from the carbonic oxide flame through the same column of carbonic acid—the gas proves powerfully opaque. Why is this? Simply because the radiant, in the case of the carbonic oxide flame, is hot carbonic acid, the rays from which are quenched by the cold acid exactly as the rays from the intensely heated sodium vapour were quenched a moment ago by the cooler envelope which surrounded it. Bear in mind the case is always one of synchronism. It is because the atoms of the cold acid vibrate with the same frequency as the atoms of the hot, that the pulses sent forth from the latter are absorbed.

Newton, though probably not with our present precision, had formed a conception similar to that of molecules and their constituent atoms. The former he called corpuscles, which, as Sir John Herschel says, he regarded "as divisible groups of atoms of yet more delicate kind." The molecules he thought might be seen if microscopes could be caused to magnify three or four thousand times. But with regard to the atoms, he made the remark already alluded to:—"It seems impossible to see the more secret and nobler works of nature within the corpuscles, by reason of their transparency."

I have now to ask your attention to an illustration intended to show how radiant heat may be made to play to the mind's eye the part of the microscope, in revealing to us something of the more secret and noble works of atomic nature. Chemists are ever on the alert to notice analogies and resemblances in the atomic structures of different bodies. They long ago pointed out that a resemblance exists between that evil-smelling liquid, bisulphide of carbon, and carbonic acid. In the latter substance, we have one atom of carbon united to two of oxygen, while in the former we have one atom of carbon united to two of sulphur. Attempts have been made to push the analogy still further by the discovery of a compound of carbon and sulphur which should be analogous to carbonic oxide, where the proportions, instead of one to two, are one to one, but hitherto, I believe, without success. Let us now see whether a little physical light cannot reveal an analogy between carbonic acid and bisulphide of carbon more occult than any hitherto pointed out. For all ordinary sources of radiant heat the bisulphide, both in the liquid and vaporous form, is the most transparent, or diathermanous, of bodies. It transmits, for example, 90 per cent. of the radiation from our hydrogen flame, 10 per cent. only being absorbed. But when we make the carbonic oxide flame our source of rays, the bisulphide shows itself to be a body of extreme opacity. The transmissive power falls from 90 to about 25 per cent., 75 per cent. of the radiation being absorbed. To the radiation from the carbonic oxide flame the bisulphide behaves like the carbonic acid. In other words, the group of atoms constituting the molecule of the bisulphide vibrate in the same periods as those of the atoms which constitute the molecule of the carbonic acid. And thus we have established a new, subtle, but most certain resemblance between these two substances. The time may come when chemists will make more use than they have hitherto done of radiant heat as an explorer of molecular condition.

The term "theoretical radiation" introduced into the title of this discourse is, I hope, thus justified. The conception of these quivering atoms is a theoretic conception, but it is one which gives us a powerful grasp of the facts, and enables us to realize mentally the mechanism on which radiation and absorption depend. We will turn in a moment to what I have called practical "radiation." It is pretty well known that for a long series of years I conducted an amicable controversy with one of the most eminent experimenters of our time, as regards the action of the earth's atmosphere on solar and terrestrial radiation. My contention was that the great body of our atmosphere—its oxygen and nitrogen—had but little effect upon either the rays of the sun coming to us, or the rays of the earth darting away from us into space, but that mixed with the body of our air there was an attenuated and apparently trivial constituent which exercised a most momentous influence. That body, as many of you know, is aqueous vapour, the amount of which does not exceed 1 per cent. of the whole atmosphere. Minute, however, as its quantity is, the life of our planet depends upon that vapour. Without it, in the first place, the clouds could drop no fatness. In this sense the necessity for its presence is obvious to all. But it acts in another sense as a preserver. Without it as a covering, the earth would soon be reduced to the frigidity of death. Observers were, and are, slow to take in this fact, which nevertheless is a fact, however improbable it may at first sight appear. The action of aqueous vapour upon radiant heat has been established by irrefragable experiments in the laboratory; and these experiments, though not unopposed, have been substantiated by some of the most accomplished meterologists of our day.

I wished much to instruct myself a little by actual observation on this subject, under the open sky, and my first object was, to catch, if possible, states of the weather which would enable me to bring my views to a practical test. Thanks to an individual who devotes her life to taking care of mine, a little iron hut, embracing a single room, has been placed for my benefit, upon the wild moorland of Hind Head. From the plateau on which the hut stands, thre is a free outlook in all directions. Here, amid the heather, I had two stout poles fixed firmly in the ground 8 feet asunder, and a stout cord stretched from one to the other. From the centre of this cord a thermometer is suspended with its bulb 4 feet above the ground. On the ground is placed a pad of cotton wool, and on this cotton wool a second thermometer, the object of the arrangement being to determine the difference of temperature between the two thermometers, which are only 4 feet vertically apart.

Permit me at the outset to deal with the subject in a perfectly elementary way. In comparison with the cold of space, the earth must be regarded as a hot body, sending its rays, should nothing intercept them, across the atmosphere into space. The cotton wool is chosen because it is a powerful, though not the most powerful, radiator. It pours its heat freely into the atmosphere, and by reason of its flocculence, which renders it a non-conductor, it is unable to derive from the earth heat which might atone for its loss. Imagine the cotton wool thus self-chilled. The air in immediate contact with it shares its chill, and the thermometer lying upon it partakes of the refrigeration. In calm weather the chilled air, because of its greater density, remains close to the earth's surface, and in this way we sometimes obtain upon that surface a temperature considerably lower than that of the air a few feet above it. The experiments of Wilson, Six, and Wells have made us familar with this result. On the other hand, the earth's surface during the day receives from the sun more heat than it loses by its own radiation, so that when the sun is active, the temperature of the surface exceeds that of the air.

These points will be best illustrated by describing the course of temperature for a day, beginning at sunrise and ending at 10.20 p.m. on March 4. The observations are recorded in the annexed table, at the head of which is named the place of observation, its elevation above the sea, and the state of the weather. The first column in the table contains the times at which the two thermometers were read. The column under "Air" gives the temperatures of the air, the column under "Wool" gives the temperature of the wool, while the fourth column gives the differences between the two temperatures. It is seen at a glance that from sunrise to 9.20 a.m. the cotton wool is colder than the air; at 9.30 the temperatures are alike. This is the hour of "intersection," which is immediately followed by "inversion." Throughout the day and up to 4 p.m. the wool is warmer than the air. At 4.5 p.m. the temperatures are again alike; while from that point downwards the loss by terrestrial radiation is in excess of the gain derived from all other sources, the refrigeration reaching a maximum at 7.30 p.m., when the difference between the two thermometers amounted to 10° F. When the observations are continued throughout the night, the greater cold of the surface is found to be maintained till sunrise, and for some hours beyond it. Had the air been perfectly still during the observations, the nocturnal chilling of the surface would have been in this case greater; for you can readily understand that even a light wind sweeping over the surface, and mixing the chilled with the warmer air, must seriously interfere with the refrigeration.

Hind Head, Elevation, 850 *feet.*

Course of Temperature, March 4, 1883.

Sky cloudless. Hoar frost. Wind light from north-east.

Time.	Air.	Wool.	Difference.
	°	°	°
6.50 a.m. (sunrise) . . .	31	25	6
7.20 . . .	32½	24½	8
7.40 . . .	34	25	9
8.5 . . .	35	27	8
8.20 . . .	35	30	5
9.15 . . .	40	38	2
9.20 . . .	41	40	1
9.30 (intersection) . . .	41	41	0
9.40 (inversion) . . .	41	42	1
10.15 . . .	42½	45	2½
11. . . .	45	52	7
11.30 . . .	47	55	8
12 noon . . .	50	58	8
11.30 p.m. . . .	50	59½	9½
1. . . .	50	57½	7½
2. . . .	49	60	11
2.30 . . .	48	58	10
3. . . .	49	56	7
3.30 . . .	48	52	4
4. . . .	47	48	1
4.5 (intersection) . . .	47	47	0
4.10 (inversion) . . .	47	45	2
4.15 p.m. . . .	47	43	4
4.30 . . .	46	41	5
7. . . .	35	26	9
7.30 . . .	35	25	10
8.30 . . .	34	24½	9½
9.40 . . .	33	24½	8½
10.20 . . .	32	24	8

Glacial wind from north-east. Stars very bright.

Various circumstances may contribute to lessen, or even abolish, the difference between the two thermometers. Haze, fog, cloud, rain, snow, are all known to be influential. These are visible impediments to the outflow of heat from the earth; but my position for some time has been that a very powerful obstacle to that outflow exists which is entirely invisible. The pure vapour of water, for example, is a gas as invisible as the air itself. It is everywhere diffused through the air; but, unlike the oxygen and nitrogen of the atmosphere, it is not constant in quantity. We have now to examine whether meteorological observations do not clearly indicate its influence on terrestrial radiation.

With a view to this examination, I will choose a series of observations made during the afternoon and evening of a day of extraordinary calmness and serenity. The visible condition of the atmosphere at the time was that which has hitherto been considered most favourable to the outflow of terrestrial heat, and therefore best calculated to establish a large difference between the air and wool thermometers. The 16th of last January was a day of this kind, when the observations recorded in the annexed table was made.

January 16th.—Extremely serene. Air almost a dead calm. Sky without a cloud. Light south-westerly air.

Time.	Air.	Wool.	Difference.
P.M.	°	°	°
3.40	43	37	6
3.50	42	35	7
4.	41	35	6
4.15	40	34	6
4.30	38	32	6
5.	37	28	9
5.30	37	30	7
6.	36	32	4
6.30	36	31	5
7.	36	28	8
7.30	35½	28	7½
8.	35	26	9
8.30	34	25	9
9.	35	27	8
10.	35	28	7
10.30	35	29	6

During these observations there was no visible impediment to terrestial radiation. The sky was extremely pure, the moon was shining; Orion, the Pleiades, Charles's Wain, including the small companion star at the bend of the shaft, the North Star, and numbers of others, were clearly visible. After the last observation, my note-book contains the remark, "Atmosphere exquisitely clear; from zenith to horizon cloudless all round."

A moment's attention bestowed on the column of differences in the foregoing table will repay us. Why should the difference at 6 p.m. be fully 5° less than at 5 p.m.; and again 5° less than at 8 and at 8.30 respectively? There was absolutely nothing in the aspect of the atmosphere to account for the approach of the two thermometers at 6 o'clock—nothing to account for their preceding and subsequent divergence from each other. Anomalies of this kind have been observed by the hundred, but they have never been accounted for, and they did not admit of explanation until it had been proved that the intrusion of a perfectly invisible vapour was competent to check the radiation, while its passing away reopened a doorway into space.

It is well to bear in mind that the difference between the two thermometers on the evening here referred to varied from 4° to 9°, the latter being the maximum.

Such observations might be multiplied, but, with a view to saving space, I will limit the record. On the evening of January 30th, the atmosphere was very serene; there was no moon, but the firmament was powdered with stars. At 7.15 p.m. the difference between the two thermometers was 6°; while at 9.30 p.m. it was 4°, the wool thermometer being in both cases the colder of the two.

On February 3rd observations were made under similar conditions of weather, and with a similar result. At 7.15 p.m. the difference between the thermometers was 6°; while at 8.25 p.m. it was 4°. On both these evenings the sky was cloudless, the stars were bright, while the movement of the air was light, from the south-west.

In all these cases the air passing over the plateau of Hind Head had previously grazed the comparatively warm surface of the Atlantic Ocean, where it had charged itself with aqueous vapour to a degree corresponding to its temperature. Let us contrast its action with that of air coming to Hind Head from a quarter less competent to charge it with aqueous vapour. We were visited by such air on the 10th of last December, when the movement of the wind was light from the north-east, the temperature at the time, moreover, was very low, and hence calculated to lessen the quantity of atmospheric vapour. Snow a foot deep covered the heather. At 8.5 a.m. the two thermometers were taken from the hut, having a common temperature of 35°. The one was rapidly suspended in the air, and the other laid upon the wool. I was not prepared for the result. A single minute's exposure sufficed to establish a difference of 5° between the thermometers; an exposure of five minutes produced a difference of 13°; while after ten minutes exposure the difference was found to be no less than 17°. Here follow some of the observations.

December 10th.—Deep snow; low temperature; sky clear; light north-easterly air.

Time.	Air.	Wool.	Difference.
A.M.	°	°	°
8.10	29	16	13
8.15	29	12	17
8.20	27	12	15
8.30	26	11	15
8.40	26	10	16
8.45	27	11	16
8.50	29	11	18

During these observations, a dense bank of cloud on the opposite ridge of Blackdown virtually retarded the rising of the sun. It had, however, cleared the bank during the last two observations, and, touching the air thermometer with its warmth, raised its temperature from 26° to 27° and 29° The very large difference of 18° is in part to be ascribed to this raising of the temperature of the air thermometer. I will limit myself to citing one other case of a similar kind. On the evening of the 31st of March, though the surface temperature was far below the dew point, very little dew was deposited. The air was obviously a dry air. The sky was perfectly cloudless, while the barely perceptible movement of the air was from the north-east. At 10 p.m. the temperature of the the air thermometer was 37°, that of the wool thermometer was 20°, a refrigeration of 17° being therefore observed on this occasion.

From the behaviour of a smooth ball when urged in succession over short grass, over a gravel walk, over a boarded floor, and over ice, it has been inferred that, were friction entirely withdrawn, we should have no retardation. In a similar way, under atmospheric conditions visibly the same, we observe that the refrigeration of the earth's surface at night markedly increases with the dryness of the atmosphere: we may infer what would occur if the invisible atmospheric vapour were entirely withdrawn. I am far from saying that the body of the atmosphere exerts no action whatever upon the waves of terrestrial heat; but only that its action is so small that, when due precautions are taken to have the air pure and dry, laboratory experiments fail to reveal any action. Without its vaporous screen, our solid earth would practically be in the presence of stellar space; and with that space, so long as a difference existed between them, the earth would continue to exchange temperatures. The final result of such a process may be surmised. If carried far enough, it would infallibly extinguish the life of our planet.

SOCIETY OF ARTS.

Solid and Liquid Illuminating Agents.*

BY LEOPOLD FIELD, F.C.S.

Lecture III.

Continuing the consideration of those bodies which can be converted into candles without alteration of their chemical nature, we will discuss palm and cocoanut oils; although, like tallow, in an unmanufactured condition, their application is very limited. The family of palms is exceedingly large; and of the number many varieties contribute to the domain of light. I have mentioned the wax palm, which perhaps remits, next to those two which we are now discussing, the largest subsidies to the candle pan; but all other vegetable sources scarcely furnish a tithe of the quantity which is yielded by the *Elais guineenis*, the oil palm, and the *Elais melanococcus*, the cocoanut tree. The former is distributed mainly through the West Coast of Africa, sometimes penetrating pretty far into the interior. Its chief habitat is along the banks of the Senegal and Gambia rivers, which are lined with the rude factories where the natives extract the oil. The fruit of this palm weighs about twenty pounds, and much resembles a large artichoke intersected with small golden plums. Dried specimens can give but little idea of the beauty of this highly oleaginous fruit as it grows on the tree. The berries are separated from the husks, and by boiling in water are divested of their unctuous integuments. The deep golden oil floats on the top, is skimmed off, and put into casks, where it assumes a granular semi-solid condition. There are many varieties of this oil, varying from deep greyish-brown to a lemon-yellow. The best is that known as "Lagos" oil. Originally, before the discoveries of Chevreul and Wilson, palm oil, from its soft nature, was of little use, as by pressing it does not become harder; but a certain kind of candle, which was called the "decimal" candle from the fact of ten going to the pound, was manufactured from the "bagged" palmitin, bleached partially by exposure to air. Messrs. Hempel and Blundell, in 1836, took out a patent for making candles from pressed fats alone. These, however, are little used. Cocoanut candles, or candles from pressed cocoanut, were made, but it cannot be said with any success. Whenever candles from the unmanufactured vegetable oils have been introduced, the glycerine present has proved almost as strong an objection in such cases as in tallow. In 1840, Mr. J. P. Wilson took out a patent for making the original "composite" candle, which was a mixture of the pressed cocoanut oil and stearic acid. These were the result of the demand for cheap self-snuffing candles which arose on the occasion of the Queen's marriage. It is a greasy candle, but comparatively cheap, giving a light of the intense whiteness characteristic of cocoanut oil. Cocoanut oil itself is obtained by pressing the dried and crushed ripe cocoanut. The best brands are sent from Ceylon and Cochin China. The nut is highly oleaginous, and is pressed when all the milk has solidified; a great portion of the oil is extracted, but a large quantity also is sent over in the dried kernel, called *copra*, to be crushed in English mills. It may be

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well here to mention night lights briefly, although we cannot give much attention to this little illuminator, of universal utility though it be. Night lights, at first called mortars (properly *mortuars*, being burnt by coffins and in dead chambers), are made chiefly of wax, blended with spermaceti, or pure. They have long been used, and their old form, as already observed, was the rush-light. The Romans used a night lamp and shade (*cubiculars*). With the introduction of cheaper materials than wax or spermaceti, their convenient form and elegant light could not fail to introduce a great demand, and by successive improvements in the composition and the cases, the substitution of stearine and pressed cocoanut in the former, and shaving or cardboard in the latter, the night light assumed an appearance to suit the most elegant, at a price within the reach of all. To Messrs. Wilson, of Price's Candle Company, these improvements are mainly due, though, I believe, it was Mr. Field who first encased stearine with cardboard. Messrs. Child's and Clarke's patents (1848-49-57), now adopted by Price's Company, are too well known to need any description, and refer to the special and improved manufacture of the night light and the apparatus for holding it. The amount of night lights consumed annually reaches 50,000,000. The manufacture is simple. The little cardboard case is supplied with a "sustainer," which is a small circular disc of tin with a hole in the centre to hold the wick which is attached to the bottom of the case by a spot of glue. The wicks being thus held upright, the cases are placed in a row and rapidly filled by hand from a kettle containing a mixture of cocoanut oil and palmitic acid; the composition, of course, varies with different makers. So much for the night light, although you would scarcely believe of how much time, labour, and numerous patents this little item has been the subject before it reached perfection.

Passing now to oils actual, and vegetal oils in particular—for I take the palm and cocoanut oils to hold an intermediate position between solid fats and liquid oils—we come to an immense class of seeds, used, some only in their native countries, and many universally, for producing illuminating oils. The chief oil of the old time was olive oil, which now, however, is rapidly being promoted to the rank of an edible, there being nothing special, either in its price or its light, to authorize its furthur supremacy. I have here several specimens of the olive, but this small dark berry, the *Olea Europœa*, is the olive of Italy and the East: the fruit of those silver-grey forests so familiar to all who have travelled along the Riviera and Palestine. The finest oil—what is called virgin oil—is obtained from the berries by gentle crushing; the inferior qualities are the result of harder pressure and ultimate boiling. But little olive oil is now obtained pure, and that which is, is almost entirely devoted to culinary purposes. It is noteworthy that the Italian mill owners themselves find it cheaper to burn petroleum in their lamps, than their own produce. After the invention of Argand, colza oil, from the seeds of the *Brassica Europœa*, was very largely employed, as giving a brilliant light at a small cost, and this vied with sperm oil for a long time; but as olive is now adulterated with colza, so colza, in its turn, was adulterated with rape, and all of them find rivals in continental countries in ground nut, sesame, poppy, and other oils, all of which have characteristics more or less desirable. I have appended a list of the various oils obtained from seeds in all parts of the world, giving, where necessary, such details as may be interesting. But we must regard all these as things of the past, or passing, their places being now taken by petroleum and paraffin; although, till the latter are rendered equally inert, we cannot expect that the virtually safe vegetable oils will ever practically become extinct as illuminants, while their value to the soap-maker increases yearly. It would not be right were I, at this point, to make no mention of cotton seed oil, which year by year assumes a greater position in the oil dominion. It is capable of such a state of perfection that, both in appearance and other properties, under cunning treatment, it can, and no doubt does, pass for olive oil. The gigantic amount of seed thrown off in cotton harvests, and the high percentage of oil contained, renders competition on the part of any other seed abortive. Last year, there were 3,000,000 tons of cotton seed produced, of which only 300,000 tons were worked up, meaning 90,000,000 gallons of oil lost. If I describe briefly the manipulation of cotton seed to extract the oil therefrom, it will serve as a type of the processes applied to most other seeds.

In the old seed crusher the grains were subjected, in bags, to the pressure of wedges, on which "monkeys" fell, as in pile driving. The advantage of such apparatus is its ready manufacture, the only essentials being timber and carpenters' tools. But now more perfect means are adopted, and the following description, which I owe to the kindness of Mr. Felton, secretary of the Cotton Oil and Stearine Company, applies to such.

The seed is first crushed between iron rollers, and is then put under edge-runners (stones), which converts it into a rough meal. It is then heated in a steam jacketed pan, and, when sufficiently warm, is filled into woollen bags, which are put into hydraulic presses, horizontally, and pressed until all the oil is exuded, leaving the cotton cake perfectly hard. The oil, which is quite dark in colour, is then put into a tank, heated with dry steam to about 80° to 85° F., and treated with caustic leys sufficiently to throw down the residuum, consisting of fibrous and gummy matter; the oil, which is of a pale yellow colour, is then drawn off into another tank, and boiled in water, in order to thoroughly cleanse it from all impurities; after this it is filtered, and is then ready for sale. (It is not suitable for distilling.) The residuum or foots is boiled up with open steam, and treated with acid, which, combining with the alkali, leaves a thick black grease. This, when distilled, yields a white stearine, also a hard black pitch.

Passing now from the oils themselves to the vehicles for exhibiting their burning powers, I solicit your attention to the magnificent lamps, which the kindness of the great manufacturers and others has enabled me to place before you. Perhaps no link of importance, from the old bronze lamp of Herculaneum to the exquisite combination of high art and supreme light lent me by Messrs. Williams and Bach, in their Ibis lamp, is omitted. I will, however, not dilate upon beauty or quaintness of form, but content myself with expounding the principles of such as appear to me to constitute an essential link or step forward. The first invention of note must be considered that of Ami Argand, who, in July, 1784, took out a patent, which rendered the lamp practicable as a domestic luminant, and his name indissolubly connected therewith. The principal object of this lamp, to quote his own words, is "to give neither 'smoak' nor smell, and to give considerably more light than any lamp hitherto known." His first structure had simply a chimney* of iron suspended over the flame, which was afterwards exchanged for one of glass. The wick was circular and hollow, thereby admitting of a current of air on both sides the flame. The uprush of heated products of combustion from the top of the chimney, induces an equal ingress of fresh air from below. By discreet adjustment of size and position of the chimney and wick, the supply of air is regulated to exactly impinge on the portion of the flame where the heated vapours come into contact with the atmosphere, and consumes the excessive carbon, which would otherwise appear as smoke. This invention underwent numerous modifications, at the hands both of the originator and others, but the principle remained unaltered. Argand's lamp, after successive improvements, consisted of the following parts:—An annular tube, on which the wick was stretched; a reservoir which contained the oil; a pipe leading from the re-

* The chimney had, however, been suggested previously by Quinquet.

servoir to the wick, and a holder for the glass, which imported, on turning, a spiral motion to the wick, and thereby adjusted the flame. The reservoir was of the kind known as the "bird fountain," whereby a bubble of air entering the small orifice at the base allows the egress of a small quantity of oil. This was first put into practice by Miles in 1781, and has since been applied to a very numerous class of lamps, especially those known as "reading lamps," where the reservoir is higher than the wick. Argand's lamp was suitable for both colza and sperm oils. As the shape was ungainly, many expedients were devised whereby the flame could be fed from a reservoir below. Carcel, in 1798, brought out a lamp which was almost universally used for many years in France. The principle of this was pumping, by two little clockwork pumps, a supply of combustible to the wick. The only objection to this is the constant need of repair to which the delicate mechanism is liable. The supply, when in good order, however, was so extremely steady as to cause this lamp to be taken on the Continent as a standard of illumination. The problem of securing an unvarying supply of oil without such complicated mechanism was one which taxed the ingenuity of many makers. A very favourite means was that of hydrostatic power, whereby a heavier liquid solution was made to raise the lighter oil equably, as it consumed. This idea was evolved from the fertile brain of Hero of Alexandria, 200 B.C. There was also a device for solving the paradox of causing a liquid to rise above its own level, by the flow of a heavy salt solution, into an air-tight chamber, the air being driven into the oil reservoirs above, and forcing out the oil into the lamp. Another ingenious "idea" for trimming the wick by the descent of the oil I do not think would be found to work. Barton, in 1809, invented a very elaborate combination of tubes and chambers, carrying out Hero's idea on an extensive scale, and in connection with an Argand lamp. This appears to have had a considerable popularity, but is now extinct.

Keir, in 1787, made a very ingenious lamp, consisting of two cylinders, the smaller floating in the larger. The wick was attached to the apex of the interior cylinder which contained the oil, and was open at the base, the exterior being filled with salt water. As the oil diminished, the salt water rose in the interior, and sank in the exterior reservoir, while the height of the interior cylinder was adjusted by means of a wooden float. Porter, in 1804, invented a lamp which deserves mention. It consisted of a rectangular box, balanced eccentrically, so that the position—horizontal at the commencement—during burning, gradually approached the vertical. A larger amount of oil being removed from the posterior, caused this to lose weight more rapidly than the anterior, the oil in which was thereby maintained at a level. The name of Smethurst is closely associated with lamps. He was the first to give a slope to the chimney, which Argand had left straight, thus directing the air-current more accurately, and thereby increasing the draught and the brilliancy of the flame. The next invention of importance took place in 1836, when Fanchot invented the moderator lamp as at present used. This had already been foreshadowed in the inventions of Stokes, 1787, Allcock in 1807, and Fayre in 1825, all of whom used pistons which forced the oil up under pressure. Fanchot gave the lamp its present form, which is, briefly, as follows:—The piston fits tightly in the reservoir, being provided with a leather collar, which admits of being raised with ease while the reservoir is full, but the descent is impeded by the collar being pressed against the sides by the liquid. There is, therefore, no outlet for the oil but by a fine tube passing through the piston up to the wick, which is, by this means, fed by a constant stream of oil, the surplus dropping down into the reservoir above the piston. When the piston has fully descended, it is re-elevated by a cog and ratchet apparatus. The flow of liquid up the tube is regulated by a fine piece of wire, which partly closes the same and helps to cleanse it. By these means, very heavy oils can be burnt, and perhaps no lamp has enjoyed greater popularity than this. Its defects are the constant need of winding up, and liability of the fine tube to become clogged. Such are the chief historical forms of the lamp. I will briefly allude to Young's "Vesta" lamp, first used used in 1834, which burnt "camphine," or turpentine, with a very brilliant snow-white flame; and the "Diacon" lamp, which was a modification of the moderator, invented and used in America. This lamp was made the subject of a characteristic novel, published in 1849, wherein a lady searches the world for the best kind of lamp.

The wick has been the subject of numerous modifications. As early as 1773, we find one Leger producing a flat-ribbon wick. Though a great improvement on that of the older cord wick, the flame was too thin, being blown out with every puff of air. Argand introduced the circular wick, which has maintained its form. A great step was made when the flat wick was forced. as in modern lamps, to adjust itself exactly to an annular tube, thus obviating the necessity of pushing the tube into an ill-fitting wick.

In 1865, Messrs. Hincks, of Birmingham, brought out a lamp with the parallel flat flames, called the Duplex, which gives a remarkably good light, and has a world-wide reputation. To the same firm, I believe, are due these ingenious devices for extinguishing and relighting the flame without moving the shade, by merely pressing a trigger.

I ought now to mention, as an entirely different variety, Mr. Holliday's vapour burner lamp, of which the specimen I have here is one of the many thousands to be seen burning on the costermongers' stalls in East and South London. The conical reservoir at the top is filled with light hydrocarbon oil, passing through a tap and tube into a burner of peculiar construction, and being ignited by holding in a flame for a few seconds, will continue to burn without wick furiously and safely as long as the supply is properly regulated. This may be said to be the first lamp which burnt hydrocarbon oils, and no doubt for an open-air flame no better can be, or at any rate has been, devised. About this time invention was very active to devise means of burning hydrocarbon oils with safety, which were being used with more and more frequency in household lamps. In 1866, Leichenstadt invented a lamp for burning a mixture of benzole and camphor, but the dangerous nature of benzole rendered this form undesirable. Aaronson, 1875, by a clever combination of oil and water, constructed a lamp to be extinguished directly it was overturned, or even deflected from the vertical. This masterpiece could also be trimmed, filled, and lighted without moving the shade and chimney. Young and Silber are two names most prominent in the lamp problem. Mr. James Young, as the discoverer and first manufacturer of paraffin oil from shale, was naturally the appropriate inventor of means for its safe combustion, and Young's company now still supply "Vesta" lamps for burning their own productions.

All the inventions thus briefly epitomized have one or other of the following objects in view:—To supply oil regularly to the wick; to apportion the supply of air to the description and quantity of oil to be burnt; to provide simple means for regulating the height of the wick, and consequently, the flame; and finally, to place the burning portion of the lamp in such a position as not to be obscured by the reservoir and other portions. The oldest lamps, as the antique Etruscan, and the cruisie of Scotland, were on the suction principle, and the wick depended for its supply upon its own capillary action. As the level of the oil was constantly varying, so the light varied also, and the first attempts of inventors were directed to maintaining an equal level of oil. The bird-fountain and hydrostatic reservoirs partly attained this end, and the Carcel and Moderator systems were perfect of their class, mechanical or pressure lamps. It is evident that suction lamps depend for their efficacy upon the gravity of the combustible. A spirit lamp, with a good wick, will burn very well, though the wick be several inches above the liquid. Elizabeth Leichtenstadt's patents, 1866, are directed to the burning of camphorated spirit and benzole, in sponge-filled reservoirs; but I am unable to procure specimens or information as to their performance. With liquids volatilizing at such low temperatures, there is always a danger of the formation of explosive mixtures.

In 1834, J. I. Beale, patented a lamp for "the burning of substances not usually burned in such vessels," under which he includes mineral and wood naphthas, and oils from the distillation of coal tar, vegetable tar, and the like; the principle being the vaporization by means of a small secondary flame, from a separate source, which soon burns out, having started the vaporization. This lamp had no wick; the supply of fluid was regulated by forced air.

Parker's lamp, patented 1840, should also be mentioned, as the most successful attempt at heating the oil before combustion. Here the upper part of the chimney was made of copper, and passed through the reservoir filled with a heavy luminant (preferably cocoanut or tallow). The air being extended, the oil fed the wick by its own expansion, regulated by an ingenious mechanism. This was a so-called "sinumbral" lamp, and appears to have been held, by some, superior even to Carcel's as a standard for photometry.

The supply of oil to the wick in all pressure lamps was in excess of the demand, and the surplus fell back into the reservoir. This can only be feasible in the case of heavy oils, especially animal and vegetal. The Russians boast of having constructed a lamp to solve the problem of burning their own heavy hydrocarbon oils, of which Baku produces so vast a quantity; but as the demerits of such oils, especially the clogging of the wick, cannot be ascertained in the few hours their committee appear to have spent upon the investigation, we must defer our meed of applause. The light hydrocarbons, such as petroleum, photogen, solar oil, and their polynomial varieties, must reach the arena of combustion in as small quantities, and at as high a temperature as possible, while the supply of air, both from inside and out, can scarcely be too abundant.

It must be remembered that this lecture has oils rather than lamps for its subject; and, therefore, we must be content with inquiring into the principles underlying the construction of the latter, leaving the mechanical beauties in which these apparatus abound for a more befitting occasion. Since compiling this lecture, also, I have found that Mr. Silber has already embraced its chief points in a masterly paper, read before this Society in 1870 (December 21); in which also, the experiments of Mr. Valentine upon the Silber lamp are adduced. Under the circumstances, therefore, I will content myself with giving a brief description of the Silber lamp.

At first sight the burner appears to be a simple aggregation of concentric tubes—and this, in fact, it is. The use of these, especially of the innermost, bell-mouthed pipes, becomes very apparent in the lighted lamp. From the right hand one of these two lamps, both burning petroleum, with equal wicks and similar chimneys, I remove the interior tube — immediately the flame lengthens and darkens, wavers and smokes. The current of air which is, by this internal conduit, directed into the interior flame surface, is the essential principle of Mr. Silber's invention. The wick is contained in this metal case, surrounded by an air-jacket, which passes down the entire length of the lamp, leaving a small aperture at the base, through which the oil flows from the outer reservoir to the wick chamber. Thus, by the interposition of an atmospheric medium, the bulk of the oil is maintained throughout at a low temperature. Two concentric bell-mouthed tubes pass down the interior of the wick case, and communicate with the air at the base of the lamp, which is perforated for the purpose. Two cones, perforated, the inner and smaller throughout, the largest only at the base, surround the wick, and heat the air in its passage through the holes to the flame. The effect of these appliances is, firstly, by the insulation of the outer reservoir, to avoid all danger of vaporization of the oil, till actually in contact with the wick. As it is drawn nearer and nearer the seat of combustion, the hot metal wick-holder heats, and ultimately vapourizes the luminant, so that at the opening of the wick tube concentrically with the air conduits—all of which are exceedingly hot—a perfect mixture of vapour and hot air is formed, and this it is that is burnt. An all important feature is the shape and position of the chimney which, Mr. Silber asserts, influences the flame to the extent of quadrupling its brilliancy if properly adjusted. The numerical results obtained by the photometry of these lamps, as to brilliancy and price, are truly gratifying. I refrain from quoting disjointed values, and beg to refer you to two tables given in Mr. Silber's paper.

I cannot enter into all the beautiful applications of this principle, with which the Silber Light Company have so kindly and bountifully supplied me. But upon this marine lamp, as it involves certain important modifications, a few moments may be spent with advantage. Its purpose is to maintain an even and steady light, during a violent tempest, with, it may be, waves dashing over it. It is provided with a cut dioptric lens, and a powerful reflector, and the light, which is equal to that of fifty candles, can be seen, on a clear night, for more than five miles. The air enters a chamber, by means of two tubes, about one-third of the height of the chamber itself, perforated. This checks and dissipates the most violent current. After entering, the air expands with the heat, loses much of its velocity, and, being still cooler than the air inside, above the flame, descends to the chamber below the burner. As the heated products ascend, the fresh air is drawn up to the flame to supply their place. The smoke from this paper will best show the direction of the currents. You observe the rapidity with which the smoke rushes into the air-pipe, and enters the chamber, which velocity gradually diminishes in ascending, till it falls over, and descends to the lower chamber, whence it is drawn up and consumed in the flame. I direct a stream of air from this powerful bellows against the inlet, and the flame you see as steady as ever. The products of combustion pass up a conical chimney, and strike against the apex of an inverted cone, which divides the current, and allows the products to pass out on every side. Above the cone is a horizontal plate, projecting on all sides beyond the cylinder it covers, and somewhat convex. This serves to divert any water that may pour upon it, innocuously away. This cover has a space between it and the base of the cone, so that any horizontal air-current striking against the top of the lantern passes through this aperture, meeting less resistance than if it chose the downward direction. As this sweeps away the products of combustion from the top, a gust of wind tends rather to increase the brilliancy of the flame than otherwise.

These lamps have been tested in ships, high towers, express trains, and in every case, successfully. As the carefully-adjusted metal funnel renders a glass chimney dispensable with, there is no part which is liable to damage. The one great point to be observed is keeping the whole case air-tight, except at the legitimate outlets; for, you perceive, when I open the door at the back, be it ever so little, the perfect equilibrium of supply and combustion, hitherto obtaining, is disturbed, and the flame wavers and smokes. With this, we must dismiss the lamps, and with them, the animal and vegetal luminants, from which, the petroleum-burning apparatus, discussed to-night, affords an apt transition to the mineral kingdom.

Table I.—Showing Illuminating Power of Original Argand Burners Consuming Colza and Petroleum Oils.

Description of Lamp. (Argand Burners.)	Illuminating power expressed in sperm candles.	Illuminating power expressed in cubic feet of common coal gas=15 candles.	Hourly consumption of oil in grains.	Cost of oil for one week's consumption of 42 hours.	Cost of gas at 3s. 9d. per 1000 cubic feet for one week's consumption of 42 hours.	Proportional cost of gas and oil.
Colza Oil Lights.				s. d.	d.	
Lamp 1, consuming colza oil from an Argand burner, wick 7/8 to 15/16 of an in.	11·81	—	1203	2 9 1/5	—	—
Lamp 2, with imperfect chimney, wick 1 1/4	3·38	—	532	1 2 2/5	—	—
Do. with differently constructed chimney	15·01	5	1775	4 1	9·45	1 : 5·2
Petroleum Oil Lights, as originally constructed.						
No. 1 Burner, size of wick 7/8 to 15/16 of an inch	15·67	5·22	864	0 11·8	9 86	1 : 1·21
No. 1 Burner, size of wick 7/8 to 15/16 of an inch	15·47	5·15	787	0 10·7	9·73	1 : 1·11
No. 2 Burner, size of wick same (of French construction)	14·93	4·98	818	0 11·1	9·4	1 : 1·18
No. 3 Burner, size of wick 1 1/4 of an inch	17·01	5·67	818	0 11·1	10·7	1 : 1·04
No. 4 Burner, size of wick 1 1/2 of an inch	33·85	—	2145	2 5	—	—
No. 5 Burner, size of wick 1 3/4 of an inch	38·32	—	3433	3 10 3/5	—	—

Table II.—Showing Illuminating Power of Altered Argand Burners, Consuming Petroleum Oil, as Compared with Original Burners.

Description of Lamp. (Argand Burners.)	Illuminating power expressed in sperm candles.	Illuminating power expressed in cubic feet of common coal gas=15 candles.	Hourly consumption of oil in grains.	Cost of oil for one week's consumption of 42 hours.	Cost of gas at 3s. 9d. per 1000 cubic feet for one week's consumption of 42 hours.	Proportional cost of gas and oil.
				s. d.	s. d.	
No. 1A Burner, wick	14	4·66	602	0 8·18	0 8·8	1 : 0·93
No. 1 Burner (original), wick 7/8 to 15/16	15·67	5·22	864	0 11·8	0 9·86	1 : 1·21
No. 1 Burner, 2nd experiment	15·47	5·15	787	0 10·7	0 9·73	1 : 1·11
No. 1 Burner (altered)	23·24	7·74	795	0 10·8	1 2·63	1 : 0·738*
No. 2 Burner (original), same size as No. 1 (of French construction)	14·93	4·98	818	0 11·1	0 9·4	1 : 1·18
No. 2 Burner (altered)	21·52	7·17	788	0 10·7	1 1·55	1 : 0·79†
No. 3 Burner (original), wick 1 1/4	17·01	5·67	818	0 11·1	0 10·7	1 : 1·04
No. 3 Burner (altered)	28·0	9·33	1102	1 3	1 5·6	1 : ·85
No. 4 Burner (original), wick 1 1/2	33·85	—	2145	—	—	—
No. 4 Burner (altered)	46·5	—	2008	—	—	—
No. 5 Burner (original), wick 1 3/4	38·32	—	3433	—	—	—
No. 5 Burner (altered)	50	—	1965	—	—	—

Table III.—Illuminating Value of the Principal Organic Oils.

Oil.	Duration of combustion under equal conditions.	Mean intensity of combustion 40 gm. 8 h., in single wick lamp.
		Standard burner.
Colza, fine	29	1·04
Colza, trade	11	0·39
Ground nut	35	1·05
Olive	23	1·07
Sperm	29	1·05
Rape	23	0·82
Linseed	14	0·87
Whale	18	0·86
Gingelly	26	0·73
Cocoanut	41	1·06

The best oils for burning, arranged in order according to the above, would be cocoanut, colza, ground nut, olive sperm, whale.

* 35 per cent. cheaper than gas.
† 27 per cent. cheaper than gas.

Note.—It is worthy of remark here that, according to recent experiments of Sir J. Douglas, with lamps brought to their present perfection, colza oil, contrary to what would be expected, gives a superior light to that of the best mineral oil. The cost, of course, cannot be taken into account, paraffin oil costing 9*d.* per gallon against 2*s.* 9*d.*, the average price of colza. But the following table will give a good idea of the relative lights during sixteen hours' trial in Trinity House:—

	Argand Burners. Colza.	Argand Burners. Paraffin.
Maximum intensity of light produced	100·0	85·5
Minimum intensity at end of time (sixteen hours)	81·8	66·9
Percentage of falling off	18·2	21·9
Consumption of oil per lamp in fluid ounces for sixteen hours	42·1	34·0
Relative quantity of light produced per gallon of oil consumed	100·0	103·0

Illuminating Power in Sperm Candles.

	6 wicks.	4 wicks.	2 wicks.	Argand.
Colza oil .	722 cand.	328 cand.	82 cand.	23 cand.
Paraffin oil.	730 „	330 „	80 „	25 „

Equivalent of Sperm to 1 Gallon of Oil.

	6 wicks.	4 wicks.	2 wicks.	Argand.
Colza oil .	26·76 lbs.	28·10 lbs.	25·77 lbs.	28·00 lbs.
Paraffin oil.	24·98 „	26·94 „	27·43 „	28·57 „

NOTE.—A comparative table of the cost of light in various lamps and candles will be given at end of Lecture 6.

List of the Principal Oils employed for Illuminating Purposes.

		Oil.	Acid.
Olea Europœa	Europe	Olive	Oleic.
Linum perenne	Europe	Linseed	(Lin)oleic.
Papaver somniferum	Europe	Poppy	(?) (Lin)oleic.
Cannabis sativa	Europe	Hemp	(Lin)oleic.
Sesamum orientale	Europe	Gingelly	(?)
Amygdalus communis	Europe	Almond	(Lin)oleic.
Guilandina mohringa	Europe	Behen	Benic.
Helianthus perennis	Europe	Sunflower seed	Benic.
Brassica campestris	Europe	Rape	Erucic.
Ricinus communis	Italy, India	Castor	Ricinoleic.
Nicotiana tabacum	Europe, America	Tobacco seed	(?)
Theobroma cacao	South America	Cacao butter	Theobromic.
Cocus nucifera	Ceylon, Cochin	Cocoanut	Rutic, caproic, caprylic, lauric, myristic, palmitic, etc.
Elais melanococcus	West Africa	Palm kernel	(Rutic, caproic, caprylic, lauric, myristic, palmitic, etc.)
		Palm oil	Palmitic.
Arachis hypogœa	Tropics	Ground nut	Hypogeic.
Gossypium Barbadense	America	Cotton seed	Linoleic.
Brassica oleifera	Europe	Colza	Erucic.
Aleurites triloba	Polynesia	Candle nut	(?)
Attalea cohune	Honduras	Cohune nut	(?)
Bassia butyracea	East India	Vegetable butter	Stearic, palmitic, myristic.
Colophyllon calabar	Central America	Calabar	(?)
Garcinia indica	India	Kokum	Palmitic, myristic.
Rhus succedaneum	Japan	Japan wax	Palmitic.
Stillingia sebifera	India	Vegetable butter	Myristic.
Bassia parkii	West Africa	Shea butter	Oleic, stearic.
Myrica sebifera	North America	Myrtle wax	Cerotic.
Ceroxylon andicola	Brazil	Palm wax	Cerotic.
Copernicia cerifera	Brazil	Carnauba wax	Cerotic.

Sp. gr. varying from ·89 to ·92. Average yield about 55 per cent., though some, as the *Aleurites triloba*, yield nearly 85 per cent., and others, as *Linum perenne*, only average 20 per cent.

Reviews.

ANATOMIE DER BAUMENRINDEN. Vergleichende Studien von DR. JOS. MOELLER in Wien. Berlin: Springer. 1882.

(ANATOMY OF BARKS. Comparative Studies by Dr. JOSEPH MOELLER.)

The share of attention paid by authors to barks, as compared with other parts of plants, does not seem to be in relation to the interest they deserve to excite in physiologists and anatomists, to the importance they may claim in respect to pharmacological inquires, or to the variety of tissues and difficulties of diagnosis presented by these organs. It is not long since the minute anatomy of plants has become the object of a more intense study among botanists, and directions have made their appearance in literature for the anatomical investigation of plants, as well as monographical treatises on single species. But there is scarcely a single exclusive publication which undertakes a thorough and systematic treatment of special organs.

The author of this work has undertaken to supply the sensible want of a standard book on the highly interesting section of barks, and has executed his task in a more thorough manner than he could do years ago in his contributions to the comparative anatomy of wood.* Though the book cannot be considered a text-book for the beginner, yet every one familiar with the elements of the anatomy of plants may use it as a guide in his investigations, and the inquirer will find in it at once plenty of clever observations on evolution and the embryology of plants.

* The Royal Academy of Sciences, Vienna, 1876.

The description of the barks of three hundred and ninety-two different species includes the outer, middle and inner strata, the author himself calling attention to the fact that this division neither agrees completely with theory nor exactly to the usual terms. Nevertheless, he has adopted it as the most suitable for the purpose of practical diagnosis. In many cases an epidermoidal layer is added to the three principal strata, which is often interesting by its relation to the "cork-initial."

The peculiarities of structure of each bark are perspicuously put together in the character of the species, and those common to the different species are pointed out in the character of the order, while the results of the inquiry are exhibited again in the conclusive remarks in excellent tables.

The chapter on outer bark contains data on the time, shape, and formation of the "cork-initial" (sc. layer), including the periderma, the bark ("Borke"), and the cork.

The chapter on middle bark contains the data on hypoderma and collenchyma, on the formation and absence of liber fibres, on the appearance and conditions of sclerotic metamorphosis, the shape and presence of oxalate of lime, and the secretory spaces. The chapter on the inner bark, as the most variable and abounding in characteristic elements, treats of the sclerosis of the liber, the occurrence of soft liber, stone cells, or of liber fibres, or both elements at once, the presence or absence, shape and locality. The interesting fact may be mentioned that crystal glands and rhaphides are found without exception in or near to sclerotic cells, which the author accounts for by osmotic influences. Lastly, the sieve-tubes and medullary rays are also described in the chapter on the inner bark.

In spite of the very lucid and thorough treatment of the subject, the author does not want to have his book used as a "clue for determination," since, as he maintains in the introduction, the knowledge of the manifold physiological differences ought to precede the interpretation of the innumerable varieties, which are to be considered as deriving from the first by adaptation. Nevertheless, the book will have its value as a help in diagnosis by the great number of hints and remarks contained in it, assisted by the clearness of description, and the truth of the many plates and engravings.

THE VEGETABLE MATERIA MEDICA OF WESTERN INDIA. By W. DYMOCK. Part I.*

Following in the footsteps of Daniel Hanbury, his late friend and correspondent, Dr. Dymock, has now for some years past been studying the materia medica of Western India, and the work which is now being issued might be styled the Pharmacographia of Western India, inasmuch as it is marked by the same remarkable accuracy of statement and painstaking investigation of doubtful points as that classic work. Nothing has been taken for granted which could be determined by personal observation. In some cases seeds picked out of drugs or obtained with considerable difficulty from a distance have been grown by Dr. Dymock in order to make sure of the botanical origin of a drug; and specimens have been liberally supplied to European chemists to have his own results confirmed, or more completely examined by able chemists with more time at their disposal. Only those who know the difficulty of getting information in the East concerning commercial articles can appreciate the time, trouble and patience required to elucidate a single point in the history or the botanical or geographical source of a drug.

The work before us cannot therefore be judged by an ordinary standard. During the progress of his researches, Dr. Dymock has contributed numerous papers on Indian drugs to the pages of this Journal, and these are now brought together, after having been carefully revised, largely added to by more recent information, and arranged in order according to the natural orders of the plants from which they are derived. The whole work will be complete in four parts. Part I. contains 160 pages, and includes the drugs of the natural orders *Ranunculaceæ* to *Anacardiaceæ*.

Each article is treated in the following sequence:—The botanical name of the plant and the part used; the vernacular names, including Sanscrit, Arabic and Persian; the history and uses; the description of physical characters; of the microscopical structure; and the chemical composition. In the three latter features this work excels all previous works on the materia medica of India, and there can be but little doubt that it must remain for many years the standard work on the subject. The author's object, as stated in the preface, has been to give a short summary of the history and uses, to describe each article with sufficient minuteness to insure the detection of any adulteration, and to draw up a condensed account of what has been already published concerning the chemical composition of the different drugs. The author, however, has done more than this, as he has given under each article references to the best papers or works on the respective drugs. It is difficult to judge fairly of the whole volume from the first part, since a number of drugs, the botanical source of which could not be settled, will be placed in a separate list, and the complete work will doubtless possess advantages that cannot appear in the commencement.

The author modestly deprecates imperfections and asks for suggestions, inquiries and further information. We may venture to remark, therefore, that a good index of vernacular names and references, where possible, to a published figure of the drug, would add much to the value of the work as a book of reference for merchants at home and abroad. We cordially hope that the learned author may meet with the co-operation he desires and that his work may prove as successful as he could wish in bringing into notice valuable remedies and in causing to sink into oblivion those which have no real value.

* London: Trübner and Co. 1883. Demy 8vo. Pp 1-160. 4*s*.

THE DENTAL MATERIA MEDICA AND PHARMACOPŒIA. By J. STOCKEN, L.D.S. Eng., assisted by THOMAS GADDES, L.D.S. Eng. and Edinb. Third Edition.*

The disappearance of the first edition of this now well-known work in four months after it was issued, and the absorption of a second edition sooner than was expected, may be taken as evidence of the appreciation with which this Dental Pharmacopœia is regarded by the members of that profession. It needs only to turn over its pages to see that the work is kept well up to date and that no new remedies or preparations are omitted that have been proved worthy of acceptance during the last few years; presenting in this respect a remarkable contrast to the British Pharmacopœia. Thus we find in it menthol, thymol, oil of eucalyptus, salicylic acid, resorcin, hamamelis, jaborandi, gelsemium, ethyl bromide, ethidene dichloride, calcium sulphide and numerous other remedial agents of recent introduction into medicine. The increase in bulk of the book by nearly one hundred pages is due almost entirely to additions of this kind and to new formulæ, only sixteen pages being devoted in part to additional notes in the elementary portion of the work and in part to an index of diseases with the remedies appropriate to each. This index is a new feature in the Pharmacopœia and will doubtless be found extremely useful as giving the dentist at one glance the power of selecting from a number the agent most appropriate to the case in hand.

The great value of the Dental Pharmacopœia seems to reside in the large amount of practical information derived from personal experience, which is found on almost every page. Thus, in using carmine for colouring tooth powder it is explained how by the method of treatment recommended the colouring power of the carmine is nearly doubled, and under tincture of gelsemium it is stated that "the tincture contains only a trace of tannin and may be given with any of the preparations of iron." In the portion devoted to special pharmacology, and which occupies nearly half the work, not only are the characters of each drug given, but the mode of preparation and the physiological effects and therapeutics. It thus becomes a pharmacopœia combined with the advantages of a work on materia medica, a commentary on the Pharmacopœia and treatises on physiology and therapeutics. It is no wonder, therefore, that it is valued in dental practice. Although only one-fifth larger than the last edition it is twice the thickness, being printed on stouter paper, which renders the type clearer and easier to read. In addition to this the headings of the subjects have been printed in heavier type, so that the present edition is more convenient for reference and for reading. The typographical errors are remarkably few, and the work throughout bears evidence of careful revision. There can be but little doubt that the present edition will be found as acceptable as its predecessors. It is not without satisfaction that we notice on the title page, "Pereira Prizeman for Materia Medica" (Mr. Stocken having gained the prize of the Pharmaceutical Society in 1850 for materia medica), since it bears witness that there are members of the Society who are quite as capable of producing an excellent Pharmacopœia as their medical brethren.

* London: J. and A. Churchill. 1883. Fcap. 8vo. Pp. 416. 7*s*. 6*d*.

COMMENTAR ZUR PHARMACOPŒA GERMANICA EDITIO ALTERA. Edited by Dr. HERMAN HAGER. Second Edition. Parts I. to V.*

No reader who is accustomed to resort to the pharmaceutical literature of Germany will require to be reminded as to the valuable nature of the work of which the commencement of a new edition is now before us. For the sake of those who are not, we may say that it is unlike any work with which we are acquainted in the English language, for although it is nominally only a commentary on the Second Edition of the German Pharmacopœia, it really constitutes a cyclopædia of information upon most of the subjects in which pharmacists are particularly interested. The order of the arrangement is alphabetical, following the Latin nomenclature adopted in the German Pharmacopœia, and some idea of the exhaustive treatment of the principal subjects may be best conveyed by an analysis of the first article in the book, on "Acetum," which occupies eighteen pages. It commences with the Latin, German, French and English synonyms, followed by a translation of the Latin official description, and a historical notice. Then come the methods of manufacture, including, besides the old plan of spontaneous fermentation, the "Orleans" method introduced by Pasteur and the chemical method of direct oxidation. The theory as to the formation of acetic acid is explained, illustrated by chemical formulæ, and there are figures of the vinegar eel, the vinegar bacterium and the *Mycoderma Aceti*. The different kinds of commercial vinegar are mentioned, as well as the characters by which they can be distinguished, and several pages are devoted to the examination of vinegar for impurities and adulterations. In the five parts before us, among other subjects, all the medicinal acids are treated of in a similarly thorough manner, and, where required, ample tables, showing the relation between the specific gravity and the strength of the solution, are given. The articles on the botanical materia medica are freely illustrated, some of the microscopical drawings being very good, while the comments on the different preparations are evidently the outcome of a wide practical experience, and convey many valuable hints. The fifth part only reaches to "Benzinum Petrolei," so that the whole work promises to make at least three bulky volumes.

KOMMENTAR ZUR ZWEITEN AUFLAGE DER PHARMACOPŒA GERMANICA. Nebst Ubersetzung des Textes sowie einer Anleitung zur Massanalyse. Zum praktischen Gebrauche bearbeitet von O. SCHLICKUM, Apotheker.† 1883.

This volume has for its principal objects to provide German pharmacists who may find difficulty in reading the official Latin version of their national Pharmacopœia with a translation of it into their own language, to add in the shape of a commentary such remarks as may appear desirable for the elucidation of the text, and to furnish an introduction to the practice of quantitative analysis, which has assumed additional importance in consequence of the greater prominence given to it in the new edition of the Pharmacopœa Germanica. That there is room for such a work there can be no doubt. Putting on one side the fact that in the translation into Latin of the original manuscript as settled by the Pharmacopœia Committee in German, several obscurities, if not mistakes, have crept in, it will be convenient to have an edition in the vernacular for the every day work of the laboratory. Then, as has been before remarked in this Journal, the official descriptions are kept within very narrow limits, synonyms, formulæ and processes, except when absolutely necessary, being excluded. In the work before us, not only are these supplied by the author, but the commentary contains a considerable amount of practical information under the different titles. An attempt has been made to illustrate the work, not, however, with uniform success; some of the engravings might pass muster, especially a number that appear to be copies, if not *clichés*, of engravings in Bentham's 'Handbook of the British Flora,' but a few of them are beneath criticism. For those British pharmacists, however, who have the wisdom to give a place on their bookshelves to information concerning the practice of pharmacy in other countries than their own Mr. Schlickum's work can be recommended as a convenient and trustworthy representative of the German Pharmacopœia.

* Berlin: Julius Springer. Super-royal 8vo. 2 marks per part of 112 pp.

† Leipzig: E. Gunther. Demy 8vo. Pp. 1–519. 10 marks.

Correspondence.

GALIUM APARINE.

Sir,—Noticing that in "The Month" mention has again been made of the plant *Galium Aparine*, I have thought that perhaps the following extract from Robinson's 'Family Herbal,' a book largely used by herbalists and certainly one of the best of its class, may be interesting to many of your readers.

After giving a description of the plant, time of flowering, etc., and also the synonyms by which it is known, such as "Cleavers," "Clevers," "Gooseshare," or "Goosegrass," it goes on to say:—"The juice of the herb is a good styptic for bleeding wounds. It is taken in broth to keep those lean who are apt to grow fat. The distilled water drank twice a day is good for the yellow jaundice and the decoction also has the same effect and stayeth lasks, both are useful in the bloody flux. The juice is also very good to close up the lips of green wounds and the powder of the dried herb cures old ulcers. Boiled in hog's lard it relieves hard swellings and kernels in the throat. The juice is good for earache. It is a renowned diuretic, most appropriate to remove speedy suppression of urine, gravelly complaints, removing slimy matters and obstructions from the kidneys and bladder. It has been found useful in the cure of scurvy. The infusion should always be made in cold water, say 4 ozs. to 2 pints."

If the above be true, notwithstanding the almost antagonistic modes in which it is to be presented, one would say it is the plant from which the elixir vitæ ought to have been made.

That it is a useful herb the writer can testify, he having seen the benefit of its use in the form of an ointment combined with yarrow (*Achillea Millefolium*) for cuts, bruises, and sores of different kinds.

It also forms one of the principal components of a "herbal beer" made in some parts of the country by the cottagers, who seem well aware of its many qualities, and who sometimes eat it in the form of a salad.

Dr. Quinlan is doing good service in endeavouring to find out and bring before the medical profession the properties of one of the commonest, and, for that reason, probably still much neglected plants, which possibly may be proved to be one of the most useful herbs this country possesses.

GEO. SPENCER.

Associate.—All communications respecting the addressing of the Journals should be sent to the Secretary.

Inquirer.—The preparation is now official in the Pharmacopœa Germanica.

J. Barth.—Babington's 'Manual' or Bentham's 'Handbook of British Plants.'

Westward.—In many of the States the practice of pharmacy is now regulated by legal enactments, but the provisions are not at all uniform throughout the Union.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Wright, Dott, Fennell, Kittow, Greshoff, Mabeu, Cormack, Morgan, Pollard, Brown, Wellcome, Radley, Attfield, Augier, Haywood, Wetzel, Frazer, Jones, Atkins, Careless, Junior, Farr, Inquirer, Glasgow, Minor, Nonplus, Inquirer, Jumbo, Victim, G. H. J. J., V. S.

"THE MONTH."

August and September are pre-eminently the holiday months of the year amongst the dwellers in cities, the time when everyone that can leaves the hurlyburly and stifling atmosphere of crowded streets for the neighbourhood of the yellow sands, the breezy downs, or the flower-spangled lanes and commons of the country. Doubly precious is such a change to the man whose hobby lies in the direction of the study of nature; to whom the relaxation does not mean the distressing *ennui* of nothing to do, but an opportunity for clothing with life and grace the dry bones of science with which he has been obliged to content himself whilst studying it shut up among the busy haunts of men. For instance, there are no doubt botanists and entomologists who having made themselves familiar at home with the writings of Darwin, Lubbock, and others on the fertilization of flowers by insects, will this season while away many a pleasant hour in following up in the country the observations on the constancy of insects in their visits to flowers which were a short time ago laid before the Linnean Society by Mr. A. W. Bennett and Mr. R. M. Christy (*Journal*, August 14). Although the subject has special interest just now when everything connected with the fertilization of flowers by insects is being so fully discussed, it is by no means a new one, Aristotle having made the assertion that "during each flight the bee does not settle upon flowers of different kinds, but flies, as it were, from violet to violet, and touches no other species until it reaches the hive." The two gentlemen named did not, however, confine their observations to the bee family, but extended them to various species of Lepidoptera and Diptera, and have placed on record a large number of interesting details, for which reference must be made to the original papers. With respect to butterflies, Mr. Bennett thinks that on the whole they manifest but a small degree of constancy in visiting flowers; though the great majority of those on which they were seen to settle were either yellow or pink, and after settling on one of these colours they seemed to show a marked tendency to adhere to it. Two species of Syrphidæ, or "hover-flies," also showed little constancy, though this may be accounted for by the fact that they are rather consumers than conveyers of pollen. But the Apidæ exhibited much greater constancy. Thirty-three observations were made of different species of *Bombus*, or "humble bee." In four instances the bee visited the flowers of three distinct species, irrespective of colour; in six instances the flowers of two species were visited, the colour being nearly the same; and in twenty-three instances the bee confined itself to a single species, though the plants chosen by the different bees were of the most various kinds and colours, some shade of pink, however, largely predominating. There could be no doubt as to this constancy being intentional, the bee frequently traversing a considerable distance without alighting, so as not to mix its pollen. But it would appear that colour is not the sole guide, since both Mr. Bennett and Mr. Christy observed that the same bees would visit indifferently white and purple foxgloves, whilst passing by flowers of any other species. The common hive bee was observed six times, and only on one occasion was it seen to visit the flowers of more than one species, and then it made one visit to the blue *Scabiosa succisa*, followed by nine in succession to the pink *Centaurea Scabiosa*. Another bee paid twenty-four consecutive visits to the flowers of *Serratula tinctoria*, obviously rejecting those of *Centaurea nigra*, which are not unlike them in general appearance and are nearly of the same colour. It is an interesting circumstance, to which Mr. Bennett calls attention, that the constancy of the insect appears to be in proportion to the part performed by it in carrying pollen from flower to flower. Mr. Christy's observations are quite confirmatory of Mr. Bennett's. He considers the hive bee to be perfectly methodic in its habits, at any rate whilst there is a fair supply of flowers, though when these are scarce it may not be quite so scrupulous; he also thinks that the humble bees show a fairly high degree of constancy. The Lepidoptera observed by him were not so numerous as those watched by Mr. Bennett, but seemed to exhibit more constancy.

At least two different natural productions met with in Australia pass under the name of "manna" among the colonists. One of these occurs originally as a moderately viscid liquid under thin pieces of exfoliating bark on different species of eucalypts, from which it falls in drops in a more or less solid state to the ground. This kind, which consists of mellitose, has been looked upon as being produced by a species of *Cicada*; but according to Mr. Tepper (*Journ. Linn. Soc.*, xvii., 109) that is not the case, the liquid ejected by the cicada not being sweet. The real producer of this "manna" is a small larva, probably of a species of *Psylla* or allied genus, which is found under a white "fluffy" substance that always surrounds and frequently overspreads the clear liquid on the bark. The other kind is a solid manna that forms around the branches or on the leaves of eucalypts, as *Eucalyptus oleata* and *E. odorata*, in white scales, and is the product of the "lerp" insect. It consists of roundish discs of about a line in diameter, formed of small irregular agglutinated globules of solid mellitose. These occur most plentifully around the branchlets springing from the stumps of trees that have been partially destroyed by fire, extending frequently for five or six inches. The discs appear first as small specks in December or January, and under each may be found a small larva, fixed to the spot by its short proboscis which is buried in the bark.

An investigation, carried out on behalf of the Secretary of State for India by Messrs. McDougall Brothers, relative to the quality of Indian wheat, forms the subject of a very interesting parliamentary paper that has just been issued. Four kinds of Indian wheat, "fine soft white," "superior soft red," "average hard white," and "average hard red" were submitted to a comparison with eleven other kinds from various sources as to the quantity and quality of flour each yielded and the character of the bread that could be manufactured from it. Messrs. McDougall pronounce the four Indian varieties to be exceedingly useful wheats; in fact hardly equalled by any other kind for what is deficient and wanting in the English market. They did not prove to be rich in gluten,—indeed, the first-mentioned yielded a very small proportion,—but their extreme dryness will, it is considered, render them invaluable for admixture with English wheats that may be out of condition through moisture; further, the thinness of the skin and consequent greatness of the yield of flour, which is almost unprecedented, place them in the front rank as a "miller's wheat," whilst the flour itself yielded a larger proportion of bread than that from any other wheat examined. But, unfortunately, the Indian wheats are marked by a distinct beany, almost aromatic flavour, in addition to which the flour is "ricey" and yields a bread too close in texture and with a hard and brittle crust; they are not therefore likely to come into use in this country without a liberal admixture of other wheats. It is probable, however, that they might be employed in the proportion of 25 to 50 per cent. together with home-grown or other wheats, such as American, possessing a fine sweet, milky, or nutty flavour, and to this extent they promise to both miller and baker a larger margin of profit than any other kind.

The apparently contradictory statements made respecting the fermentation which takes place during the operation of bread-making, to which reference was made recently in these columns (see before, p. 64), have provoked further discussion. It will be remembered that whilst M. Chicandard alleged that the fermentation was not alcoholic, but entirely due to the physiological action of bacteria, M. Mousette recorded that he had recovered a considerable quantity of alcohol from liquid obtained from the condensation of vapour escaping from an oven during the baking of bread. A communication from M. Boutroux (*Comptes Rendus*, xcvii., 116), appears to reconcile these two statements. He says that upon examining a sample of leaven, such as was used in the making of bread in a locality remote from any brewery, where it was preserved by successive cultivations in the paste of rye bread, he recognized the presence of numerous bacteria and of four other distinct kinds of microscopic organisms, which, when separated by cultivation in appropriate mediums, proved to be *Mycoderma vini*, two true yeasts, and an organism resembling a species of *Saccharomyces*, but devoid of any fermentative power. M. Boutroux is of opinion that the bacteria are the most active agents, though he thinks that the preservation of two species of yeast in a leaven far from any brewery renders it difficult to deny to them an accessory *rôle*; whilst, therefore, not hesitating to regard the "peptonic" fermentation as the most important, he considers that alcoholic fermentation is not excluded.

An editorial statement is made in *New Remedies* (August, p. 225) as having some practical interest in relation to the value of the gastric secretion of the pig taken at different times, which may be safely classed among "things not generally known." It is said that a well-known manufacturer of pepsine,—taking advantage of the fact that the contemplation of appetizing food not only causes an increased flow of saliva, but also stimulates the secretion of gastric juice,—before killing his pigs turns them fasting into a pen where a trough filled with hot mush is covered with a wire screen to prevent them from eating and thus absorbing the pepsine contained in the peptic glands. The yield of pepsine from the stomachs of pigs killed soon after being subjected to this preliminary treatment is said to exceed that obtained when it is not adopted.

In a report on the Trade and Commerce of Smyrna, Mr. Consul Dennis states that the export of liquorice root is largely increasing. The plant grows wild throughout vast districts in the interior and the only cost is for the labour of digging it up, drying and packing it and transport to the coast for shipment. The roots are packed by hydraulic pressure in bales, weighing each from 280 to 340 lbs., and of these 63,000, valued at £127,600 were exported in 1881. The entire export, with the exception of a small quantity sent to France and an insignificant one to this country, goes to the United States where it is boiled down and converted into paste. Some paste is also manufactured in the Meander and Hermus valleys, the roots being allowed to dry through the summer, during which they lose 60 per cent. by weight; they are then ground, the powder boiled with water and the liquor poured into boxes to cool. The Turkish liquorice paste is in mass, as it will not retain the stick form without the addition of some extraneous ingredient; neither is it so sweet as that of Spain or Sicily, but on the other hand it is said to keep better.

Writing to the President of the Academy of Sciences, from Buenos Ayres (*Comptes Rendus*, xcvii., 206), M. Sacc expresses his gratification at the extent to which during the last ten years the cultivation of the best species of cinchona has been carried on in Bolivia. In the mountains, he says, they are now sown by thousands in nurseries and afterwards transplanted, and he gives a list of seven villages which possess nearly four million cinchona plants between them. The trees are full grown in ten or twelve years and then yield 6 to 8 per cent. of bark, the unscientific method of cutting them down prior to the removal of the bark being at present adopted. The Bolivian calisaya bark from this source is said to yield equal to 3 per cent. of quinine sulphate.

According to a communication to the *Adelaide Observer* an experiment in cinchona cultivation that is being carried on in a plantation in the "Northern Territory" of South Australia is progressing very favourably. The "succirubra" plant is the kind most numerously grown, though some good results have been obtained with the "officinalis."

Some further information has appeared (*Comptes Rendus*, xcvii., 174) concerning the new alkaloid, cinchonamine, isolated by M. Arnaud from a "cuprea" bark (*Pharm. Journ.*, [3], xii., 626) which he now states to have been derived from *Remijia Purdiana*. He states that he has again obtained the alkaloid in a state of purity from fresh samples of bark and that several of its salts have been prepared. He finds that it combines readily with acids, the salts formed being usually well crystallized and only slightly soluble in water, especially in the presence of an excess of acid; in hot alcohol they dissolve freely and upon cooling of the solvent crystallize out more readily than from an aqueous solution. The hydrochlorate crystallizes in two forms: from an acid liquid as an anhydrous salt, in very brilliant exceedingly thin prismatic laminæ, very slightly soluble in acidulated water, not efflorescing even at 100° C.; and these when redissolved in hot pure water recrystallize upon cooling in thick flat dull and opaque prisms, much more soluble than the original crystals in both hot and cold water, efflorescent, and containing a molecule of water of crystallization. This property possessed by the anhydrous hydrochlorate of crystallizing in acidulated water allows of the easy separation of cinchonamine from other alkaloids accompanying it in the bark of *R. Purdiana*. The observation has been made by Dr. Laborde that cinchonamine is exceedingly toxic, even in very small doses.

The *Journal de Pharmacie et de Chimie* quotes a report from the French Consul-General at Calcutta, recently communicated by the French Minister of Agriculture and Commerce to the Comité Consultatif d'Hygiène de France, in which the cinchona febrifuge prepared in India under Government auspices from the bark of *Cinchona succirubra* is spoken of in not very favourable terms. It states that analysis has shown that quinine is present in the mixture only in small proportion, about 12 to 13 per cent. of the whole, and expresses an opinion that in spite of the difference in price of this product and that of quinine the latter will continue to hold the exclusive confidence of medical men.

A further contribution to existing evidence as to the unsatisfactory nature of the pharmaceutical preparations of cinchona has been made by M. Tanret (*L'Union Pharm.*, xxiv., 352), who has examined for alkaloidal strength, astringency and acidity a number of samples of soft extracts of cinchona prepared by himself from different kinds of bark such as are now met with in commerce, as well as other samples from the principal manufacturers of pharmaceutical products in Paris. The cinchona tannin principle was estimated in equivalents of tannin from nut-galls and the acidity in terms of acetic acid. M. Tanret found that some of the extracts, such as those prepared from Loxa bark, contained but little alkaloid and much tannin; those from Huanuco bark, on the contrary, contained five or six times more alkaloid and only one-third as much tannin. Two others, from "grey" barks not more distinctly defined, contained no more alkaloid than the Loxa bark preparations and only one-third as much tannin; whilst some preparations from "Indian barks" appeared to contain little tannin, but sometimes very notable quantities of alkaloids. The conclusion to which M. Tanret arrives is that the medical man cannot know exactly what he is ordering for his patient when he prescribes the soft extract of cinchona.

A short time ago a paper by Mr. Rother was printed in this Journal (April 21, p. 860) describing a process for the preparation of a "tinctura opii deodorata," in which the novel feature is the use of a mixture of vaselin and spermaceti for the removal of the odorous principles. Mr. G. W. Sloan has been engaged in the pertinent inquiry as to how far the product compares in alkaloidal strength with that obtained by the official process and reports (*Am. Journ. Pharm.*, lv., 392) that when using an opium containing 13·80 per cent. of morphine he obtained a "deodorized" tincture representing only 7·10 per cent. of the alkaloid. Unfortunately the fatty substances were thrown away before they had been examined for the missing morphine.

It is evident that the prolonged boiling to which hops are submitted in the ordinary operations of brewing, whilst it is favourable to the solution of extractive matter, is destructive to the volatile aromatic principles. To overcome this disadvantage M. Boulé, a pharmacist of Bourges, has patented a process (*L'Union Pharm.*, xxiv., 373) by which the lupulin is first removed by rubbing the dried hops upon suitable sieves; the strobiles are then exhausted with water, the liquor evaporated to dryness, and the extract powdered and mixed with the lupulin. The product is kept in hermetically closed vessels until required, when it is added in definite quantities to the liquor in the vat five minutes before the cessation of the boiling. The extractive dissolves immediately, but the lupulin is said to remain in contact with the liquid during the whole period of fermentation, yielding a more aromatic beer which keeps for a longer time.

A communication from M. Henriot was recently read before the Academy of Sciences (*Comptes Rendus*, xcvii., 218) upon the alleged conversion of brucine into strychnine by Professor Sonnenschein, whose experience, however, he says, he has been unable to repeat. That the supposed conversion was based upon a mistake has been long ago demonstrated, and the communication is only mentioned here as illustrating the desirability that intending investigators should make themselves acquainted with the literature of a subject before working upon it, for probably had M. Henriot been acquainted with the exposure of Sonnenschein's mistake by Mr. Cownley, confirmed by Mr. Shenstone (*Pharm. Journ.*, [3], vi., 841, and vii., 652), he would not have set himself the unnecessary task of a third time killing the slain.

A short time since the Pharmacie Centrale de France received from its Rhodes correspondent a quantity of the substance described by Guibourt under the name of "écorce de storax" or "storax rouge de commerce." It consisted of compact cakes entirely composed of pieces of thin bark, with some corky *débris*, agglomerated by strong pressure, and was represented to be a residue from the preparation of liquid storax. The colour was a dark wine-red with a slight whitish efflorescence, and the odour was strong, balsamic, analogous to that of peru balsam, and very slightly bituminous. The cakes appeared to be still rich in resinous and aromatic constituents, and M. Ferrand reports (*L'Union Pharm.*, xxiv., 349) that when treated with solvents the substance yielded to alcohol 17·66 per cent. of extract, to ether 16·61 per cent., and to carbon bisulphide 10·76 per cent. These extracts appeared to contain a true balsam having some of the properties of storax, and capable of being utilized in perfumery if not in medicine. The raw material is said to be obtainable at a low price, there being little use for it at present.

In the estimation of tannin by the gelatine process a difficulty arises through the persistence with which the precipitate produced remains diffused through the liquid, rendering it difficult to determine the exact point at which the addition of the standard gelatine solution should cease. According to M. Rouquès (*L'Union Pharm.*, xxiv., 359) this may be overcome by first adding to the astringent liquid some precipitated barium sulphate and stirring the mixture briskly with a glass rod while pouring in the gelatine solution; the barium sulphate becomes thus entangled in the gelatinous precipitate and by virtue of its weight carries it rapidly to the bottom.

At a recent meeting of the Massachusetts State Pharmaceutical Association, Mr. Flynn mentioned (*Proceedings*, 1883, p. 103) that the red colour sometimes assumed by carbolic acid is precipitated upon treatment of a solution of the acid with a solution of chloride of sodium. Professor Markoe confirmed the statement, and said that a 5 per cent. solution of salt was sufficiently strong for the purpose; but he also pointed out that, as a rule, the pharmacist would not be justified in adding sodium chloride to his carbolic acid.

In most of the published processes for the estimation of salicylic acid in liquids the use of ether has been recommended to dissolve out the acid. M. Malenfant advocates (*Journ. Pharm. et de Chim.*, [5], viii., 106) the substitution of chloroform for ether, as dissolving the salicylic acid equally well and being more manageable. He proceeds by shaking together moderately in a flask 50 c.c. of the wine or other liquid to be examined and 20 c.c. of pure chloroform, in such a way as to avoid complete emulsion taking place. The mixture is then thrown on a funnel having a robinet and allowed to stand a few minutes, when it separates into two layers. About 10 c.c. of the chloroform layer is then drawn off into a test tube, and a drop of tincture of perchloride of iron in solution in several cubic centimetres of distilled water added. If any salicylic acid were contained in the liquid submitted to analysis, upon shaking this mixture and letting it stand the water which will float above the chloroform will show the characteristic violet colour. If a quantitative analysis be required the usual colorimetric method may be adopted.

Herr Beckurts has described (*Pharm. Centralh.*, xxiv., 377) the results of an examination of a spurious oil of cloves, which was reputed to be of English origin. It was yellowish in colour, had only a weak aromatic taste, and differed but little in odour from true oil of cloves. The sp. gr. was 1·03, instead of 1·041 to 1·060, as required by the German Pharmacopœia; when exposed to bromine vapour it assumed neither a blue nor a violet colour, but became black; a drop of the oil dissolved in four grams of alcohol was not coloured blue, but green, upon the addition of a drop of dilute solution of perchloride of iron; and water after being shaken with the oil showed an acid reaction. When submitted to distillation, 9 per cent. passed over at 82° C., and proved to consist of a compound ether—formate of propyl; the other constituents were recognized to be some genuine oil of cloves and a much larger quantity of a compound apparently belonging to the phenols.

Bitumen Judaicum, or asphalte from the Dead Sea, is one of the numerous substances that have been put forward in France as a means of combating the phylloxera. According to some information furnished to the French Academy (*Comptes Rendus*, xcvii., 492), the Arab writers, in speaking of the use of this pitch as an insecticide, distinguish three kinds: first, the kind thrown up by the Dead Sea from time to time, which is solid and appears to be identical with the commercial substance; second, that which is found on the surface of the soil in the neighbourhood of the Dead Sea, which is also solid, and that which is obtained in the same locality from below the surface, which is liquid. A sample of the first kind having been examined by M. Delachanal, he found it to yield products of distillation analogous to those obtained from petroleum, together with more than 3 per cent. of sulphur. As the substance upon incineration only gave 0·273 per cent. of ash, the sulphur, or at any rate, the greater part of it, could not have been present as metallic sulphate The presence of so much sulphur would appear to point to a mineral origin for this bitumen; and to separate it from those which are entirely of organic origin.

Herr Heumann has made the interesting observation that under certain conditions sulphur is capable of exhibiting a phosphorescence equal to that of phosphorus (*Berichte*, xvi., 139). When, for instance, it is heated in a dark place upon a metal or porcelain plate the vapour omitted is brilliantly phosphorescent. Sulphur then appears to burn with a clear, scarcely bluish flame very different from the blue flame of its combustion at a high temperature, whilst instead of the odour of sulphurous acid the vapour resembles in smell a combination of sulphuretted hydrogen, camphor and oxygen. If, too, a heated glass rod be plunged into powdered sulphur, and the blue flame resulting from the ignition of the adherent particles be extinguished, as long as the glass is hot a vapour will continue to be emitted, which in a dark place takes the appearance of a distinctly visible pale flame. Certain compounds of sulphur also, such as cinnabar and the sulphides of antimony, arsenic and tin, hyposulphite of soda and xanthate of potash, show when heated in obscurity a pale phosphorescence and emit vapours that have not the odour of sulphurous acid gas. The phosphorescence of sulphur is accompanied by a slight evolution of heat, but not sufficient to char paper.

From the nineteenth annual report of the Chief Inspector under the Alkali, etc., Works Regulation Act, it would appear that the treatment of the waste heaps from alkali works is still a very difficult subject. When no direct operation is carried out for the recovery of the sulphur the alkali makers attempt by beating down the waste firmly as it is laid and making a hard smooth surface to exclude the air and thus prevent decomposition. In this, however, as is known, they are only partly successful; the rain falling upon the heaps is absorbed and carries with it oxygen where the atmosphere unaided could not penetrate, the result being that decomposition goes on and an offensive yellow drainage is set up. Some idea of the enormous quantity of sulphur continually being thus wasted may be formed from the fact that in the course of some experiments in connection with the drainage from one ground it was ascertained that something like twelve tons of sulphur, worth at least £70, was being carried away daily by the various drains of yellow liquid. As a temporary expedient, Dr. Angus Smith suggests the digging of pits for the reception of alkali waste drainage, from which it could be pumped for treatment at some central station.

PREPARATIONS OF PEPSIN.*

BY DR. ADOLPH TSHEPPE.

Although an immense amount has been written and published on this subject, during the last decade, our knowledge and our individual judgment regarding the same has by no means made much advance, and to-day we are still in the same position of empirical experimentation in which we were formerly. We admit having made a decided progress, but if we consider the great popularity enjoyed, for instance, by preparations of pepsin, proven by experimental research to be worthless, the practical application of what is known concerning the use of this remedy seems to have been promulgated only to a very limited degree, especially in the medical profession. The following remarks have been written with a view to furnish answers to questions frequently asked me.

* Lecture delivered April 12 before the New York Deutsche Apotheker-Verein, translated by Hugo Engel, M.D. (The translation in part revised by ED. N. R.). Reprinted from *New Remedies*, August, 1883.

The gastric juice, *vulgo* pepsin, was introduced as a remedy by Dr. L. Corvisart, who supposed that this juice, which was recognized also as the digestive principle for albuminoid bodies outside of the stomach, would be indicated in all cases in which, from failure of its secretion, disturbances of digestion or dyspepsia existed. The physiological supposition has been verified by experience, and the gastric juice has since been employed in different forms, as wine, elixir, glycerol, or in the dried state, and has been prepared in many different ways under the name of pepsin, as the apparently isolated digestive principle, and, after a great deal of opposition, it has at last been introduced into all the Pharmacopœias.

Pepsin is officinal in the U.S. Pharmacopœia under the name of Pepsinum saccharatum; in the German Pharmacopœia it is simply called Pepsinum. Modes of prepation are not mentioned in either of these Pharmacopœias, but its properties* and tests are given. The U.S. Pharmacopœia has adopted Scheffer's method of testing the remedy and his "standard strength:" 1 part pepsin in 500 parts water, acidulated with $\frac{1}{2}$ per cent. of absolute hydrochloric acid (*i.e.*, $1\frac{1}{2}$ per cent. of the officinal concentrated acid), shall digest 50 parts of hard-boiled albumen within five or six hours, at a temperature of 38 to 40°. The German Pharmacopœia demands double strength, 1 part to dissolve 100 parts of albumen cut into small pieces of the size of a lentil; time, four to six hours. This capability of dissolving albumen is badly expressed in German by the "percentage of pepsin," so that a pepsin which is capable of dissolving a hundred times its weight of albumen is called 100 per cent. pepsin, not because it contains 100 per cent. of pure pepsin. Our officinal pepsin would be, therefore, a 50 per cent. preparation, and one cannot say that the Pharmacopœia makes a very high demand, as there are many pepsins in the market which are much stronger, and which may be changed into a pepsin of 50 per cent., by diluting with sugar of milk. The German Pharmacopœia does not mention any substances by which pepsin may be reduced to a normal strength, but the pepsins which come to us from Germany are also diluted with sugar of milk. The Pharmacopœia also demands that it shall be soluble.

Its power of dissolving albumen changes greatly under different circumstances; and any comparative experiments have to be instituted always under the same conditions. Temperature, percentage of acid, concentration of the pepsin solution, *i.e.*, the quantity of fluid in relation to the pepsin employed, have their determining influence upon the quantity of the albumen dissolved, as also upon the time necessary for its solution; and for the latter (the time) the degree of division of the albumen is especially important, this influence even going so far that the time necessary for the solution of finely-divided albumen amounts only to as many minutes as, according to the Pharmacopœias, hours are necesssary.

The U.S. Pharmacopœia does not mention a word about this division of the albumen, and it can be concluded only from the time given, that the pieces of albumen have to be of about the same size as those which the German Pharmacopœia directs.

For the purpose of comparing the different preparations of pepsin I have made use of the following somewhat different procedure, as it permits their examination within a short time, while according to the process given in the Pharmacopœia, one to two days are necessary.

Albumen, taken from the raw eggs, is beaten to destroy the cellular walls and mixed with water, sulphate of magnesium is dissolved in the fluid, the latter filtered, and the whole is heated after a few drops of acetic acid have been added. The albumen separates as a fine cream-like precipitate, which, on the filter, is freed from the salts by water and then diluted with a definite quantity of fluid containing 0·5 per cent. of absolute hydrochloric acid (5·0 per cent. diluted hydrochloric acid, Ph. U.S., 1883).

For the purpose of comparing the digestive power of different preparations of pepsin, I made solutions each containing 1 per cent. of the respective pepsin, and to this I added 25 centimetres of my albumen-magma (just described), having previously shaken the latter thoroughly and exposed the same to a temperature of 40° C. This temperature was preserved in the water-bath. Solution sets in within fifteen minutes, when 25 or 10 centimetres of the magma are again added to each solution, and this is continued until at last the pepsin does not visibly dissolve any further addition. This point may, near its approach, generally be recognized by the fact that the dissolving process itself goes on more slowly. In case one employs for the different kinds of pepsin relatively 100, 150, 200, 400 centimetres of the albumen-magma, these numbers will express the relative dissolving powers of the different preparations of pepsin in the same numbers. To reduce this value to the albumen, which is coagulated in one whole egg, the percentage of dry substances in the albumen, or in the solution employed, is calculated and then multiplied by seven. (It is to be remarked, that albumen generally contains 14·25 per cent. of dry substance.) The albumen of one egg for every 100 or 150 centimetres fluid may be recommended for practical purposes. It has further to be remarked that the solution, which is finished within a short time, does not represent any peptonization of the albumen; only the first stage of the process of peptonization makes its appearance; the solution takes place by the change of the albumen into syntonin, which is completely precipitated, not by boiling, but on being carefully neutralized with an alkali, or on being boiled with an excess of carbonate of lime or of carbonate of lead. The addition of chloride of sodium to the acid solution also precipitates this syntonin. The perfect metamorphosis into peptone demands considerable time, and is generally not finished at the end of twenty-four hours. The quantity of "peptone" still present as syntonin, and not peptonized, is recognized by the amount of the precipitate produced by ferrocyanide of potassium and acetic acid. The precipitate still appears even if nothing more is thrown down by neutralization; no further sediment takes place.

The different kinds of pepsin of commerce are prepared according to different principles, representing the different phases of experimental empirics, or of the scientific knowledge of this substance. Up to the present time it has not been possible to prepare a perfectly pure pepsin, the preparations sold to-day as such being merely mixtures of certain albuminoid bodies possessing digestive power, and therefore they are looked upon frequently as absolute pepsins, and sold as such by the manufacturer.

No reagents are known by which it would be possible to separate the pepsin from the many other protein-substances and to prepare it in a pure state; nor can pepsin, on the other hand, be separated by precipitating the other albuminoids accompanying it, because when these are precipitated it is carried along with them. But fluids have been obtained possessing a considerable digestive power, and containing, therefore, pepsin, which fact permitted the deduction, that pepsin is *not* precipitated by the well-known precipitants of albuminoids, such as boiling tannic acid, acetate of lead, mercuric chloride, nitrate of silver, acetic acid, or ferrocyanide of potassium; although it may be precipitated by basic acetate of lead, chloride of platinum and alcohol; and even the modes of preparation of the commercial pepsin are based upon the precipitation of albuminoid bodies, to which the real pepsin adheres only mechanically.

The following are some of the processes by which pep-

* Under "Properties of Pepsin," a *lapsus linguæ* has happened in the German Pharmacopœia, copied also in other places; it says, that pepsin does not give a clear solution with water, but that the solution may be made clear by the addition of *two* drops of muriatic acid. That these two drops really refer to the quantity of pepsin equivalent to as much as the "point of a knife" will carry, is left to the imagination of the reader.

sin, each time with different properties, is obtained; properties which in reality do not belong to the digestive ferment itself (which to-day is still hypothetical), but to the accompanying albuminoids forming the greater part of the product:—

1. *Old Method.*—The gastric juice is obtained by scraping the mucous membrane of stomach, extracting with water, filtering, and evaporating at a moderate temperature (Lamatsch's Pepsin). All former pepsins were prepared after this primitive method. To this category belong also the pepsin-wines and elixirs prepared directly by digestion of the finely-cut stomach or its mucous membrane, and the pepsin which is procured by alcohol from the respective digestive fluids.

2. *French Method.*—The extract obtained from the stomach is precipitated with acetate of lead, the precipitate washed, suspended in water, treated with sulphuretted hydrogen, filtered, evaporated to the consistence of syrup, and mixed with starch. (French Codex, Boudault's Pepsin). Since this process precipitates the albuminoid bodies, but not pepsin, only so much of the latter can be effective as has been carried along by the precipitation of the albuminoids. Besides, by this complicated process the effect of the original fluid seems to have been so decidedly diminished that only very little can be expected from the action of this pepsin. The French Codex is satisfied if the "Pepsine amylacée" digests twelve times its weight of albumen; Boudault considers it sufficient when his pepsin digests four times its weight of fibrin.

3. *Scheffer's Method.*—The fact that the acidulated gastric juice is precipitated by a concentrated solution of chloride of sodium as a cream-like substance seemed to prove that it were possible at last to obtain a pure pepsin. However, the pepsin is not precipitated in this manner, but the albuminoid bodies are; and only the property of pepsin to be carried along with precipitates of any character contained in the pepsin-fluid causes the albumen-precipitate of Scheffer to contain pepsin. This albumen is in the condition of syntonin or acid-albumen. The pepsin is prepared by dressing the precipitate, re-dissolving it, and repeating the precipitation, when the mass expressed represents the so-called Pepsinum purum (Scheffer) or, with the addition of sugar of milk, the Pepsinum saccharatum of our own Pharmacopœia.

In this manner, and by careful manipulation, really excellent pepsin preparations may be obtained, the physical properties of which, regarding odour and colour, meet all just demands. The only drawback is, that by the addition of uncertain quantities of sugar of milk, no limits have been put to unlimited dilution, and the latter can to some extent only be controlled by testing how much further dilution any given sample would stand. It is also possible to make a proximate assay of these preparations (which should be called "Saccharum pepsinatum" rather than "Pepsinum saccharatum") by precipitating with chloride of sodium or with picric acid. Some manufacturers of high-grade pepsin indicate directly the quantity of sugar of milk with which their products may be diluted to still merit the name of pepsin, and this shows very strikingly how much sugar of milk is sold under the name of pepsin.

4. The *latest method* for the preparation of not only a very handsome-looking pepsin, but of one possessing a power of digestion far surpassing that of all other preparations of the gastric juice, is that of Carl L. Jensen, formerly of Dakota, now of Philadelphia. This pepsin, to which on account of its appearance the name "crystallized" has wrongly been given, is easily soluble in water without the addition of an acid, is not precipitated by common salt, and turns out to be in every respect a peptone, but of very considerable digestive power; in fact, it is the most powerful pepsin preparation obtainable in the market. I have found Jensen's "Crystallized Pepsin" to be really one of 500 per cent.; at least, if its solubility is tested under most favourable conditions for dissolving albumen.

In contradistinction from those pepsins which are obtained by precipitation with common salt, Jensen's preparations of pepsin contain, besides the ferment which dissolves albumen, another which coagulates milk, the same which exists in rennet and differs from pepsin; this ferment remains partly or wholly dissolved in the saline solution of Scheffer's process. Since it is the peptones proper (but not pepsin, as has been erroneously maintained) which are the "carriers" of the digestive power, we may say that they are prepared by maceration of the stomach and of its mucous membrane in acidulated water at a temperature of 38° to 40° C., by which the albuminoids change into peptones, and can be separated easily, so that by drying on glass they are finally obtained in transparent grains or scales, the superlative properties of which have found their expression in the hyperbolic names given them by their discoverers.

Several manufacturers have heretofore offered quite praiseworthy preparations, which have, however, been dispensed only in consequence of the moral obligation of the apothecary towards the physician; but it must also be admitted that preparations far less valuable, and the disagreeable odour of which already indicated their quality, have also been employed against the better conviction of the apothecary.

The peptone-nature of these preparations is evidenced by the fact that they cannot be precipitated by acetate of lead (unless sulphates are accidentally present), nor by alcohol in acid solution, but by mercuric chloride, nitrate of silver, picric acid or tannic acid. With caustic potash and a little solution of sulphate of copper, the well-known biuret-reaction sets in.

Physiological Deductions.

For the purpose of testing the solvent power of pepsins for albumen, the most favourable conditions have been determined, and it has been found that pepsin without acid does not dissolve albumen at all; but that the addition of hydrochloric acid containing 0·5 per cent. to 0·6 per cent. absolute acid for temperatures of 38° to 40° C., and a less addition, viz., of 0·2–0·3 of the same acid for higher temperatures, 40°–50° C., favours the strongest effect of the pepsin. Somewhat weaker is the action of phosphoric, nitric and sulphuric acids; with lactic acid and the other organic acids, the effect is diminished. Metallic salts and antiseptics, possessing no coagulating effect upon albumen, do not disturb this process of solution.

Temperature higher than the normal temperature of the human body, and a percentage of acid larger than is met with in the human stomach, may be permitted as proper conditions for the artificial production of peptones or for the comparison of the effect of different kinds of pepsin; but for demonstrating the amount of solvent power of a pepsin for therapeutical purposes, it would be necessary to establish the identical conditions actually existing in the human organism, and, under these conditions, the co-efficients of solvent power usually claimed for pepsins are far too high. Besides, for the practical preparation of meat peptones, the experimental results gained in this manner have been proven to be illusions, because the yield of meat peptone represents only a small fraction of the albuminoid substance contained in the muscular substance employed. (I know a manufacturer of peptones, who, without the use of pepsin, manages to get more elegant preparations in larger quantity than they can be obtained by pepsin.)

Pepsin, as well as all other similar ferments which represent products of a continuous physiological function, possesses one great drawback, which cannot be removed. We have invariably at our disposal only that quantity of the pepsin-ferment which the stomach of a slaughtered animal at a certain time either has secreted or prepared in cells. It is questionable, therefore, if the therapeutic employment of this ferment has any advantage at all when given to assist the process of digestion in a dyspeptic stomach, and it is doubtful how much in the cases mostly benefited by the use of the pepsin has to be ascribed to the effect of the latter, and how much to the hydrochloric acid accompanying it.

According to the investigations on the amount of digestive fluid in individuals who, on account of a gastric fistula, were proper subjects for these experiments, this quantity proved to be (in the human organism) 2 kilograms calculated for twenty-four hours. Although the demands on digestion made by the stomach of the hog are totally different, the conditions of the secretion of pepsin are similar to those in man; and the quantity of pepsin which can be obtained at a definite time from a single stomach, even though more could be obtained from that of a hog than from that of man, would, on account of the loss, represent at most a *single dose*.

But experience teaches us that from a good stomach the manufacturer in a favourable case may obtain 4–5 ounces of this saccharated pepsin of the strength as formerly in vogue, viz., $\frac{1}{12}$.

This quantity, according to the method usually employed, was dispensed in one hundred and twenty-five doses of 10 grains each, or in two hundred and fifty doses of 5 grains each. Calculating now the solvent power of the pepsin, we find that 10 grains of pepsin, according to the former statements, could dissolve 120 grains of boiled albumen. For the digestion of 2 ounces of beefsteak, there would be necessary, therefore, 80 grains of pepsin, and for that of $\frac{1}{2}$ pound even 320 grains. To-day, the strength of the preparations of pepsin in the market is far greater; but we must not forget, that hand in hand with the methods of preparation, those of the tests have also improved. Our Pharmacopœia demands that 1 grain of pepsin should dissolve 50 grains of boiled albumen; in the case above mentioned, viz., for the digestion of $\frac{1}{2}$ pound of beefsteak, even of this digestive preparation 80 grains would be necessary to effect solution. It must be admitted that for the pepsins of greatest effect (I myself have found Jensen's pepsin as probably one of 500 degrees) only the 500th part would be necessary for the same purpose; and 1 ounce of a protein-substance, therefore, would demand 1 grain of this pepsin only; but as mentioned above, even in the best preparations the percentage of peptones obtained during the process from those really present is a very limited one, and the general objection made above is not answered even by the fact that very active pepsin preparations are actually obtained.

The logical deduction, therefore, from these observations would be, that the small doses of pepsin of feeble digestive power should be replaced by very much larger doses of those preparations of pepsin which are recognized as the best, whenever any practical results are to be expected and looked for; that all favourable conditions which are known experimentally to produce a rapid and perfect solution of the albuminoids should never be lost sight of when the remedy is employed for medicinal purposes, and that this effect ceases when pepsin is administered either simultaneously with or in combination with alkalies, a rule which, in spite of frequent warning, is, up to this day, still disregarded by many.

THE CHEMICAL COMPOSITION OF OIL OF BIRCH (BETULA LENTA, LIN.).*

BY H. P. PETTIGREW.

A thorough chemical investigation of the composition of the volatile oil of birch has never been made, although in 1844 Procter† first found it to contain salicylic acid, and from the similarity of the properties of this oil with those of oil of gaultheria he suggested the idea of an analogous chemical composition of the two oils.

Nothing more was written upon the subject until 1882, when Mr. G. W. Kennedy,* of Pottsville, made some experiments with it, by which results were obtained, indicating the presence of salicylic acid, and by which the identity of the oil with that of gaultheria was presumed.

In 1843, Procter made a series of experiments with oil of gaultheria, and in the following year M. Cahours† made a careful analysis of it, and found it to consist of salicylate of methyl, together with 10 per cent. of a terpene.

The oil used in this analysis was obtained through the kindness of Mr. Kennedy, and, being distilled by a friend of his, an oil of absolute purity was thus guaranteed.

The oil of birch when freshly distilled is a bright and colourless liquid, of considerable refractive power; it possesses a very agreeable and fragrant odour, closely resembling that of gaultheria, although a difference can be perceived when the two oils are compared. With age, the oil acquires a reddish colour, of which, however, it is deprived by distillation. It has a specific gravity of 1·180 at 15° C. (59° F.), and its boiling point is constant at 218° C. (424·4° F.).

A portion of the oil when shaken with a concentrated solution of sodium bisulphite afforded no crystalline compound, thus proving the absence of an aldehyde.

The plan of analysis adopted was as follows:—

To 100 grams of the oil contained in a half litre flask provided with an inverted condenser a concentrated solution of 50 grams of potassium hydrate was added, which is somewhat more than the theoretical quantity required for the decomposition of the oil, and the mixture boiled for six hours upon a sand-bath. At the end of this time the oil was completely decomposed, and a clear liquid was obtained, without the separation of any oily layer, and also affording none upon dilution with water or upon supersaturation with an acid. This observation demonstrated conclusively the absence of a terpene, which, had such been present, would have remained undecomposed by the caustic alkali, and become separated at once or upon subsequent dilution of the strongly alkaline liquid with water. In this manner 400 grams of the oil were treated.

The resulting liquids were then distilled from a sand-bath until one-fourth of the entire amount had passed over; this distillate was then redistilled from a sand-bath; collecting one-fourth as before, and the latter distillate, which would contain all the methyl-alcohol, was then distilled from a water-bath, and further rectified and deprived of water by distilling twice from quick lime. This liquid thus obtained then possessed the unmistakable odour of methyl-alcohol, and corresponded to it in its specific gravity and boiling point.

The liquid remaining from the first distillation, which would contain the salicylic acid combined with the potassium, was then slightly supersaturated with hydrochloric acid, whereby a dense white precipitate of salicylic acid was obtained. This was then washed with a little water, dried by exposure to the air, and purified by crystallization from hot petroleum benzin, from which it was deposited in light, colourless and lustrous crystals.

Upon adding a concentrated solution of potassium or sodium hydrate to the oil, as had been previously observed by Procter (*loc. cit.*, 1844, p. 243), combination immediately ensues, with liberation of heat, and a white, crystalline compound is formed, which is decomposed by acids, with a separation of the original oil.

The composition of these compounds with the alkalies, in which the hydrogen atom of the phenol group of methyl salicylate is replaced by potassium, sodium, etc., and their decomposition by the action of an acid with the regeneration of the original oil, may perhaps be more clearly seen when expressed by an equation, as follows:—

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* From the *American Journal of Pharmacy*, August, 1883.

† *Am. Journ. Pharm.*, 2 ser., vol. ix., 1844, p. 243.

* *Am. Journ. Pharm.*, 4 ser., vol. xii, 1882, page 49.

† *Journ de Pharm et Chimie*, Mai, 1843. Abstracted by *Am. Journ. Pharm.*, 2 ser., vol. ix., 1844.

$$C_6H_4\begin{cases}OK \\ CO-OCH_3\end{cases} + HCl = C_6H_4\begin{cases}OH \\ CO-OCH_3\end{cases} + KCl$$

It is worthy of note that the specific gravity of oil of gaultheria, as stated in the United States Pharmacopœia (1880), corresponds precisely with that of oil of birch, while the specific gravity of an authentic specimen of oil of gaultheria in the possession of Professor Maisch was found to be but 1·0318 at 22° C.

The lower specific gravity of oil of gaultheria may easily be explained by the presence in the latter of a terpene which is lighter than water.

The results obtained by the present investigation may, therefore, be briefly summarized as follows:—

I. The volatile oil of birch is not identical with the oil of gaultheria, in that it consists entirely of salicylate of methyl, and contains no terpene.

II. The specific gravity of oil of gaultheria is not 1·180, as stated in the United States Pharmacopœia, but 1·0318; the former being the specific gravity of oil of birch, which, as is known, is often indiscriminately sold and employed as oil of gaultheria.

In conclusion, the writer desires to state that he has commenced the analysis of pure oil of gaultheria, and that the terpene which it contains, but of which at present so little is known, will be submitted to further investigation.

THE SPECIFIC GRAVITY OF CONCENTRATED SULPHURIC ACID.*

The relation between specific gravity and percentage of absolute acid, in the case of sulphuric acid, formed one of the subjects of extended discussion during the last revision of the United States Pharmacopœia. A special committee of the National Academy of Sciences is at present also engaged with the examination of a similar question, namely, the establishment of a reliable scale and a report on the feasibility of abolishing Baumé's scale altogether or at least adopting a fixed scientific basis for it.

During the examination of the various tables of the strength of sulphuric acid by the Committee of Revision, it became evident that the tables heretofore usually relied on (Ure's, etc.), were entirely unreliable. The only one which was based on elaborate scientific experiment was that constructed by Kolb, of Mühlhausen. And this was the table finally selected. To demonstrate the relative coincidence or divergence of the different tables, the writer of this article constructed for the Committee of Revision a series of curves, on one and the same table, in which the specific gravities were entered upon the ordinate—and the percentages upon the abscissaxis. While curves for the weaker acid often coincided, they began to diverge more and more as the strength of the acid increased, the only one which remained somewhat in harmony with Kolb's being that of Bineau. The curve is quite normal—with the exception of a few points which probably mark definite hydrates—until a strength of about 88 per cent. is reached, when it begins to ascend rapidly so that there is but little difference of specific gravity for the highest strength of acid left.

Kolb s table, unfortunately, omits the very section of the curve involved in this rapid increase, inasmuch as he gives no specific gravity or percentage between 1·819 (89·7 per cent.) and 1·842 (100 per cent.).

Professor G. Lunge, of Zürich, and Mr. P. Naef, have lately made a renewed investigation of this subject, under observance of all precautions and corrections insuring a reliable result. The thorough familiarity of Professor Lunge with this subject renders his contribution particularly valuable, as it probably settles the question permanently.

Professor Lunge and Mr. Naef find that Kolb's figures coincide, below 90 per cent., with the values found by themselves so closely that they may be regarded as practically correct. Two observations were, however, made which are of importance. Kolb, namely, states that he succeeded, by careful repeated distillation, in obtaining an acid containing 99·72 per cent. of sulphuric anhydride. No other chemist had, before him, succeeded in this, and even Lunge and Naef could not obtain, by the most careful evaporation *in vacuo*, a stronger acid (as *residue*) than 98·57 per cent. Further it was shown that the specific gravity of the latter acid (98·57 per cent.) as obtained by evaporation agreed almost absolutely (within 0·0003) with an acid prepared by mixing the calculated quantity of anhydrous sulphuric acid with a somewhat weaker acid; and that an acid of the latter kind (that is, one containing an excess of SO_3) as well as an acid approaching 100 per cent. has a *lower* specific gravity than a somewhat weaker acid, which observation confirms similar ones already made by F. and W. Kohlrausch.

The utility of Kolb's table being somewhat impaired by the absence of any data for the strongest sulphuric acid, Lunge and Naef have now filled out the gap by the construction of the following table, the last column of which gives the specific gravity and degrees by Baumé's scale of a commercial acid made at Uetikon, on the lake of Zürich:—

Table of Percentage and Specific Gravity of the Strongest Sulphuric Acid at 15° C. (59° F.), reduced to Water at 4° C. and a Vacuum.

Percentage H_2SO_4.	Pure acid.	Commercial acid (Uetikon).	
	Spec. grav.	Spec. grav.	Baumé.
90	1·8185	1·8202	65·1°
*90·20	1·8195	...	...
*90·29	...	1·8219	...
91	1·8241	1·8254	65·4
*91·48	1·8271	...	...
92	1·8294	1·8306	65·6
*92·83	1·8334	...	...
93	1·8339	1·8346	65·8
94	1·8372	1·8374	65·9
*94·09	...	1·8375	...
*94·84	1·8387	...	...
95	1·8390	1·8397	66
*95·26	...	1·8404	66
*95·97	1·8406	...	...
96	1·8406	...	...
97	1·8410	...	...
*97·70	1·8413	...	...
97·75	...	1·8464†	66·2
98	1·8412	...	...
*98·39	1·8406‡	...	...
*98·66	1·8409§	...	...
99	1·8403	...	...
*99·47	1·8395	...	...
*100	1·8384	...	...

Below 90 per cent., Kolb's table may be used unhesitatingly for commercial acids.

* These figures were directly determined; the others by graphic interpolation.

† Acid prepared, at Griesheim, by direct evaporation on a large scale.

‡ Prepared by mixing ordinary strong acid with anhydride.

§ Prepared by direct evaporation of ordinary strong acid.

* From *Die Chem. Industrie*, 1883, 37. Reprinted from *New Remedies*, August, 1883.

FLUID EXTRACT OF SENEGA.*

BY H. J. ROSE.

The tendency of this extract to gelatinize and form a copious precipitate has provoked considerable investigation, and the remedies advocated have, in my experience, but slightly modified the evil. The alkaline treatment, recommended by Dr. Squibb and others, while mitigating the first-named evil, does not seem to prevent the formation of a precipitate, the deposit proceeding slowly, for a considerable time, sometimes for months. Without criticizing the methods recommended by many would-be doctors for the evil, or giving details of the different menstrua employed, and their relative merits, I will only refer to two papers read at the New York State Pharmaceutical Association, which have led me to think that the result of my experiments to find a suitable menstruum would be acceptable. In these experiments I have endeavoured to avoid the application of heat, and to preserve the active constituents of the root in an unchanged condition.

The first process, recommended by C. W. Holmes, of Elmira, that of exhausting a pound of the root with dilute alcohol, evaporating to 11 ounces, filtering and washing the residue, must surely leave a large portion of the polygalin on the filter. The other process, that of Professor P. W. Bedford, is much better, viz: heating the hydro-alcoholic solution quickly to boiling, and then filtering. The only objection is the application of heat, which he states could hardly be accepted in a fluid extract, and gives in preference the United States process in which ammonia is used, furnishing a product which is said to be unexceptionable in every respect. My experience is that this preparation does throw down a precipitate continuously.

I have found that the addition of a small quantity of neutral spirit of nitrous ether to the menstruum has in my hands proved a very effectual remedy for both the troubles complained of, forming a stable product, without the use of glycerine or alkalies, or the application of heat. The menstruum used was:—

Alcohol	7 parts.
Spirit of nitrous ether	2 „
Water	7 „

and the process that of the U.S.P. The product has kept with me some ten months without deposit, and I should like others to try the same and report results.

The idea was suggested by some experiments made on the deposit formed in the fluid extract. Various solvents were tried, among others, the spirits of nitre, which appeared to be quite effective. Its preservative action is still more marked.

SOAP VARNISHES.†

BY E. ANDRES.

This varnish, owing to its cheapness, complete resistance to water, and considerable elasticity, is of value for many purposes. To make it, boil good tallow soap with soft water until dissolved, and filter while hot through cloths, heat again, add an equal volume of water and a boiling solution of alum as long as an alumina salt is precipitated. Let the stearate of alumina settle from off the water, and wash the precipitate thoroughly, then dry and heat on a water-bath until transparent. Finally, stir the preparation into turpentine, heated nearly to boiling until a solution is made of the consistency of thick varnish, which can afterwards be thinned with more turpentine if required. Johnson's waterproof varnish for paper and cloth is made by dissolving copperas in water, adding soap solution thereto and straining off the precipitated stearate of iron. If this be dissolved in bisulphide of carbon or benzole, a waterproof varnish is obtained. For a white varnish, use alum instead of copperas. Varnish for gilding is made as follows: 50 parts soda are dissolved in 100 parts water in a copper vessel heated to boiling, and 100 parts powdered resin stirred in and boiled for two or three hours until perfectly clear. Let it cool, pour off the supernatant water from the heavy, viscous, resin soap, add 100 parts of fresh water and 15 parts of steeped glue, and heat till the whole is dissolved. This makes a quick drying varnish; for a slow drying varnish add 10 to 20 parts glycerine of 28° B. The above resin soap, mixed with about 5 per cent. ammonia, forms a very cheap and durable vehicle for paints. Waterglass paints are only successful when mixed in small quantities and applied immediately.

CANTHARIDIN AND ITS USES.*

E. Dietrich, manufacturer of plasters, dressings, etc., in Helfenberg, advocates the abandonment of cantharides as an ingredient in blistering tissues and the employment in its place of the active principle cantharidin.

The best solvent for this principle is formic acid, which itself occurs in cantharides; the stronger the acid the greater is its solvent action.

If cantharidin is to be dissolved in collodion, oil, or the mass of the plaster, it is advisable to rub it first to a very smooth paste with oil. In this shape it is soluble in collodion by mere shaking; in oil and plaster it dissolves on being heated for half an hour to 80° C. (176° F.).

Cantharidal Collodium.

Cantharidin	$\frac{1}{20}$ gr.
Collodion	15 grs.
Rape oil (as colouring)	$\frac{3}{4}$ gr.

Ordinary Cantharidal Plaster.

Cantharidin	$\frac{1}{16}$ gr.
Suet	3 grs.
Yellow wax	12 grs.
Turpentine	3 grs.

Perpetual Cantharidal Plaster.

Cantharidin	$\frac{1}{64}$ gr.
Resin	10 grs.
Yellow wax	8 grs.
Turpentine	5 grs.
Suet	3 grs.
Euphorbium, powd.	1 gr.

Cantharidal Oil.

Cantharidin	$\frac{1}{20}$ gr.
Rape oil	15 grs.

Cantharidal Ointment.

Cantharidin	$\frac{1}{9}$ gr.
Yellow wax	45 grs.
Olive oil	100 grs.

Unguentum Acre.

Cantharidin	$\frac{1}{32}$ gr.
Yellow wax	$1\frac{1}{2}$ gr.
Resin	3 grs.
Turpentine	6 grs.
Lard	20 grs.
Euphorbium, powd.	1 gr.

In all these cases the relation of cantharidin to Spanish flies is ample, about 1 to 200. In the case of some preparations, as the oil and ointment, loss is occasioned by heat, but this loss is made up by a proportionately larger quantity.

* From the *Canadian Pharmaceutical Journal*, August, 1883.

† From *Faerb. Must. Zeit.* Reprinted from the *Journal of the Society of Chemical Industry.*

* From *Pharm. Zeitschr. f. Russl.* Reprinted from *New Remedies*, August, 1883.

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THE INLAND REVENUE COMMISSIONERS' REPORT.

THE reports presented annually by the Commissioners of Inland Revenue to the Lords of Her Majesty's Treasury always contain a mass of information for statisticians interested in ascertaining the exact way in which a large proportion of the current income of the country is made up, but they also usually refer incidentally to a large number of subjects that are more or less connected with the business of many readers of this Journal. In recent years this has been especially the case with respect to the appendix devoted to the account of the work done in the Laboratory at Somerset House, and the Twenty-Sixth Report, which has been issued during the past week, is no exception to the rule. It shows that the various departments of the State are becoming increasingly aware of the services that can be rendered by the chemist, since the number of samples analysed during the year ending March 31st last was 24,312, or 4356 above the average of the previous three years, and 10,000 more than were submitted for analysis in the year 1873. Hitherto the additional work has been met by an increase in the staff of temporary assistants, but this has necessitated the withdrawal of first class analysts from their ordinary work for the purpose of supervision, and as the higher class of analytical work has increased concurrently some considerable embarrassment and hindrance to business has resulted, which induces the Principal of the Laboratory to urge the desirability, in the public interest, of the provision of some more certain and reliable assistance.

Among the most responsible work done in the Laboratory are the references under the "Sale of Foods and Drugs Act" in cases of prosecution where the evidence of a public analyst is disputed. During the year there were thirty samples so referred, including milk, butter, whisky, gin, rum, beer, bread, coffee, "sweet nitre," ketchup, arrowroot and ground ginger. Of these seventeen were samples of milk, twelve being alleged to have been watered and five deprived of a portion of their cream. In two-thirds of the "watering" cases the results obtained confirmed the conclusions of the public analyst, but in four out of five of the "cream" cases the percentage of fat was found to range from 2·49 to 2·79, and as the lowest of these figures was considered to be practically equal to the minimum limit recommended by the Society of Public Analysts, it was inferred that the respective local analysts had failed to extract the whole of the fat. There were two samples of butter alleged to contain foreign fat, but in neither case was the department able to confirm the statement. With respect to four samples of spirit, three were found to agree with the description of the local analyst, but in the fourth it was considered probable that the obscuration of strength caused by the presence of sweetening and colouring matters had not been taken into account. A sample of beer was alleged to have been adulterated with common salt, but concerning this the Report says that the public analyst had evidently followed the practice of calculating the amount of salt from the chlorine present, without ascertaining whether or not there was sufficient sodium in the beer to form, with the chlorine, the quantity of common salt reported. A sample of bread was found to contain the unusually large proportion of 39 grains of alum per 4 lb. loaf. A sample of "sweet nitre" is referred to as affording an illustration of the difficulty sometimes felt in giving a certificate which shall be equally just to the prosecutor and the defendant. The London Pharmacopœia process for "sweet spirit of nitre" is described and the modification of it in the British Pharmacopœia under the name of "spirit of nitrous ether," which is spoken of as containing "a large "and less variable proportion of nitrous ether than "'sweet nitre' prepared by the process laid down "in 1851." But, recognizing the fact that the first-named process is still extensively followed, the department reported that "the results of an ana-"lysis agreed with those of 'sweet nitre' pre-"pared according to a formula given in the "London Pharmacopœia of 1851." The other samples referred were one of coffee which contained nearly half its weight of chicory, one of ketchup of low strength and in a state of decomposition, one of arrowroot containing 40 per cent. of sago flour, and one of ground ginger containing 20 per cent. of ground rice. It will, therefore, be seen from the foregoing that in thirteen out of the thirty cases of disputed analysis referred by magistrates to the Inland Revenue Laboratory during the year the department was unable to confirm the reports of the local analysts upon which prosecutions had been based.

Besides the foregoing analyses and those conducted in the Laboratory which have an immediate bearing upon the collection of revenue, a large number are made for the different public departments, especially of articles which are the subject of contract, and which evidently require that a sharp supervision should be exercised over them. Thus, out of nine samples of treacle that had been supplied to the Admiralty as derived from cane sugar, for the use of the boys on board Her Majesty's training ships, all but one were found to have been derived more or less from beet sugar and to contain too large a proportion of alkaline salts to allow of their being safely used as regular articles of diet. An unsightly batch of pickles was found to have been made with a "vinegar" consisting chiefly of pyroligneous acid, and the traces of iron usually present in such acid had combined with tannic acid from the wood of the cask to form an ink which had of course discoloured the pickles. Turning to another class of articles, out of five pieces of electroplated ware only one had deposited upon it the proper proportion of silver. For the Board of Trade upwards of five hundred samples of lime juice and lemon juice were examined, representing upwards of seven thousand gallons of the former and sixty-seven thousand gallons of the latter. The report states that the marked improvement in the quality of the juice which had been observed in the previous year had not only been maintained, but had become even more decided. The samples rejected amounted to only 3 per cent. of the lime juice and 7 per cent. of the lemon juice, a proportion lower than in any preceding year. Nineteen samples of fortified juice were analysed, and four were rejected on the ground of unsoundness, presence of pulpy matter, or excess of spirit.

It will not be necessary to refer here to the general statistics contained in the Report, especially as the most important were dealt with by the Chancellor of the Exchequer when introducing his Budget to the House of Commons. But it may be mentioned that the falling off in the consumption of spirit as a beverage, which has been the subject of comment as indicating an improvement in the habits of the people, is coincident with a continued increase in the quantity of spirit methylated for use in the arts and manufactures. Eight samples of naphtha intended for "methylating," representing more than a thousand gallons, were rejected on the ground that it was not sufficiently offensive in odour and taste to render the resulting methylated spirit unfit for drinking purposes. In connection with a decrease in the beer revenue, and the possibility of this having been affected by the failure of the hop crop last year, it is remarked that it is believed that other vegetable substances have been used by some brewers together with hops, as "hop supplements," but that nothing has yet been found that possesses the aromatic and preservative properties which have for so long made hops an essential ingredient in all good beer. In connection with the subject of drinks, it is worthy of note that 642 samples of various "temperance beverages," such as botanic beer, herb beer, tonic ale, etc., were examined, and these ranged in contents of proof spirit from none to 8·1 per cent. Lastly, the revenue from the issue of patent medicine licences during the year amounted to £4851, and from patent medicine stamps to £154,439, showing in the latter item an increase of £9555 as compared with the previous year.

Should any of our readers share the intense susceptibility of the "Own Correspondent" of a contemporary, who recognized in the absence, on the plea of illness, of the Archduke Carl Ludwig from the ceremony at the opening of the late International Pharmaceutical Exhibition an indication that pharmacy had been "once more snubbed by royalty," they may find perhaps some comfort in the fact that the Emperor of Austria was present towards its close. His Majesty had signified on the previous day his intention of visiting the exhibition on Friday, the 24th, and precisely at the hour appointed, eleven o'clock, his carriage was driven up to the entrance, where he was received by the President and members of the Executive Committee and the Jurors, and from whence he passed into the centre of the building and took his stand near the exhibit of military medicine chests from the Imperial War Department. The President delivered a short address to His Majesty and then presented to him the members of the Committee and some of the Jurors, the representative of this country being Mr. Thomas Greenish. His Majesty passed round the exhibition, and left after a stay of about an hour and a half.

* * *

In connection with this exhibition we may mention that we have received a copy of the list of awards by the jurors, and find that each of the three British exhibitors has received some recognition of the merits of his exhibit, Professor Attfield, who sent a set of the ten editions of his 'Manual,' having been awarded a gold medal and Messrs. Fletcher, Fletcher and Stevenson and Mr. W. Martindale silver medals.

* * *

Professor Attfield has been elected an Honorary Member of the Pharmaceutical Society of New South Wales.

* * *

The French Association for the advancement of Science has recently held its twelfth annual meeting at Rouen, and the managers of the Association seem certainly to have reason to be satisfied with the progress it has made, for according to M. Masson, the Treasurer, its accumulated capital already equals that of its elder sister, the British Association, whilst it has five hundred more members. But M. Masson left the sure ground of facts for the region of prophecy, concerning which some good advice has been given, and went on to say: "When we have reached our fifty-second year we shall certainly be able to dispose of a capital of several millions, and the French Association, which already draws to its bosom so large a number of illustrious personalities, will enjoy an immense influence over the scientific progress of our country and consequently of the entire world."

* * *

According to the circular of the Entertainment Committee, a very large attendance of members is expected at the meeting of the American Pharmaceutical Association in Washington next month, arrangements having been made for the reception of over six hundred persons. The meeting, which will be held in the Smithsonian Institution in the national capital, will commence at 3 p.m. on the 11th instant, and the concluding excursion will take place on the 15th.

In the United States, as in this country, the stupidity of the public in preferring the advertized nostrums of quacks to the medicines of regular medical practitioners is a fertile cause of scolding by orthodox writers, whose lucubrations sometimes show a ludicrous straining after effect. Thus one contemporary laments that "In spite of learned physicians, the ignorant multitude, like swine possessed of devils, rush violently into the sea of patent medicines and perish. They are not capable of distinguishing between the true and the false, sham work and the effects of real specifics. They prefer the advertised quack to be tied like a millstone around their neck, and to be cast into the sea, instead of resorting to the pharmacopœia," etc., etc. The *St. Louis Druggist* rather cruelly but pertinently remarks upon this, "Let the good work go on! The more advertised quacks that are tied like millstones around the necks of the public and cast into the sea, the better it will be for those of us who are left."

* * *

In May last, a French pharmacist, against whom an action for supplying a lady with rather considerable quantities of morphia without requiring a fresh medical authorization each time had been brought by the lady's husband, was condemned to pay a penalty of 1000 francs and 2000 francs damages to the husband as well as to undergo eight days' imprisonment. Upon appeal, this severe sentence has just been somewhat mitigated, the penalty having been reduced from 1000 francs to 500, but the amount of damages and imprisonment have been maintained. Commenting upon this case a writer in the *Répertoire* says that although with the majority of poisonous substances it would be difficult for the pharmacist to refuse the repetition of a prescription upon the solicitation of a customer, it will be necessary in the face of this judgment to safeguard himself by requiring that the physician shall endorse upon the prescription the length of time during which it is to be repeated and at what intervals.

* * *

A vacancy in the division of physics, medical chemistry and pharmacy of the Academy of Medicine has recently been filled by the election of M. Andouard, of Nantes, whose 'Nouveaux Eléments de Pharmacie' is probably known to some of our readers.

* * *

At a meeting of the Aberdeen University Court on Tuesday last, Dr. Matthew Hay, Demonstrator of Practical Materia Medica in the University of Edinburgh, was appointed to succeed Dr. Ogston in the Chair of Medical Logic and Jurisprudence.

* * *

According to a recent census, quoted by the *Medical Times and Gazette*, there are in Paris and the communes of the department of the Seine 1915 doctors of medicine, 12 doctors of surgery, 83 officers of health, 43 foreign doctors, 1500 midwives, 845 pharmacists and 95 veterinary doctors. These figures are, of course, exclusive of illegal practitioners.

* * *

A weakness for "picking and stealing" bits of information, without acknowledgment as to their source, has placed an Irish medical contemporary in the ludicrous position of fathering a mistaken announcement made in another journal that the British Association will meet this month in "the New Dominion." We refrain from mentioning the names of the originator and endorser of the *canard*.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council of this Society was held on Wednesday, August 1, 1883.

Present—Professor Tichborne, President, Dr. Aquilla Smith, Vice-President, Dr. Collins, Dr. R. Montgomery, Messrs. Brunker, Doran, Draper, Grindley, Hayes, Hodgson, Wells, jun.

The minutes of the July meeting were read and signed.

Letters were read from Mr. Patrick S. Moriarty, of Killarney, and Mr. Laurence H. Elmore, of Dundalk, both of whom have passed the preliminary examination of this Society, asking to be allowed to come up for their final examination, the former in nine months, and the latter in six months, from the time at which they passed the preliminary.

It was resolved that they be informed that their requests cannot be granted, inasmuch as the regulations require that twelve months must elapse between the two examinations, except in the case of candidates who have passed (at least two years before) one of the preliminary examinations recognized by the General Medical Council.

Read a letter from Mr. Philip Princep, Secretary to the British Pharmaceutical Conference, asking for the names of the delegates from this Society to the approaching Conference at Southport, in September.

It was decided that delegates should be appointed at the next monthly meeting of the Council to be held on September 5.

Read a report from the Law Committee on the petition and letter forwarded by the Clerk of the Privy Council, by direction of that Council, for any observations which this Council might choose to make thereupon (see report of July meeting in *Pharmaceutical Journal* of July 14, 1883, p. 36).

The report included a draft letter to be sent by the Registrar to Dr. Kaye, in reply to the petition and letter forwarded by him.

When the petition and draft letter had been read over, it was proposed by Mr. W. F. Wells, jun., and seconded by Mr. Grindley:—

"That the following paragraph, 'The proposed grade of Registered Druggists, whose licence would empower them to sell poisons, but not dispense medical prescriptions, might in the opinion of this Council be extended with advantage to persons who should pass an examination as to their knowledge of the nature and properties of poisonous drugs and chemicals. Under the present powers of this Council there is no such examination possible,' be omitted."

The motion was lost on a division, two voting for, and eight against it.

The adoption of the draft letter, as sent up by the Committee, was then proposed, seconded, and carried.

Read a report from the House Committee, stating that Mr. Francis O'Neill had accepted the proposal of the Committee for the tenancy of three rooms in his house, No. 11, Harcourt Street, Dublin, for a term of ten years, at a rent of fifty pounds a year, with an additional sum of nine pounds a year for attendance. The Committee recommended that a sum of £160 be placed at their disposal for the purchase of furniture, etc., for these apartments; and submitted the draft of an agreement to be signed by the President and by Mr. O'Neill, specifying the conditions upon which the premises are to be held.

Proposed by Dr. Montgomery, seconded by Mr. Doran, and resolved:—

"That the sum of £160, asked for by the Committee, as essential for furnishing the new rooms in Harcourt Street be granted, leaving the disposal of it to their discretion."

The report of the examination for the licence as Pharmaceutical Chemist, held on July 4th and 5th, was laid on the table. Seven candidates presented themselves, of whom one withdrew, one was rejected, and the following five passed—

Robert Armstrong, Cootehill.
Richard Godley, Tralee.
Thomas Lemon, Markethill, Co. Armagh.
John Cooper Francis Meyler, 7 Wellington Place, Dublin.
Gerald Leahy Stack, Listowel, Co. Kerry.

Mr. Hayes, according to notice given, moved the following, which was seconded by Mr. Brunker, and adopted:—

"That the resolution of March 5th, 1879 (see 'Calendar' for 1883, pages 55 and 83) be altered to read, after the word 'Ireland', 'or Registered Chemist and Druggist of Great Britain.'"

[N.B. The resolution as now amended sanctions the acceptance from candidates of certificates for compounding given by registered Chemists and Druggists of Great Britain.]

Some bills were ordered for payment, and the Council then rose.

Provincial Transactions.

HAWICK PHARMACEUTICAL ASSOCIATION.

The third meeting of this Association was held on Wednesday, the 8th inst., when there was a good attendance, Mr. Dechan occupying the chair.

The first business of the meeting was the reading of a paper on "Lime Water," by Mr. T. Maben, Pharmaceutical Chemist. At the outset, Mr. Maben gave the results of a series of analyses of commercial samples of lime water, from which it appeared there was considerable variation in the quality of this preparation. The strength required by the British Pharmacopœia is ·56 grain CaO per fluid ounce at 60° F., and there were a number of this strength, but the majority were under ·5 grain, while one specimen reached as low a point as ·3 grain. Discussing the causes of these variations, Mr. Maben showed that they might be traced to several sources, viz., the lime, the water, the method of preservation and temperature. It was of the utmost importance to have calcic hydrate to begin with, and not a mixture of hydrate and carbonate. The hydrate absorbs CO_2 with great rapidity, and unless very carefully preserved, it would be found to be in a short time largely contaminated with carbonate. Again, it is believed to be a not uncommon practice to use ordinary water in making this preparation, but in very many cases it will be impossible to obtain lime water of full strength by so doing and therefore distilled water only should be employed. It is found that lime water if exposed to the atmosphere, as in a half-empty bottle, very rapidly absorbs carbonic dioxide, and immediately becomes weakened in consequence. Lastly, the changes of temperature exert a considerable influence. It is well known that salts of lime are less soluble in hot than in cold water, and even at an increase of 5° F. a considerable difference is noticed, the point of saturation being reached at ·54 grain CaO per fluid ounce. The solubility gradually diminishes up to 80° F., when ·52 grain is found to saturate each ounce of water. The practical considerations naturally arising out of this fact are that great care should be exercised in keeping all the stock and shop bottles perfectly air-tight and as cool as possible; otherwise it is next to impossible to supply the public with a perfect lime water.

Mr. W. P. Kennedy then delivered a lecture on "The Spectroscope and Spectrum Analysis." The lecturer first gave a short account of the hypothesis concerning light, afterwards describing the spectroscope and the discovery of spectrum analysis, by which we are now able to ascertain the composition of the furthest distant stars, and explaining practically its application as a means of detecting metals in qualitative analysis. Mr. Kennedy then gave an exceedingly interesting description of the rainband spectroscope, by which we are almost able to predict with certainty what the weather of to-morrow will be.

Votes of thanks having been heartily awarded to Mr. Maben and Mr. Kennedy for their papers, the Secretary intimated the arrangements for the Botanical Class, and the next meeting of the Association.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

Solid and Liquid Illuminating Agents.*

BY LEOPOLD FIELD, F.C.S.

Lecture IV.

We now leave that part of our subject pertaining to unmanufactured materials, and come to consider what difference chemical treatment is able to produce in them. As mentioned several times already, spermaceti and wax are incapable of improvement by decomposition, but tallow and palm oil only become true illuminators when chemistry has divested them of their grosser components. It is singular to remark how prominent a part France has played in the history of lamps and candles. We have the Sieur de Brez inventing mould candles; Cambacères, who introduced plaited wick, perhaps as vital and essential an improvement as any; Argand and Carcel, the fathers of the lamp; and last, and greatest, Chevreul, the discoverer of stearine. It is also worthy of note that all the great inventions which confer a lustre on this century took their rise in the period intervening between the first and second great French Revolutions. The steam-engine, the railway, the steamship, the electric telegraph, gas lighting, the penny postage, and the abolition of slavery, are all events in that era. I mention the latter with a purpose, because Chevreul's discoveries have tended more to the bringing about of that blessing than missionary labours or Acts of Parliament. This assertion will be proved as we proceed. For the present we will consider what these labours were. In 1811, Chevreul's researches commenced; his first paper saw the light in 1813. In this he announced that fatty bodies were of a composite nature; that tallow, lard, and other fats were not pure compounds, but, in the first place, *mixtures* of hard and soft materials which, again, were *compounds* of a fatty acid with a substance called glycerine. This discovery is the keynote of the stearine industry; for, until the comparatively uninflammable glycerine is severed from the brilliantly burning fatty acid, and devoted to its own valuable purposes, neither of them can be said to fulfil its legitimate intention. The efforts of all labourers in this field are still directed to the obtaining a fatty acid free from glycerine in the cheapest manner and greatest quantity. Chevreul published paper after paper, attacking and decomposing one fatty substance after another; until, in 1823, he published the whole of his labours under the title of 'Chemical Researches on Fatty Bodies of Animal Origin,' perhaps as fine a monument of untiring perseverance, combined with supreme skill, as chemistry has to boast of. But, so far, the tendency of Chevreul's work had been entirely scientific, nor had he attempted to obtain any pecuniary result from his labours. From a keen eye like his own, however, it was impossible that the intrinsic value of his discoveries would long remain concealed. Accordingly, in 1825, he, with Gay Lussac, started a

* Cantor Lectures: Reprinted from the *Journal of the Society of Arts.*

factory for the manufacture of stearic acid, under the protection of patents. But chemical knowledge and technical—or rather commercial—success do not always go hand-in-hand. Chevreul's enterprise proved a failure; and it remained for M. de Milly to reap the harvest which the great chemist had sown. In 1832, M. de Milly commenced manufacturing stearine candles near the Barrière de l'Etoile, and produced some very excellent candles which were called by that name. The Société d'Encouragement, of Paris, in the same year, were moved, in consideration of Chevreul's labours, to offer a premium of 4000 francs to the manufacturer who should produce two tons of candles under the following conditions:—The price not to exceed 9*d.* per lb.; the light to be, weight for weight, equal in amount and brilliancy to that of wax candles; neither to smell, smoke, nor gutter, and to be hard and dry; the multiplying point not to be below 122° Fahr. Messrs. Motard and Milly were successful in their endeavours to obtain this prize, up to a certain point. They produced candles complying in all respects with the conditions, except in that of price, which was nearly double the amount stipulated. In awarding a silver medal to the claimants, the Society expressed a hope that the money prize would be carried off.

It is here necessary to consider the results published by Chevreul, and applied by M. Milly. You have heard that oils are divided into "fixed" and "essential," and that the latter are not qualified to be considered as luminants, differing totally in constitution from the former. I may just remark that as nearly every natural product yields a separate definite acid, so also it contains a characteristic essential oil. I need scarcely remind you how keen the sense of smell is, which enables us readily to distinguish the hundreds of different odours we come across in daily life, and nearly each of these is due to an essential oil. But the fixed oils can be defined as compounds of a fatty acid with alcohol, either glycerine, as in true fats, or ethyl, cetyl, etc., in wax. Tallow, the most important, is a mixture of stearine and oleine. By simple pressure the latter separates in the form of a brown oil. This is now extensively used in the art of making butter, but is not to be confounded with the commercial oleine used by soapmakers, which is really oleic acid. Stearine consists of stearic acid and glycerine. Palm oil, which is becoming as important a substance as tallow itself, consists mainly of palmitine, which is palmitic acid and glycerine. In order to effect the separation of these bodies to obtain the palmitic, stearic, and oleic acids in a utilizable condition, three processes are available; the first is that of Chevreul, adopted by M. Milly, called the *saponification* process; the second, perfected by Wilson, is called the *acidification*; and the third, the modification of Tilghmann's invention, called the *high pressure* process. We will take them *seriatim*. The theory of the saponification process is based upon the fact, that glycerine has less affinity for the acids than an alkaline base. Accordingly, if the fat be heated with lime or soda, the glycerine is set free, and a *soap* is formed. If soda be used, the soap is soluble, and, as such, is the ordinary vehicle for removing dirt. But where lime is employed, an insoluble soap is formed. This is the plan adopted for the manufacture of stearine by Chevreul's process. Into a large lead-lined tank, certain proportions of tallow and palm oil are emptied from the original tubs, which are finally steamed. Thereupon a certain amount of slaked lime, varying in quantity with the nature of the fat used, is added, and the whole boiled for some hours with open steam. At the end of the time, the tallow of the acids will have combined with the lime to form a hard substance, technically known as "rock;" chemically, as a mixture of stearate, palmitate, and oleate of lime. The liquid contains the glycerine highly diluted, and is known as "sweet water." The rock is then removed to another lead-lined tank, where it is boiled with strong sulphuric acid. This combines rapidly with the lime to form insoluble sulphate, and the freed acids float on the top. When partially cool, they are run into flat pans, and allowed to solidify. The cakes are placed in horsehair bags, and introduced into the hydraulic press. Here they undergo a pressure at a gentle heat, sufficient to force out the bulk of oleic acid; by this time the cake has assumed a light yellow colour, instead of the original dark brown. The oleic acid still contains much stearine, which is removed by various processes, still the subject of much inventive energy, as the relative prices of stearine and olein being as 50—30, the success or failure of a factory often depends upon the percentage of stearine obtained.

The cakes are now placed in stronger bags, and subjected to a considerably higher pressure, approaching six tons on the inch, at a temperature of over 120° Fahr. Cast into blocks, they are then ready for the manufacturer. The stearine obtained by this process, is beautifully crystalline. It is a mixture of stearic acid and palmitic acid, often called margaric* acid. It is still open to doubt whether margaric acid is a true compound, or simply an alloy of the two other acids. The reasons for believing it to be an independent compound are, that its formula, $C_{17}H_{34}O_2$, is intermediate between those of stearic acid, $C_{18}H_{36}O_2$, and palmitic acid, $C_{16}H_{32}O_2$.

Chevreul first called the fatty acids he discovered margaric and margarous, the latter being stearic acid. Heinty has shown the margaric acid of Chevreul to consist of 90 per cent. palmitic, and 10 per cent. stearic acids. All other saponified margaric acids, so called, have been proved to be different mixtures of stearic, oleic and palmitic acids. But an actual margaric acid, of the formula $C_{17}H_{34}O_2$, may be obtained by the action of water on cyanide of cetyl—

$$C_{17}H_{33}N + 2H_2O = C_{17}H_{34}O_2 + NH_3.$$

This is a yellowish body, crystallizing in fine needles. By re-crystallization, and partial precipitation, the margaric acid may be made to yield a higher member still, $C_{19}H_{38}O_2$, which has not, I believe, been found in natural products hitherto. The name margarine is, however, too tempting not to be applied, in a good many modulations, to candles of pearly lustre by the makers.

One of the great obstacles to commercial success in the manufacturing of stearine was the difficulty of the disposing of the oil, which was a waste product, and would have remained so, but for the wise step of removing the duty on soap. It is now, however, almost as important as the stearic acid, being employed for making what is known as pure oil soap, an article in immense demand among dyers and bleachers.

The next process—that of acidification—requires a short history, by way of preface. Till now, only tallow had been employed for making stearine, though, in 1836, Messrs. Hempell and Blundell took out a patent for making candles from saponified palm oil. These, as you see by this specimen, give a fair light, but are dark in colour and are greasy to handle, and never became popular. In 1829, Mr. Soames had taken out a patent for pressing cocoanut oil, obtaining a solid and a liquid. This cocoanut stearine was a decided improvement upon pressed tallow, but the candles made from it still required snuffing, and consequently were never extensively used. The composition of cocoanut oil, as already shown (Lecture III.), differs very considerably from that of palm oil and tallow; the proportion of glycerine is comparatively small, and the fatty acids very numerous; some of them, as *caproic* and *caprylic*, are volatile at low temperatures and give very pungent vapours, especially when the candle is blown out, which, of course, tended to render this candle objectionable. It was not till Mr. Wilson brought out his composite candle, which I have already described,

* *Margarita*, a pearl.

composed of the cocoanut stearine and the new stearic acid, that they became popular. Their sale is still very great, though the composition of the present composite candle differs materially from those first introduced under that name. In 1840, Mr. Gwynne patented a process of distillation *in vacuo* for fatty bodies, and also for distilling fatty acids, under atmospheric pressure. Though the principle was mainly the exclusion of air from the apparatus and was valuable, the working was not found practicable. In 1842, Messrs. Price and Co.—under the name of W. C. Jones—patented the process of distillation of acids from cocoanut oil alone, and also after combination with lime. Very beautiful candles were made by this method, but were still subject to the same complaint of those of stearine, namely, of evolving vapours. The candles made of the product of distillation from the cocoanut lime soap were free from all defects, but their cost was far too great. Various experiments were tried, and patents taken out; but we cannot stop to consider any till we reach the patent of Messrs. Wilson and Gwynne, in 1843, which embodied the suggestion of M. Frémy, to heat oils with acid instead of alkali; only, instead of following his recommendation that the vessel should be kept as *cool* as possible, the patentees recommended a high temperature, and distillation under superheated steam. The process will be best understood from the actual description. Tallow oil is subjected to the action of strong sulphuric acid at a very high temperature, in the proportion of 6 tons of the oil to 7 cwt. of acid. By this means the glycerine is converted into sulpho-glyceric acid, with evolution of sulphurous acid, and a certain amount of carbon. After the acid treatment, the black mass in the vessel looks anything but promising. A little washing, however, frees it from the residual charcoal and acid, and it is then transferred into a still, into which superheated steam plays, and this, with the aid of gentle "bottom heat," distils over the acid. Here is the raw palm oil of a golden-yellow colour. Here the black mass produced by the acid treatment, and this firm white substance the product of distillation. In the still a black thick pitch remains, known commercially as palm pitch. What has come over is pure palmitic acid. The medium runnings of the distillate are the best. The first and last are not so good, and are used for inferior candles. From this palmitic acid the finest composite candles are now made. Price and Co. subject their distillate to hot pressure, and obtain the "Belmont Sperm" thereby. You will remark the beauty of their appearance, and the clear lustre of the flame. I have here burning, side by side, a candle of tallow, and a candle of stearic acid, with equal wicks, and you will perceive at once the difference made by the exclusion of the glycerine. I have forgotted to mention, in the description of the palm oil, the kernel of the nut, from which is obtained a very large amount of oil, equal to, if not exceeding, the quantity produced from the fruit. The composition, however, is quite different, being, in fact, almost identical with that of cocoanut oil, which it replaces in many instances, especially in the manufacture of soap, for which both these oils are abundantly employed. So much for the saponification and distillation processes. Mr. Tilghmann, in 1854, took out a patent for the separation of fats into acids and glycerine by heating with water under pressure. He suggested pumping the mixture of fat and water through a coil heated to a temperature exceeding 800° Fahr., and at a pressure of 2000 lbs. to the inch. Messrs. Wilson and Payne patented a method by which superheated steam passed into the fat at ordinary pressure effected the separation, and distilled both acids and glycerine. By resubjecting the latter to this process, Mr. Wilson obtained the beautiful glycerine for which Price's Patent Candle Co. have so high and just a reputation. I cannot dilate as I should like to upon the uses and beauties of this beautiful alcohol. They form part of that branch of chemistry known as saponification, a wide reaching and deeply interesting subject. However, Mr. Tilghmann's idea has been amplified, and on the Continent a great part of the stearine is made by what is called the autoclave process. The tallow and palm oil are introduced into a stout copper vessel provided with a stirrer, into which superheated steam is passed till the pressure reaches 250 lb. on the inch. After several hours' agitation at this pressure, the separation is complete. Each of these methods has its particular advantages, and is applied to certain specialities of stearine, in the choice of which experience is the only guide. I have on the table samples of candles produced by all the methods I have named, and many more (which will be particularized in the last lecture on candles). I cannot conclude witnout drawing your attention to the great results which have followed the discoveries of Chevreul and Wilson. Had it not been shown that by these processes the worst and darkest greases can be forced to yield a clean and beautiful substance, palm oil would have been almost useless to the candle-maker. As it is, over 40,000 tons are imported annually into England, and, no doubt, far more into the Continent and America. The kings of the countries where the palm tree grows find that the labour of their subjects, in collecting the fruit and extracting the oil, is far more remunerative to them than the selling of these subjects into slavery. Being as keenly alive to their own interests as any white men can be, they have become humane as a matter of business. By encouraging the influx of European goods in exchange for their native productions, they have brought about their own civilization far more rapidly than could have been effected by the simple spiritual pressure of missionaries unendorsed by self-interest. There are many other varieties of tree oils, such as the Cahoun palm, the Bassia butter, and others of which I have already given the names and compositions, and of which you see specimens on the table. We must now dismiss the vegetable and animal kingdoms, and devote the next lecture to the consideration of those products of a bygone world—paraffin and petroleum.

Those for whom the history of the stearine industry possesses sufficient interest would do well to read Mr. G. F. Wilson's excellent lecture on the subject, delivered before the Society of Arts, in 1852, and a paper read a short time subsequently, in amplification of the lecture. For the major portion of the above information I am indebted to these records, written by one who should, perhaps, rank next to Chevreul for the share he has taken in promoting this gigantic industry.—L. F.

Addendum to Lecture II.

Since the publication of Lecture II., Professor Thiselton Dyer has kindly called my attention to several points where my statements concerning the waxes need emendation; I therefore add the following particulars:—

Chinese Wax (*Chung-peh-la*).—This wax had not assumed commercial importance in China till the thirteenth century, and, till a much later date, was used only by those of the highest rank. The cultivation of the insect is now an industry next to silk in importance. The annual value of the amount produced is computed at about £600,000. Concerning the name and the nature of the insect which produces the wax, and the tree on which it grazes, there has been much doubt. This is partly due to the fact that several other species of *Coccus* produce kindred but dissimilar substances. Thus, the *Coccus ceriferus* produces a substance called white lac, a brittle semi-transparent body, with appearance and properties by no means resembling *peh-la*. Mr. Lockhart, of Shanghai, has given much information concerning this insect, and Mr. Westwood reported upon the specimens of insects sent over by him, and proposed the name of *Coccus sinensis* for the new insect. The form of the *coccus* is not unlike that of the small wood-louse. The young are probably the real producers of the wax. As regards the nature of the tree upon which the insect feeds, and the branches of which it encrusts with wax, the statements are also conflicting. From a Chinese drawing with names appended, we may judge the tree to be of the species *Ligustrum lucidum*, although another drawing, as pointed out to me by Professor Dyer, would show that the insect also affects the *Fraxinus Chinensis*, or China ash. In my second lecture, you may remember, I quoted *Rhus succedanea* as the most likely forage, inasmuch as that tree yields Japanese wax, but to this Professor Dyer objects the dissimilarity of constitution between the Chinese and Japanese wax, the latter of which you will remember is a palmitate of glycerine; the former was cerylic cerotate. But as the acids are of the same series, and Professor Maskelyne has obtained palmitic acid by the saponification of Chinese wax, I ventured to think that the predetermination of the plant to form wax might be carried out differently in the insect to the fruit. But as it is very doubtful whether the insect feeds at all upon the *Rhus succedanea*, my theory must be received with extreme caution. Professor Maskelyne's paper, which gives the most comprehensive account of the chemistry of *peh-la*, is to be found in the *Quarterly Journal of the Chemical Society*, vol. v., p. 24. Sir Benjamin Brodie ('Transactions of the Royal Society,' 1848, p. 159) also gives an account of its composition. In the Museum of the Pharmaceutical Society there is a twig of the *Fraxinus Chinensis* coated with the wax of this insect, and Mr. Westwood's description is published in the *Gardeners' Chronicle*, July 30, 1853. Mr. Fortune obtained a plant through some Catholic missionaries from the province of Sze-tchuen, which has much similarity to some species of *Fraxinus*; and in Hanbury's 'Science Papers,' at pp. 60 and 275, will be found a copious account, containing nearly all that is known concerning this insect, with woodcuts, etc. Concerning the Japanese wax, Professor Dyer informs me that it is not produced from the *root*, as I stated, but from the *fruit* of the *Rhus succedanea*; and in the North of Japan, from the berries of the varnish tree, *Rhus vernicifera*. It must be observed that the varnish is not made from the wax. The latter is yielded by the berries on boiling, to which process they are subjected several times, with pressure in bags, a small amount of oil having been added to render the wax more fusible. The varnish flows from incisions made in the stems of this species of *Rhus*. Both these trees, and several other wax producers, are in the Kew Botanical Gardens.

It will be observed that I have not mentioned the properties of the whale, seal, and other oils of that species (manatee, dugong), etc. Mr. A. H. Allen, on the evening of my third lecture, read a paper before the Society of Chemical Industry* upon these oils, in which he points out that they contain a large proportion of free oleic acid, and suggests that to the presence of this a great deal of the clogging of machinery lubricated therewith is due. He also thinks that sperm oil should, from its constitution, like sperm itself, be classed rather with the waxes than with true oils; and the bottle-nosed whale oil closely resembles that of the cachalot. As regards the oil from both these whales, Mr. Allen endorses my statement that it produces sperm from whatever part of the body it be taken. He attributes the differences of properties in the two oils, as commercially known, to the fact that while the sperm oil is boiled down on the ship, and hence freed from the fibre soon after death, the bottle-nose oil has been prepared from boiling the blubber after it has arrived in England, when it has undergone putrefaction to a more or less considerable extent. The northern and southern whale oils he regards as triglycerides. One important difference between the whale and sperm oils lies in their specific gravity; that of the whale being ·880, and that of the sperm ·914, which would strengthen the presumption of the waxy nature of the latter. Two oils known in the market as shark-liver oil, and African fish-oil, are of very light density, and Mr. Allen expects that they will prove to resemble sperm oil in constitution; but hitherto they have resisted all attempts at saponification. His paper is full of interest, and, containing information almost entirely novel, is well worthy of study by those interested in the subject.

* See *Pharm. Journ.*, [3], xiii., p. 1007.

Parliamentary and Law Proceedings.

Prosecutions under the Sale of Food and Drugs Act.

At the Marylebone Police Court on Wednesday, August 15, before Mr. A. De Rutzen, stipendiary magistrate, Mr. Joseph John William Allen, chemist and druggist, of 19, Elizabeth Terrace, St. John's, Hampstead, and Mrs. Jane Allchin, of 1A, Elizabeth Terrace, St. John's, Hampstead, were charged on two summonses under the Sale of Food and Drugs Act, that they did unlawfully sell to the prejudice of George Allan Smith, Inspector of the Parish of St. John, Hampstead, certain drugs, to wit:—(1) 3 ounces of tincture of quinine, B.P., which was not of the nature, substance, and quality of the article demanded by the purchaser, inasmuch as it did not contain the proper quantity of sulphate of quinine, viz., 8 grains to the ounce, contrary to the statute in such case made and provided. (2) 6 ounces of spirits of nitrous ether, B.P., which was not of the nature, substance, and quality of the article demanded by the purchaser, inasmuch as it did not contain the proper quantity, viz., 2 per cent. of nitrous ether, contrary to the statute in such case made and provided.

Mr. S. J. Porter, of the firm of Messrs. Glaisyer and Porter, Solicitors, Birmingham, acting under the instructions of the Secretary of the Chemists and Druggists' Trade Association of Great Britain, appeared for the defendants, and Mr. Ricketts represented the parish authorities.

Mr. Porter asked to be allowed to mention the cases of Allen and Allchin, and said that summonses had been issued against them under the Sale of Food and Drugs Act, and stood some distance down the charge sheet. He wished to apply for an adjournment, and based his application on the fact that the summonses were not served until the previous Friday, and that, therefore, sufficient time had not elapsed to allow of an independent analysis being made of the samples of drugs left with one of the defendants by the inspector.

Mr. Ricketts said that in addition to the summonses mentioned by his friend, a fifth summons had been issued under the same Act against Mr. Pipe, a chemist and druggist, residing in King's College Road. Although he had no objection to an adjournment of the whole of the cases, he saw some difficulty in allowing one case to proceed and the others to stand over, more particularly as Mr. Pipe was charged with selling indifferent spirits of nitre, and two of the other summonses related to the same drug.

Mr. Pipe expressed a wish that his case might be taken at once, but subsequently decided to have it adjourned with the others, and it was finally arranged that the hearing of all the summonses should be taken on September 12.

Mr. Porter then said in the case of Allen he had to ask that the magistrate would be good enough to make an order that sealed samples of the drug purchased from the defendant be handed to him for independent analysis.

The magistrate inquired how it was that the inspector did not leave sealed samples with Mr. Allen at the time the purchase was made.

Mr. Porter said that the inspector had carried out the requirements of the Act by asking Mr. Allen at the time the purchase was effected if he would have sealed samples, but Mr. Allen unfortunately said that he did not care about them, and under the circumstances he should feel obliged if the magistrate would make the order for which he had applied, as he presumed the sealed samples would still be in the hands of the inspector, and it was important that an independent analysis should be made.

Mr. Ricketts said that he opposed the application entirely; it was admitted by his friend that the inspector had done his duty in offering samples to Mr. Allen, and when the case was heard the defence would have an opportunity of cross-examining the public analyst, and if, after that, they were not satisfied with his analysis there was a provision in the Act by which the sealed samples could be analysed by the Somerset House authorities. He certainly could not agree to the samples leaving the inspector's hands at that stage.

Mr. Porter said that he did not wish that the whole of the samples left by the inspector should be given up, but that they should be further divided, still leaving a portion with the inspector which might subsequently go to Somerset House if necessary.

The magistrate said that he really did not feel disposed to make an order at that stage of the proceedings.

Mr. Porter then asked that the sample in the inspector's hands might be at once transmitted to Somerset House.

Mr. Ricketts said he thought the application was somewhat premature.

Mr. Porter said his object in making it was to save a probable further adjournment at the hearing.

Mr. Ricketts said if the other side made an application for a further adjournment at the hearing, and his worship thought it was a reasonable application, he, on the part of the authorities, would raise no objection.

Mr. Porter said that after what Mr. Ricketts had just said, he would withdraw his application for the order.

Poisoning by Morphia.—A Mistaken Diagnosis.

A few months ago in a northern university town a medical man of some professional standing read a paper before a local society on what he described as a case of poisoning by salicylate of soda. The patient, a young man, aged twenty-nine, had for some days been suffering from pains in his joints, which he thought were rheumatic. One morning on trying to get up, he complained of a pain in his side, and was compelled to return to bed. His wife sent to a neighbouring druggist for half a dozen 15-grain salicylate of soda powders, which she had been told were good for rheumatism. The patient was given one of these powders, and in an hour and a half fell asleep. After sleeping for two hours he was roused up and had some dinner, but feeling very drowsy went back to bed and was soon asleep again. His wife tried to waken him three hours later, but failed to do so, and sent for a doctor, who came in about an hour, and found him comatose with stertorous breathing. The pupils were contracted and not sensitive to light, the face, neck, and ears were covered with perspiration, and the extremities cold and clammy. The treatment was very simple, consisting of mustard to the back of the neck, heat to the trunk and legs, and ice to the head. The patient was seen again three hours later, when the pulse was noted to be 100. At one o'clock the next morning the pulse was 130, and the breathing laboured. Death occurred that afternoon at half-past two, sixteen hours and a half after the powder had been taken. A *post-mortem* examination was made, but seems to have thrown very little light on the subject. The five remaining powders were examined, and, as they gave a violet colour with a solution of perchloride of iron, were declared "to consist wholly of salicylate of soda." It was stated, however, that salicylate of soda could not be detected in the viscera or in the blood, and the urine was not tested. In the discussion which followed the reading of the paper, doubts seem to have been expressed by several gentlemen present, one member suggesting that it was acute congestion of the lungs, whilst several thought that it was not a case of poisoning at all. The President, with a foresight which does him credit, gave it as his opinion that the powders consisted of morphia, with a small quantity of salicylate of soda as an impurity. The matter would probably have remained for ever in doubt had not the widow brought an action against the druggist for £750 damages as compensation for the loss of her husband. The court ordered one of the powders to be sent to Dr. Stevenson Macadam, of Edinburgh, for analysis. From his report, just received, we learn that it contained 49·6 per cent. of morphia, equal to 52·63 per cent. of muriate of morphia! This, then, effectually disposes of what was supposed to be a very remarkable case of poisoning by salicylate of soda. We may mention incidentally that the case was compromised for £400, the druggist having succeeded in showing that he sold the drug just as he purchased it from an eminently respectable firm of wholesale dealers. There is no reason, as far as we know, to suspect anything but carelessness as the cause of this admixture. But it was carelessness of a very coarse character. It is to be regretted that in the public interest the whole course of the drug and its supply was not traced. Next to the lesson of the necessity for a little more hesitation in diagnosis, and a little more thoroughness in investigation, is the lesson taught by this case as to the insufficiency of legal investigations of this kind in Scotland. Such facts as obtained in this case would scarcely have eluded exposure under the jury system of England led by a medical coroner.—*The Lancet.*

Prosecution under the Apothecaries Act.

At the Southwark County Court, on Friday, August 3, before Mr. Holroyd, Judge, an action was brought by the Medical Defence Association in the name and with the consent of the Apothecaries' Company to recover £20 penalty against the defendant, Charles Pearson, a chemist carrying on business at 104, Stamford Street (and who is also district registrar of births and deaths), for acting as an apothecary without legal qualification. Mr. H. R. Hodson, barrister, instructed by Mr. C. J. C. Pridham, solicitor to the Medical Defence Association, appeared for the plaintiff society, and Mr. Washington, solicitor, of the firm of Messrs. Hicklin and Washington, for the defendant. Several technical objections by Mr. Washington on behalf of the defendant having been overruled by the learned judge, Mr. Hodson stated the case for the plaintiffs and called witnesses in support. From their evidence it appeared that the defendant was in the habit of making his daily rounds as a medical man, attending the sick at the bedside, sounding the chest, feeling the pulse, etc., and after his visits forwarding medicine of his own selection for their cure or relief. The defendant in his defence relied on the 28th section of the Apothecaries Act, contending that he had done nothing which exceeded the rights and privileges reserved to chemists by the section, and that chemists had always the right to prescribe in simple cases. He also relied on the fact that he was "a perpetual student" of Westminster Hospital, and attended the cases referred to in the plaintiffs' evidence at the bedside for the sake af acquiring experience.

The learned Judge found that the evidence proved that the defendant in the cases relied on by the plaintiff society had acted as an apothecary and not as a chemist. There would therefore be judgment for the plaintiffs for the amount claimed, £20, together with costs on the higher scale, as the issues involved were of public interest.—*The Lancet.*

Correspondence.

Brief Note on Calisaya Ledgeriana.

Sir,—I think it will tend to the enlightenment of your readers if I state at once what is my contention in the Calisaya controversy to which you have directed their attention. It is simply this, that Mr. C. Ledger's "*Ledgeriana*" is a legitimate Calisaya, and not a new species. Of much less importance are the observations I have made as to Dr. Trimen's plates and description of the plant figured in the *Journal of Botany*. These are entirely superseded by Mr. Moens' own description and definition of the *Cinchona Ledgeriana*, Moens, in a very valuable work 'De Kina Cultuur in Azie,' which, through the courtesy of this gentleman, I have just received; and to which, in the conclusion, I shall again refer.

I have always understood that by an unwritten law of botanical science the privilege of naming a plant belongs to the botanist who first observes and properly describes it; always supposing that he has regard to what has previously been known about the subject. This rule, which common sense appears to sanction, is in danger of being disregarded in India.

The name and history of Calisaya bark has engaged much of my attention in the last few weeks; as I have availed myself of a visit of Mr. C. Ledger to this country (on his way to Australia) to re-investigate the whole question, which it was my pleasure to study many years ago with my lamented friend Dr. Weddell.

The 'Histoire'* of this distinguished naturalist is a treasury of really scientific investigation. It is not, however, by any means exhaustive; as in his first voyage he did not observe the best kind of his *C. Calisaya*. In his second journey† to the gold districts of Bolivia, he obtained specimens from the Yungas and from Larecaja of the bark of the finer sorts which are now in question. In his subsequent notes, 'Sur les Quinquinas,' he further describes these.‡

Dr. Weddell did not invent the term Calisaya, but adopted it as the term generally in use. He says that it was indiscriminately called Colisaya, Calisaya and Culisaya. Further§:—"It is to this species that we owe the most precious of all the barks employed in the healing art,|| that which has always been known in commerce as the Quinquina-Calisaya, and of which the origin had remained completely unknown in a botanical sense."

I have in fact a fine specimen¶ (which I bought with the rest of Pavon's barks) called *Quina de Calisaya* (ascribed by that botanist to *C. lanceolata*, a very different bark). It is of Weddell's *a vera* quality.

Dr. Weddell proceeds thus:—

"In spite of the different explanations which authors have given, the etymology of the word "Calisaya" is still very obscure. M. Humboldt thought it came from the name of the province from whence it was first derived; but well-informed persons have assured me that such a province never existed. In the department of La Paz, where it is found abundantly, it still most frequently bears the name of Colisaya or Calisaya; and I am disposed to think that these designations have been applied to it on account of the red colour which the external face of the bark presents when drying, or probably (*bien*) of that which its leaves have sometimes. *Colli* means really *red* in the Quichua language, and *saya*, taken in a figurate sense means sort or form. The red maize is called *colli*, çara, or *culli* abbreviated.

Weddell lived some time amongst the Indians and studied their language,** which seems to have some elements of affinity to the Sanscrit. After consulting Tschudi's dictionary, I have no doubt that Dr. W. is right, and that it means "the red sort." Mr. Ledger says the word means "red" in Aymara as well as in Quichua.

Now it is exactly this red sort, called in Spanish, *rojo*, of which Mr. Ledger has always been in search, hearing of its superior qualities from the Indians. Mr. Ledger tells me that Dr. Weddell sought for the white flowers, which are distinctive,* but without success. Mr. L. endeavoured to assist Dr. W., but it is easy to understand, in conversation with him, the difficulties which beset the path of inquiry. Mr. L.'s explanation of the term *rojo* is, that the leaves turn this colour whilst the tree is flowering, changing to a dark purple before they fall.

The trees under these circumstances present a magnificent appearance, visited by multitudes of humming birds and bees, and the older ones adorned with the beautiful cryptogam, *Hypochnus rubrocinctus*† (Ehrenb.). The presence of this used to be considered in trade as indicative of the best kind of Calisaya. Specimens so found in my possession date from 1853.

This description especially applies to the finest and most luxuriant trees, which probably raise their heads above the surrounding forests, and present their white flowers, fraught with pollen of superior power for cross fertillization, to the access of the useful visitors above named; also perhaps to more frequent damage by frost.

The Indians call them "tata" (father) trees, and believe they are so important to the rest that where they are found all the bark around will be Colli-saya; and they cross themselves when they meet with them. They think that without them all would perish.

Dr. Weddell says of his first sort "*C. vera*," "The variety which I havs been describing is the most frequent. It bears in Bolivia the name of *Colisaya amarilla*, *C. dorada* or *C. anaranjada*."

That is to say the *Cinchona Calisaya vera* described and figured as such by Sir Joseph Hooker, in *Curtis's Bot. Mag.*, from a tree at that time (1879) flowering in my possession. This tree, which is still so flourishing that I have difficulty in keeping it within the narrow compass of my stoves, represents probably very fairly this sort then very abundant, now practically extinct, but in one district extensively replanted, owing to advice given by Mr. Ledger some twenty years ago.‡ Mr. Ledger does not recognize my tree, owing to its large leaves, but approves some of my young plants of *Ledgeriana* from the Yarrow Estate, Ceylon, and also in part those from Mr. Thomas Christy's seed from South America. All these belong to the next division of Weddell and the bronzed appearances of the young tips which summer has brought on my young plants, and which is much rested on in Ceylon, may be looked upon as a ready mode of discrimination of the second sort from the *a. vera*. The rich velvety appearance and ciliated margin of the young leaves are also useful to this end.

I proceed with Dr. Weddell's description of this second variety.

"Another sort of bark remarkable for the dark shade of its external face, which is often wholly of a vinous black, bears the names of *Calisaya zamba*, *C. negra* or *C. macha*. I have remarked it particularly at Apolobamba in Bolivia, and in the province of Carabaya in Peru."

He did not then describe this further, but I have from him an excellent specimen of flat bark, marked *Calisaya zamba*, gathered at that time, and I learned from the same source how to distinguish this superior quality.

In 1869 he describes it more fully§ (see the original) and adds:—"I brought this variety of Calisaya in 1851 from

* Paris, 1849.

† 1853.

‡ 1869.

§ 'Histoire,' pp. 30, 31.

|| 'La therapeutique.'

¶ Dating probably from last century.

** 'Voyage dans le Nord de Bolivia,' p. 555, Weddell, 1853.

* It seems impossible to overcome the jealousy of the Indians about these trees and it is easy to understand that it is a work of difficulty to get even sight of the flowers, unless when the tree is cut down. Mr. Ledger assures me that he has seen pinkish flowers on one tree, of which the flowers were white towards the summit. Dr. Weddell related to me that on one occasion he had to fell three trees in order to bring to the ground one (of I know not of what sort) whose flowers he wished to observe.

† Figured by Fée 'Sur les Cryptogrames,' Tab. v.; also by Goebel, *Pharm. Waarenkunde*, Taf. xv.

‡ I have specimens of the bark from 1849 downwards. That which is now imposed upon the public as flat Calisaya bark, judging from a specimen given me by Mr. Lescher (who has exposed this fraud) is *Cochabamba* bark, according to Ledger, or *C. Australis*.

§ *Annales des Sciences Nat.*, T. xi., 347, xii., 54.

the mountains which rise above the river of Coroico, an affluent of the Mapiri, one of the most important in the department of La Paz. The cascarilleros of the country have pointed it out to me as giving a bark superior in quality to that of other varieties growing in the same places, and I confess that I have been happy to see this appreciation of the native (l'homme des bois) confirmed by Mr. Howard. It is, in effect, from a bark recognized by him as identical with that which I have described that my eminent friend has obtained the largest proportion of quinine which has yet been found in a Quinquina, that is to say about double the quantity which MM. Delondre and Bouchardat indicate as the average yield of the Calisaya. The shade, more or less purple, of the under part of the leaves gives to this variety a character of resemblance to the *C. Boliviana*.* I have not seen its young leaves, but it appears to me that they must have much analogy with those of the variety which I have just named. Perhaps we may also consider as giving a representation of it the figure 2 of the plate which accompanies the article published by Mr. Howard on the barks brought from Bolivia by the merchant Don Pedro Rada" (*Journal of Botany*, January, 1869). This plate was coloured in accordance with some plants derived from Mr. Ledger's seed, then in my possession.

Now all this description of the *Zamba* and of Rada's *Negrilla* agrees entirely with Mr. Ledger's *rojo*. He at once recognizes Weddell's specimens and mine as such, notwithstanding the vast distances between the different habitats.

Mr. Ledger wrote me,† "The seed sent by me in 1865, 'Calisaya red bark,' is not (as you say) the *morada* of the Spaniards; it was the *rojo*."

When I examined this bag of seeds I pointed out that it belonged to *var. microcarpa* of Weddell, and was consequently of good quality. It was not, however, all *rojo*. This is proved by the germination of the seeds in Java, for out of some six or eight varieties obtained, only one is acknowledged by Mr. Ledger as his true *rojo*. This is figured in plate IV. of my 'Quinology.'

It is comparatively scarce. In the same letter he writes, "I always understood the red bark, Collisaya, to be the best of all in its yield of quinine. For one tree of the *rojo* you will find fifty of the Calisaya. The leaves of the *rojo* are of a bright scarlet colour, and of darker green on surface than those of other good descriptions."

This richer green colouring of the leaves, changing very naturally to bright red in decay, is much rested on by Mr. Ledger, and I have no doubt finds its explanation in the term *macho*, which Dr. Weddell applies to this sort, *Colisaya zamba*, *C. negra* or *C. macha*.‡ The two first imply the very dark colour of the upper side of the slabs of bark, which are now rarely, if ever, seen; and these terms are probably forgotten and quite unknown to Mr. Ledger, though not to Rada, who called his fine slabs, the like of which have never been seen since, *negrilla*. I am sorry to hear that Mr. Rada has suffered so much in health, partly from wounds received from the wild Indians on his voyage down the rivers, that he is not likely to undertake another such expedition. The trees from which these were taken were from 120 to 150 feet in height.

I now come to the term *macho*,§ which Dr. Weddell explains thus:—"The flowers of the Cinchona present in the relative greatness of their sexual organs variations very interesting to study—not only on account of the frequency with which they present themselves in many species, but by the curious circumstances which (parfois) accompany them. If the stigmata are protruded the anthers are almost sessile in the middle of the tube of the corolla; if, on the contrary, the anthers raised on their filaments appear at the mouth of this tube, the style then is found reduced and the stigmata occupy the place before held by the anthers. In a word the development of the style and that of the stamens are constantly in the inverse proportion the one to the other; and not only that of the male organs is always accompanied by the simultaneous development of the floral envelopes, but, a fact very worthy of remark, other parts of the plant appear to feel this predominance of the strong sex. The leaves, for example, may be more richly coloured, the bark more robust. Now, the cascarilleros, who very certainly never occupy themselves with the details of the flowers, have, nevertheless, remarked in the aspect, in the produce even, of these* bark trees such differences, that they have had the idea of distinguishing them by the epithets, male and female (*macho y hembra*), and since my attention has been awakened to this subject, I have been not a little surprised to find a coincidence between this epithet of *macho*, so naïvely applied by the natives (les hommes des bois), and the predominance of the male system of which I speak."

I think I now see the reason why Dr. Weddell did not proceed in the description of this variety. He found it, indeed, "un peu embarassante," to make a distinct variety, still more a species out of the *macho*. To distinguish thus, the bull amongst the herd might appear pedantic!

Weddell's 'Histoire' was published in 1849. When afterwards, in 1869, he saw his way clear to define his *C. calisaya microcarpa*, he gives a description intended (?) to include† all the forms of small fruited Calisaya, at all events the zamba and zambita (he drops the term macho). The pubescency of the under surface of the leaf seems more marked in Weddell's plate than elsewhere and he does not give (as not having seen) the flowers, but it seems to me that not only Mr. Ledger's *rojo*, but all that might imperfectly be called Colli-saya, the *verde* of Mr. Christy,‡ the *C. Boliviana* and other forms may all be called Weddell's "second sort." I do not know the form which he defines "*subtus pubescentibus*;" this, strictly speaking, excludes all the other forms.

My publication of *C. Calisaya*, var. *Ledgeriana*, is too inclusive, as taking in all the varieties recognized as such by Mr. Moens. I am sure that this gentleman, to whom we are all so much indebted for his able analyses, and I myself specially for his most carefully prepared herbarium, will see that it belongs to Mr. Ledger, and to him alone, to define what is the true *Ledgeriana*. It is then my form A, the *macho*, exclusive of form B and form C and other forms now existing in Java and in Ceylon, from whence specimens (received from T. N. Christie, Ceylon), are now in the Museum.§ They are (?) *microcarpa*, but not *Ledgeriana*.

The bark of the true *Ledgeriana* is that which was sent me by M. Van Gorkom; typically resembling Weddell's *zambita*, from the province of Yungas, now before me. Of this extraordinarily rich bark a certain portion has come in trade, but probably a larger portion, from very inferior trees (still called *Ledgeriana*). The recent specimens from the Amsterdam Exhibition, now in the Pharmaceutical Society's Museum are miserable; but I have taken care to forward a true specimen. It will be seen at once how much these differ. I have not met with any yet, from British India, of the true *rojo*.

I also ask the Pharmaceutical Society's acceptance of original specimens from the herbarium of Mr. Moens, of the form A, from which my plate of the true Ledgeriana was drawn;—and also of other forms.

Mr. Ledger does not recognize my *Micrantha calisayoides*, nor Dr. Trimen's *C. Ledgeriana*, Moens. As we have no description of the bark of the latter, nor any analysis as far as I can learn of the bark of the tree itself, I may be mistaken in associating the two; for the rapid degeneracy of sorts when, in cultivation, the beautiful natural arrangements are interfered with, begins to open a new chapter in the history of the culture; which it would scarcely be pleasant, though perhaps necessary, to write; and hybridism leads to endless confusion. The pollen of the Bolivian *micrantha* may have affected some of these sorts.

I do not agree with Dr. Otto Kuntze in regarding

* This is very remarkable in the *morada* and the *Rubra venada* of Mr. Christy.

† December 22, 1874.

‡ 'Histoire,' p. 35.

§ 'Histoire,' p. 21.

* Mr. Ledger says "they judge of the good *rojo* slabs by their relative greater weight. The relative weight and thickness of bark are alike characteristic of true *Ledgeriana*. I well remember purchasing and packing, in 1852, more than 120 tons of *Calisaya vera* bark. Out of all that quantity I was only able to pick out 2 tons of *rojo* or *morada* slabs. You also can verify my statement by your own practical knowledge."

† *Annales der Sciences Nat.*, vol. xi., p. 5.

‡ A distinct and very valuable form, Weddell's *C. Calisaya oblongifolia* (see *Sciences Nat.*, ([5], t. xii., p. 5).

§ See *Pharm Journ.*, August 11, 1883.

hybridism as the source of improvement (quite the contrary), but he has perhaps done good service in pointing attention to the subject of cross-fertilization.

I look upon the *Ledgeriana*, not as a species, but as one form of Dr. Weddell's second division of the species, and as being the Calisaya *par excellence*, the true red sort.

I have been surprised with the high appreciation by Mr. Ledger (and as he tells me by his Indian servant) of my plate of *Calisaya anglica*. The leaves and flowers are both too large for *Ledgeriana*, but the colouring, to which I attended myself, as taken from a tree flowering with me, represents exactly (it seems) the rich appearance of the leaves.

Mr. Ledger's Indian exclaimed with admiration and delight on seeing my plate that it was *Tata, tata, tata*. I have looked back to my description of its parentage ('Quinology, p. 87) and to Mr. Broughton's letters of 1872 and find that "the seed was gathered from two trees of the same red under-leaved variety of Calisaya," and this again from Ledger's seed. The idea of its being a hybrid must be abandoned if no interference of pollen had taken place in India. The distance between the nearest districts in which the Succirubra and Calisaya are found is, in a direct line, over 1100 miles. No possibility of the interference of the pollen of these two can arise in their native habitats.

I find that I cannot conclude this notice without more reference to technical botanical description than I intended to introduce into these pages.

I present then the diagnosis of Dr. Weddell, as definitive of the true *rojo* bark of Mr. C. Ledger.

Cinchona calisaya var. *Ledgeriana* [Weddell, *pro parte* How.].* "C. foliis elliptico-oblongis vel fere oblongis, obtusis obtusissimisve, haud raro ante apicem nonnihil angustatis s. constrictis membranaceis, utrinque viridibus vel subtus pallide purpurascentibus nervis simul rubris, axillis sat distincte scrobulatis; panicula florifera ovata, corollis albis, *antheris subexertis* (saltem in specim. obviis); panicula florifera subcorymbosa, densa, capsulis ellipticis (9–12 millim. longis) puberulis."

This it will be seen by comparison is not the *A. microcarpa*, of Weddell.† It is my form A, (Plate IV.), exclusive of B and C. It is only in part the *C. Ledgeriana Moens*, since it is exclusively the *macho* form. Indeed, in other respects it does not apply to some forms which both Mr. Moens and I had considered "*Ledgeriana*." I am much pleased to see that Mr. Moens includes, amongst these, two varieties, *a Cinchonidinifera* and *β Chinidinifera*. This is an excellent step in the right direction, and worthy of Mr. Moens' fame as a chemist, thus to distinguish these forms. If I understand right, my *Calisaya Anglica* stands under the first of these. It is *Cinchonidinifera*, and my Plate IX. *Quinidinifera*. Indeed, I am ready to believe that it is very nearly related to the true *rojo* bark of Mr. Ledger, so nearly, that he at once fixes upon it as right in the general colouring and aspect; but then it is very decidedly *Hembra* and so cannot come under Weddell's diagnosis. May it not (*pace* the botanists) be as nearly related as male and female of any race of animals? ‡

Much yet remains to be put before those interested in the subject in connection with the highly important work of Mr. Moens, which I hope you will review for the benefit of your readers.§

JOHN ELIOT HOWARD.

* 'Quinology, E. I. Plantations,' p. 85.

† Mr. Moens objects rightly to the defective colouring of my plate Plate IV., which is the fault of my artist. Plate X. I took from nature.

‡ "Hybrids (?) between *Succirubra* and Ledger, found amongst Ledger seedlings, have been found to contain 10 to 12 per cent. of sulphate of quinine, so that while possessing the robustness of the one they have been blessed with the richness of the other."—"A Java Propietor," *Ceylon Observer*, July 27, 1883. I thought the Ledger's were kept select from crossing with *Succirubra* in Ceylon. Surely these plants are from *Calisaya Anglica* crossed with real *rojo*, as above.

§ Although we are aware that Mr. Moens has published such a work, we have not received a copy, and have only recently had an opportunity of seeing one accidentally in the pharmaceutical exhibition in Vienna.—ED. PHARM. JOURN.

ESTIMATION OF PHENOL.

Sir,—In a paper on the "Estimation of Phenol," by Mr. C. Thompson, printed in the Journal of August 18, I noticed a slight error. Referring to the gravimetric estimation of phenol as tribromophenol, he remarks—"This is open to one great objection, as pointed out by Koppeschaar, that since the tribromophenol melts at 91°, some of it is lost in drying at 100° C., so that it has to be dried over H_2SO_4, or else *in vacuo*, thus taking some time." The fatal objection to drying tribromophenol in the water-bath is not that it melts, but that it (or its products of decomposition) volatilizes.

Mr. Thompson refers to "the homologues of phenol, such as *creasol*," etc. It ought to be *cresol*.

D. B. DOTT.

THE ACCEPTANCE OF SEALED SAMPLES IN PROCEEDINGS UNDER THE SALE OF FOOD AND DRUGS ACT.

Sir,—Kindly grant me space to once more impress on all members of the trade the absolute necessity, in their own interests, of accepting sealed samples from the inspectors appointed under the Sale of Food and Drugs Act, when offered at the time when purchases are effected, and also to carefully look over the whole of the weights and measures used for the purpose of trade, which they have in their possession and ascertain that every weight and measure bears the Government stamp.

The need of the first caution is strongly exemplified in the proceedings under the Sale of Food and Drugs Act which took place recently at the Marylebone Police Court.

The necessity for the second caution was forcibly brought under my notice some few weeks since, when a member of the trade was found to have upwards of seventy weights and measures in his possession, not one of which had been stamped as required by the Weights and Measures Act.

The Chemists and Druggists' Trade Association of Great Britain is at all times willing, indeed, I may say, anxious, to assist chemists in any legal trade difficulty that may arise. Individual traders should, however, as far as possible, take simple precautions for their own protection.

W. F. HAYDON.

"*Victim*."—We think that the necessity for the exercise of caution in such a transaction and the danger attending attempts to deal in articles concerning the quality of which the buyer is not competent to judge are generally recognized by business men. *Caveat emptor* is a very old maxim.

V. S.—Apply to the Registrar of the Royal College of Veterinary Surgeons, 10, Red Lion Square, W.C.

Nonplus.—According to 32 and 33 Vict., cap. cxvii., sect. 1, nothing contained in the first fifteen sections of the Pharmacy Act affects persons who are registered as legally qualified medical practitioners.

Minor.—Apply to the Secretary for a copy of the pamphlet entitled 'Hints to Students.'

Glasgow.—See *Pharm. Journ.*, [3], vol. x., p. 603.

G. Cormack.—Numerous papers on the subject of syrup of the phosphates have appeared in this Journal. See especially one in vol. vi. of present series, pp. 804 and 832.

T. Kitton.—Some information upon the subject will be found in the *Pharm. Journ.*, [3], vol. x., pp. 486 and 644. It is claimed, however, that the manufacture of the composition is protected by a patent, and we understand that inconvenience has followed the preparation and sale of it in several cases.

G. A. Hawdon.—We are unable to inform you whether the name is registered, or whether any claim as to priority in its use can be established.

D. Frazer.—We do not think it necessary at present to reopen the discussion, especially since the argument of your friend is very much affected by the insertion of the word "(in)," which is not in the draft Bill.

A Subscriber.—The subject is not suitable for discussion in these columns upon the basis of an *ex parte* statement. If, as you seem to imply, your employer is failing in his duty towards you the proper way would be for you or your guardian to take steps to enforce the fulfilment of the terms of the contract.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Howard, Inquirer, Eurowie, T. M. C., W. C.

INTERNATIONAL PHARMACEUTICAL EXHIBITION IN VIENNA.

(*Continued from p.* 143.)

Before proceeding to refer in detail to some of the more interesting and important objects in the exhibition it will be convenient to recapitulate briefly the divisions in which they were grouped and the arrangements for awarding distinctions to the exhibitors who might be deemed most worthy. These divisions were six in number and were as follows:—

Group I.—Scientific Instruments and Contrivances for Pharmaceutical Purposes.

Group II.—Literature of Pharmacy and the Allied Sciences.

Group III.—Apparatus and Machinery for the Manufacture of Medicinal Products.

Group IV.—Utensils and Appliances that are Necessary or Useful in carrying on the Business of a Pharmacy.

Group V.—Drugs, Chemical Products, Pharmaceutical Preparations and Wares intended for Use in Medicine:—

(A) Chemical Products.
(B) Pharmaceutical Products.
(C) Drugs.
(D) Wines, Mineral Waters, Spirits and Food Materials.
(E) Dressings and Various Articles.

Group VI.—Contributions to the History of Pharmacy, Pharmaceutical Antiquities, Historically Interesting Apparatus, Utensils, etc.

Under one or another of these groups all the objects sent for exhibition were included and the respective merits of the exhibits were adjudged by a separate committee of jurors for each group, consisting of three members for Groups I., II., III. and VI., six members for Group IV., and eighteen members for Group V. All scientific institutions, museums and Government departments and establishments were considered outside the competition for prizes, as well as any firm a partner of which might be a member of the jury. Further any exhibitor who had obtained a first prize at any of the larger international exhibitions was at liberty to stand aloof from the competition upon giving notice of a wish to that effect four days before the meeting of the jury. The prizes to be awarded were:—(1) Diplomas of Honour for the best, most excellent and most perfect productions; (2) Gold Medal Diplomas, for inventions, improvements and skilful development of objects exhibited; and (3) Silver Medal Diplomas, for the most useful contributions to pharmacy and the branches of business connected with it. All the jurors were nominated by the Executive Committee, care being exercised that as far as possible every country taking part in the exhibition should be represented. The jury for each group elected a Chairman and Secretary and the Chairmen of all the groups elected a President and a Referee. The decisions of all the group juries were to be finally settled at a closing meeting of Chairmen and then, through the President of the jury and Referee, laid before the Executive Committee for confirmation. Any group jury desiring it was entitled to the assistance of experts, who were to be nominated by the Executive Committee and were then entitled to take part in the deliberations and vote with the jury.

Notwithstanding the laudable intentions of the organizers of this exhibition that it should be international, it must be confessed that its predominant features were rather Austrian than cosmopolitan, as will be evident from the fact that out of the 317 exhibits enumerated in the Catalogue 202 belonged to the Austro-Hungarian empire. But that it did possess some international character is shown by the following list of other countries which took part in it:—Germany, France, England, Belgium, Italy, Spain, Portugal, United States, Brazil, Denmark, Switzerland, Russia, Sweden, Norway, Holland, Turkey and Roumania. Whether a broader conception by the Executive Committee of the polyglot requirements of such an undertaking in the sending out of invitations and conveyance of preliminary information would have resulted in a fuller response from these and other countries, or whether the somewhat limited internationality was an unavoidable result of a first experiment and of the locality, may fairly remain an open question; but there can be no doubt that notwithstanding any shortcomings in this respect in the exhibition just closed, the country aspiring to hold a second international pharmaceutical exhibition will have to work hard to attain the standard set up by Austria in the first one.

Group I.—*Scientific Instruments and Contrivances for Pharmaceutical Purposes.*

Exhibits from Austro-Hungary, 10; Germany, 2: total 12.

Jurors*:—Messrs. Jarmay (Budapest), Krafft (Vienna), and Schlosser (Vienna).

This group, although made up of the contributions from a smaller number of exhibitors than either of the other sections, was not the least interesting, since in it were included the objects used as aids in teaching. These were not so numerous as might have been wished, but amongst them there was an excellent collection of models of crystals, cut out of "taufstein," exhibited by the Vienna Haupt-Gremium, and a set of models of flowers and parts of flowers, large enough to be used for lecture purposes, contributed by the General Austrian Apotheker-Verein. The Vienna University authorities sent from the "Pharmacognostische Institut" some wall diagrams and some fine sections of drugs, and from the botanic gardens and museum a very fine herbarium in four fasciculi. The plants seemed to be beautifully mounted, the delicate colours being well preserved; but such collections are not particularly well suited for exhibition, and this did not seem to attract the attention it deserved, since only one bundle was untied and it had scarcely been disturbed on the fourth or fifth day, a circumstance perhaps upon which the owners might be congratulated. In this group were included also the microscopes, thermometers, barometers, areometors, and other physical instruments, as well as the finer balances. The balances shown by the local makers, so far as they could be judged by a passing inspection, seemed well suited to keep up the reputation of Vienna for this industry; those of A. Rueprecht and J. Nemetz were especially noted for their fine appearance, an impression that has since found confirmation in the award of a diploma of

* The names of the jurors are taken from the official list; but as some of the gentlemen named had not arrived in Vienna at a period later than the first meeting of the juries, and a few did not attend at all, it is evident that this list represents rather the wishes of the Executive Committee than the exact composition of the juries by which the awards were made.

honour to the former and a gold medal diploma to latter. Messrs. Verbeck and Peckholdt, of Dresden, exhibited their short-armed balances, which are constructed on a principle that is said to ensure their turning with equal delicacy with any weight between one and two hundred grams in the pan. Another advantage that is claimed for these short-armed instruments is that in using them it is not necessary to wait until an exact equilibrium of the pans has been established, since the last minor differences in weight may be ascertained by observing the position of the tongue upon the index. In two of the balances exhibited the sensibility was so arranged that a milligram placed in one of the pans should cause a deviation of $2\frac{1}{2}$ degrees, or $\frac{1}{4}$ of a degree for each milligram. A deviation of $3\frac{1}{2}$ $(=\frac{14}{4})$ of a degree would therefore represent a difference in weight of 1·4 milligram.

Group II.—*Literature of Pharmacy and the Allied Sciences.*

Exhibits from Austro-Hungary, 15; Germany, 5; France, 4; England, 2; Italy, 2; United States, 1; Spain, 1; Sweden, 1; Switzerland, 1: total 32.

Jurors: Messrs. Geissler (Dresden), Godeffroy (Vienna), and Ludwig (Vienna).

The most conspicuous contributions to this group were three excellent displays of current literature on pharmacy and the allied sciences by F. Oscar, W. Frick, and A. Hartleben, all of Vienna; the last-mentioned especially showing amongst other works a series of upwards of one hundred manuals on different manufactures in which chemical principles are involved, published by him at a comparatively low price. Some excellently illustrated botanical works, published by E. F. Koehler, of Gera, in Thuringia, were also shown. This publisher was awarded a gold medal, and Messrs. Wood and Co., of New York, who exhibited copies of 'New Remedies' and of the United States Pharmacopœia, a silver diploma. Although not making quite so attractive a show, those whom Dr. Johnson chose to consider the victims of publishers were also represented, and they have no reason to complain that the jury was insensible to their merits. A set of all the editions that have appeared of Professor Attfield's 'Manual,' enclosed in a little book-case, hung high up on the wall, but not sufficiently high to escape the jury, who showed their appreciation of the service rendered in that work to pharmaceutical education by awarding the author a gold medal diploma. A similar honour was conferred on Herr Klinger, as the editor of the 'Zeitschrift des allgemeinen österreichischen Apotheker-Vereines,' Dr. Heger, as the editor of the 'Pharmaceutische Post,' and Dr. Méhu, as the author of various works aud pamphlets and translator of Sutton's 'Volumetric Analysis' into French. M. Ferrand, editor of 'L'Union Pharmaceutique,' and Herr Graf, editor of the 'Rundschau,' were awarded silver medal diplomas, and it was probably on account of the 'Extra Pharmacopœia' exhibited by Mr. Martindale that a like award was made to him. Accompanying a curious exhibit of the literature relating to the Struve mineral water establishment, in Dresden, there was an extremely interesting document, consisting of an autograph letter in French from Berzelius, in reply to one from Dr. Joseph Ritter von Vehring, asking in the name of the Emperor of Austria as to the possibility of a perfect imitation of the Carlsbad water being prepared. The great chemist cautiously answers that if a complete analysis of the natural water could be made the imitation would be possible, but he adds that as far as his own analysis went he was unable to say that there were no substances in the water which had escaped detection.

Group III.—*Apparatus and Machinery for the Manufacture of Medicinal Products.*

Exhibits from Austro-Hungary, 11; Germany, 6; France, 2; United States, 1: total, 20.

Jurors: Messrs. Hauptfleisch (Vienna), Kohlman (Leipzig), and Winkler (Hietzing).

The objects exhibited in this group were not very numerous, neither did they present many features that were not more or less familiar to persons who had attended the exhibitions of recent years. Nevertheless the general appearance of the apparatus was very creditable, and there were several of those contrivances for boiling, evaporating and distilling that always appeal to the weak side of the pharmacist who makes his own preparations. A combined evaporating and distillatory apparatus was exhibited by F. A. Wolff and Sons, of Vienna, connected with a copper boiler of about 33 gallons capacity, fixed in a cast iron casing which could be moved from place to place; the boiler was capable of being used also to drive a half-horse power engine. A model of of an apparatus was exhibited by J. Schmidinger, a pharmacist, of Liesing, near Vienna, designed to economize fuel, in which one source of heat could be regulated so as to suffice for one or more operations as required. There were also several kinds of apparatus for the manufacture and manipulation of aerated drinks. One very showy soda-water apparatus, shown by S. Baumann, was nickel-plated; another, which was enamelled in the interior, so as to prevent contact between the water and any metal, and provided with a refrigerating jacket enabling the water to be drawn off at a low temperature, was exhibited by T. Keil, of Halle. There were also specimens of machines for preparing the compressed medicines which are acquiring a certain amount of popularity, exhibited by E. M. Reiniger, of Erlangen, and F. A. Reichardt and Co., of New York.

Group IV.—*Utensils and Appliances that are Necessary or Useful in carrying on the Business of a Pharmacy.*

Exhibits from Austro-Hungary, 35; Germany, 4; England, 1; Denmark, 1: total 41.

Jurors: Messrs. Boettger (Bunzlau), Heindl (Ottakring), Linde (Melk), Madsen (Copenhagen), Pserhofer (Vienna), and Sinnimberghi (Rome).

This very inclusive group, though relatively not of very great importance from a scientific point of view, was certainly not the least interesting to many of the visitors, since here were to be found all the little knick-knacks which, trifling as they may be, assist the pharmacist in maintaining that superior neatness and finish which should be characteristic of all the work he turns out. Paper and paper bags of all kinds and sizes, plain and ornamental labels, envelopes and printed forms, earthenware pots of various patterns for ointments and other preparations, turned wooden boxes and the stamped tin boxes which are so freely and conveniently used on the Continent for small quantities of plaster were among the articles exhibited. There were also some very useful looking enamelled evaporating dishes and other utensils from the manufactory of A. Prickryl, Austerlitz. Corks were extremely well illustrated by C. Rahmer, of Breslau, and R. Pecher, of Vienna, the latter of whom provided the additional attraction of a very graphic representation of the stripping of a cork tree. Mention must be made here too of the very ingenious "Spahnpfropfen," or "shaving stoppers," patented by F. and K. A. Koeller, of Neulengbach. Each of these stoppers is made of a long shaving of soft wood, about ¾ of an inch wide, rolled up into a coil of a diameter to suit the size required and thrust into a tinned capsule open at one end. Although the coil is tightly rolled there is considerable elasticity in the wood, so that the stopper when driven into the neck of a bottle closes it as effectually as a good cork, whilst the cleanliness of such a plug and its non-liability to decay seem to give it a great advantage over inferior corks at least. These stoppers are said to be coming into considerable use for mineral waters. In this group, too, there were some very creditable displays of glass apparatus, bottles, etc., from the Austrian Glass Manufacturing Company's works in Aussig and C. Stoelzle's works in Lower Austria and Bohemia. There were also a few exhibits of balances suitable for pharmacies, that of J. Florenz, of Vienna, appearing to be especially good.

GROUP V.—*Drugs, Chemical Products, Pharmaceutical Preparations and Wares intended for Use in Medicine.*

This group, which was by far the largest and most important in the exhibition, including 172 exhibits from eighteen different countries, was conveniently divided into five sections, a separate jury being appointed for each section.

Section A.—Chemical Products.

Exhibits from Austro-Hungary, 8; Germany, 3; total 11.

Jurors: Messrs. Ludwig (Vienna) and Reichardt (Jena).

Among so large a number of exhibits of a diverse character it would be obviously presumptuous to claim absolute pre-eminence for any, but it may be fairly said that in this section there were two cases,—those of E. Merck, of Darmstadt, and Schimmel and Co., of Leipzig,—which contained specimens that were not surpassed in value and beauty by any in the exhibition. At the same time it was perhaps in this section that the limited internationality of the exhibition became most evident, the names of the majority of the most eminent manufacturers of pharmaceutical chemicals being conspicuous by their absence. Some analogous exhibits of chemical products, however, were included in cases that were placed in other sections, notably one from J. Schorm, of Vienna, and Gehe and Co., of Dresden. The case of E. Merck was crowded with specimens,—several of them of considerable intrinsic value,—not only of the alkaloids and other definite chemical compounds which have received official recognition in the pharmacopœias, but also of almost all that have in recent years been the subject of therapeutic experiment, and it served admirably as an exponent of what has been done by chemists in recent years towards the isolation in a definite form of the active principles of crude vegetable drugs. Among the better known alkaloids shown may be mentioned very fine crystals of morphia and strychnia. The atropine was claimed to be perfectly pure and free from the so-called "light atropine," or daturine, which occurs together with it in the belladonna plant, and, according to Ladenburg, is identical with hyoscyamine. A perfectly white "neutral" sulphate of atropine was shown, as well as the salicylate in crystals. Then there were the hydrobromate and hydriodate of hyoscine, the second alkaloid discovered by Ladenburg in *Hyoscyamus niger*, and said to approach atropine in its action; also homatropine, the synthetically prepared alkaloid and its hydrobromate, still said to present advantages in cases where dilation of the pupil for a short time is desired. There were also caffeine and a definite hydrobromate, as well as caffeine compounds bearing the designations "natrio-benzoicum," "natrio-cinnamylicum," and "natrio-salicylicum," which represented the soluble compounds of that alkaloid recently introduced by Tanret. Pure codeine was accompanied by the phosphate, which has the advantage of being soluble in water to the extent of 1 in 4. It would, however, extend beyond proper limits simply to catalogue here all the specimens exhibited in this case, though it is very difficult to make a selection; it must suffice, therefore, to mention some of the rarer or more recently introduced compounds. Of alkaloids there were aspidospermine and its citrate, from quebracho bark; the febrifuge ditaine, from the bark of *Alstonia Scholaris*; duboisine, prepared from *Duboisia Myoporoides*, said to be still in demand, notwithstanding that Ladenburg has alleged it to be identical with hyoscyamine; gelseminine sulphate and hydrochlorate, from the root of *Gelsemium sempervirens*; hydrastine, from *Hydrastis Canadensis*, used in typhus fever; pelletierine hydrochlorate, sulphate, and tannate, from the root bark of *Punica Granatum*, said to be an efficacious remedy for tapeworm, the tannate being most used; physostigmine, from the Calabar bean, and some of its salts, of which the crystalline salicylate is said to be the most stable and has been included in the new German Pharmacopœia; and sparteine, from *Sarothamnus Scoparius*, which, like the accompanying acid principle, "scoparin," is said to have a diuretic action. Amongst acids, glucosides and neutral principles there were cathartic acid, the active constituent of senna leaves, administered in doses of 0·4 gram to adults and 0·2 to children; "cannabinum tannicum," the new narcotic from Indian hemp; cantharidin, which is to some extent replacing the use of the flies; colocynthidin, a purgative glucoside from the colocynth; convallamarin and convalarin, the former now coming into use as a substitute for digitalis; cotoin and paracotoin, the latter especially said to have a specific action against diarrhœa; cyclamin, from *Cyclamen europæum*, resembling saponin in its action; kosin, the crystalline active principle of kousso flowers; scillipicrin, a diuretic compound from *Scilla maritima*; and podophyllotoxin, which according to Podwyssotzky (*Pharm. Journ.*, [3], xii., 1011) is a compound of picropodophyllin, the active purgative principle of the podophyllum root, with picropophyllic acid, by which it is rendered soluble and assimilable in the stomach. There was also a specimen of white "eucalyptol puriss.," prepared specially for use in medicine by purifying the commercial eucalyptol; it was described as of sp. gr. 0·918 at 15° C. and boiling between 170° and 173° C.

The individual compounds shown in the case of Schimmel and Co. were not nearly so numerous, but the interesting character and rarity of some of them and the volume and beauty of the specimens constituted the whole a most remarkable collection. The specialty of this firm is the manufacture of essential oils and essences for use in perfumery, and in the case some fine samples of essential oils were shown. But what attracted most notice were the solid crystalline principles derived from such oils that were exhibited. For instance, there were anisic acid, in beautiful small crystals, from oil of anise; salicylic acid from oil of gaultheria; cuminic acid from oil of cumin; cinnamic acid from oil of cassia; a splendid crystallization of apiol from oil of parsley; allantcamphor, elecampane camphor or helenin (alantic anhydride) from the essential oil of *Inula Helenium*; matico camphor; white scales of bergamoptene, the stearoptene of oil of bergamot; magnificent crystals of menthol, some approaching 2 inches long, from Mitcham oil of peppermint; and an extremely fine specimen of thymol crystals. But quite as interesting, if not more so, was a dish full of small crystalline needles of heliotropin, the odorous principle of the heliotrope, not prepared, however, from the flowers, but produced synthetically as a derivative from piperine. Another synthetically prepared compound shown was coumarin, the odorous principle of Tonka bean, which was probably obtained by one of the processes referred to on another page. Besides its use in perfumery this compound appears to be in some request for masking the odour of iodoform. In another bottle was about 50 grams of essential oil of iris, a yellowish mass of the consistence of butter, solid at ordinary temperatures and melting at about 40° C. This specimen was said to represent one thousand times its weight of the crude material.

Another class of chemical manufactures, the tar products, was illustrated by the exhibit of J. Ruetgers. Here were to be seen benzol in crystals; toluol and xylol as colourless liquids; naphtaline; chinoline and its hydrochlorate, salicylate, tartrate, and sulphate, the last two as white apparently amorphous powders; pyridine, the probable nucleus of many, if not all, alkaloids, and which, with its homologues, is alleged to possess powerful insecticidal properties; a compound of pyridine and zinc chloride, in white silky flakes, used as a disinfecting material; and carbolic acid in various grades of purity. According to a return made by this firm, and published in the catalogue, its production of pyridine and chinoline amounts to from thirty to forty thousand kilograms yearly. Still another class was represented by the Soap-boiling Works Company of Vienna and F. A. Sarg and Son. Both of these firms exhibited some very fine specimens of glycerine, and displayed considerable ingenuity in showing their chemically pure samples in clear glass vessels that appeared to be quite empty, so free from colour was the glycerine contained in them. According to a statement made on behalf of F. A. Sarg and Son, who carry on a stearin candle-making business founded in Vienna by De Milly, the price obtained for the first glycerine sold from the manufactory was 100 florins per Vienna centner (about 100 lbs. av.), and the amount produced at first was 50 centners per year, rising slowly to 100 centners, until the introduction of glycerine soap and glycerine toilet articles created an increased demand. As the production of glycerine, however, increased the price fell as low as 24 florins the centner, when the introduction of the use of nitroglycerine enormously increased the consumption and the price too.

Other exhibitors in this group were Wagenmann, Seybel and Co., of Liesing, near Vienna, who made a fine display of general chemicals, as did also J. Wurth and Co. and W. Neuber of Vienna. Hartmann and Hauers exhibited "kreosotum verum faginum," as well as a disinfecting compound of creasote and lime. In this case also was to be seen a preparation which, under the name "Essig-Essenz" (vinegar essence), appears to be in use in Austria. It consists of a strong solution of pure acetic acid, which, when further diluted, yields a very palatable table "vinegar." Lastly, milk sugar from the Austrian Tyrol was exhibited by J. Traunsteiner, of Niederdorf, in mass, in rods and as a powder.

(*To be continued.*)

SOPHISTICATED OIL OF CLOVES.

BY G. SPENCER.

Some time since, having begun a series of experiments upon essential oils with ferric chloride, I was struck with the green coloration produced with a few samples of oil of cloves that came under my notice. At that time I did not further trouble, but mention having been made of the same thing by Herr Beckurts in the *Pharm. Centralh.*, xxiv., 377, a *résumé* of which appears in "The Month," I determined to repeat his experiments on a sample obtained for retail purposes a short time ago, with exactly the same results, viz., "yellowish in colour, very weak aromatic taste,"—so weak, indeed, that shaking the bottle and placing the stopper on the tongue did not seem one half so pungent as biting an ordinary clove, —"with odour exactly that of true oil of cloves." I found the sp. gr. to be only 1·02 instead of 1·03 or as it should be, according to the German Pharmacopœia 1·041 to 1·061.

When exposed to bromine vapour a deep black was produced, but no blue nor violet. With ferric chloride a green coloration took place with perhaps a trace of blue at the line of juncture produced by carefully pouring the "oil of cloves" into a solution of ferric chloride in alcohol, but which entirely disappeared on shaking. By distilling a portion and carefully treating the distillate with KHO, and afterwards with argentic nitrate, the latter was reduced and a resplendent mirror formed, proving the presence of a formate. That left in the retort was of a dark brown colour, treacly appearance, and a peculiar faint unpleasant odour. This treated with Fe_2Cl_6 gave a much deeper green than the "oil of cloves." Treated with KHO it was only partially saponifiable, leaving a pinkish-buff deposit, but the odour of cloves to a large extent was restored.

It seems to be a mixture of genuine oil of cloves, with a compound belonging to the creasol class, as the latter gives the same coloration with Fe_2Cl_6. All pharmacists should examine what they now have and receive with caution any new samples into stock, as the kind above referred to came from a first-class London house, and in all probability has been in the market over six months, it being about that time since I first noticed the green coloration with ferric chloride.

ARTIFICIAL COUMARIN.*

Coumarin is found in nature in several plants, as is well known, and especially to a great extent in the well-known fruit of the *Dipterix odorata*, the Tonka bean; further, in the leaves of the *Liatris odoratissima*, growing

* From *New Remedies*, August.

in Virginia, Carolina, and Florida, called "deer tongue" in the American trade. Small portions are also found in the much-liked woodruff (*Asperula odorata*), the melilot trifoil (*Trifolium melilotus*), the sweet smelling grass (*Anthoxanthum odoratum*, and in the leaves of *Angræcum fragrans*, or Faham leaves. All these drugs owe their aroma, and consequently their value, exclusively to the quantity of coumarin they contain, and all the other parts they consist of are not only totally valueless, but in being worked they are as disadvantageous and cumbersome as the well-known extract matter and soft resin of vanilla. These drawbacks having been duly recognized, repeated attempts have been made to produce coumarin from the Tonka bean; this process, however, is not only troublesome, but leads also to losses which make coumarin enormously dear.

Through the production of coumarin by means of synthesis, a real want has therefore been supplied in several respects, and to all those branches of industry which hitherto used it in the shape of the Tonka bean, or in one of the said parts of plants, the opportunity is now presented materially to improve their manufactured articles, to impart to them always exactly the same amount of coumarin, and also—as will be shown—to economize considerably.*

Artificial coumarin was produced, years ago, synthetically; but it has been reserved to our most recent times to perfect the production to such a degree that nature—as in the case of vanillin—has been perfectly attained. The coumarin which is now an article of trade is a production that will convince any one who tests it without bias and prejudice that the Tonka bean has become superfluous, and that its days as an article of commerce are numbered. The perfect chemical equality of the natural and artificial coumarin precludes, in the first instance, any idea of putting the latter in the background. It has neither a weaker aroma than the natnral coumarin, nor is it more volatile, nor less durable, for its melting-point is precisely the same. It is no substitute for the Tonka bean, but for the body which yields the aroma. It possesses the same qualities, and cannot be distinguished from the coumarin extracted from the Tonka bean, either by the senses or by the means employed by the chemist.

The artificial coumarin possesses the important quality of dissolving easily in almost all the fluids employed. It dissolves in water, spirit, ether, glycerin, vaseline, fat oil, and animal fat, in almost any proportion; and there is probably hardly any substance that is practically used in the various industrial branches concerned in which it is not soluble. As soon as the most important point, the production of a perfectly faultless coumarin of chemical purity, had been attained, the next point was to extend its manufacture to a sufficient extent, in order to be able to compete with the Tonka bean, which is being used in larger quantities than is supposed. Only that factory is able to compete which can supply, in case of need, the equivalent of a whole year's return of Tonka beans within the period of a year; for what manufacturer of tobacco, extracts, or perfumery will change his recipe for coumarin without having absolute security for it? This security exists now, and is guaranteed in a manner the Tonka bean market has never presented.

It suffices to cast only a look on the fluctuations in the price of this drug in order to perceive the embarrassment a total failure of the crop would cause to the consuming branches of industry, small deficiencies of the crop having been sufficient to raise prices by 50 and even 100 per cent.! The artificial coumarin presents, consequently, besides the other advantages already enumerated, a complete independence respecting the Tonka bean, and therefore a safe calculation with reference to the articles for which it is employed. It can be preserved in a cool, dark place for any length of time.

The proportion of coumarin with regard to the Tonka bean has been fixed by exact investigations. The average amount of coumarin in superior beans can be estimated at the most at one and one-half per cent., so that consequently those who have used it hitherto would have to employ the following proportions:—One ounce of coumarin for four pounds of the best Tonka beans. The price of coumarin is such that, even if the lowest value of Tonka beans is taken as a basis, the employment of the former is advantageous under all circumstances. Thus, for instance, one ounce of coumarin costs nowadays 3·50 dollars, whilst four pounds of good Tonka beans cannot be procured under 6 dollars, notwithstanding that the crop of this year has yielded the extraordinarily large quantity of about 220,000 pounds. By far the largest portion of the Tonka beans produced is consumed in the United States. New York and Boston alone imported in 1876 about 200,000 pounds. From the above-stated figures it is sufficiently clear that the price of Tonka beans must still drop considerably before the pecuniary advantage which coumarin offers can be balanced. It may be expected that with a larger sale of the latter the cost of production may still be materially reduced, and that the competition of the Tonka bean with coumarin will soon be a thing of the past.

In the manufacture of confectionery and perfumery, coumarin is now extensively used, and its successful introduction and adoption by those who have tried it, has created a large demand; to fill which, some competitors have not scrupled to partially remove the crystals from Tonka beans, and sell these crystals as pure coumarin. To such an extent has this practice been indulged in that it is now almost a rarity to procure fully crystallized Tonka beans, and consumers who pay for prime beans, and are entitled to full value, should protest against a usage so detrimental to them.

Coumarin is one of the most effective agents to cover the odour of iodoform. About 1 or 2 grains to the drachm will generally be found sufficient.

* The artificial production of coumarin may be accomplished in several ways. For instance, by warming sodium salicylaldehyde ($NaC_7H_5O_2$) with anhydrous acetic acid, or by boiling salicylaldehyde with sodium acetate and anhydrous acetic acid. Recent improvements in the process have greatly shortened the time and expense of preparation.

TINCTURA FERRI CHLORIDI.*

BY MIMMS WILLIAM COLEMAN, PH.G.

As much discrepancy of opinion exists regarding the desirability of retaining the alcohol in the preparation of tinct. ferri chloridi, it has seemed of interest to institute a series of experiments bearing upon this point, and also to extend the investigation to the determination of the result of other influences upon the preparation.

In preparing the liquor ferri chloridi, according to the formula of the U.S. Pharmacopœia of 1880, the mixture of iron, acid and water is to be raised to the boiling point after the cold mixture has ceased to effervesce. If the mixture be boiled at this point, a large quantity of the acid will be driven off and thus lost; and if the solution be filtered at the time directed, only about one-third of the acid will be neutralized. Much better results are obtained by a gentle heat applied for several hours, until effervescence again ceases, when the solution should be raised to the boiling point and filtered. After careful manipulation, using pure acids of the proper strength, the solution was found to have the specific gravity 1·390, and this was the highest that could be obtained by following the directions of the Pharmacopœia, which requires a density of 1·405.

On investigating the cause of this, it was observed that the admixture with nitric acid was to be performed in a capacious porcelain vessel. If so mixed, a considerable quantity is lost by the energy of the reaction, and the loss materially reduces the specific gravity of the resulting solution. It is probable that the experiments incident to the construction of this formula were made in a flask,

* From the *American Journal of Pharmacy*, August, 1883.

which would prevent the loss of any portion of the liquid.

If this conclusion be correct, the specific gravity of the officinal solution is certainly wrong. On inquiring among pharmacists, it was found that the same trouble had been experienced by others.

The Pharmacopœia states that 10 grams of the solution, when completely precipitated by ammonia (NH_4OH), yields a precipitate which, when washed, dried, and ignited, should weigh 1·86 gram. These directions having been followed precisely, with a solution of less specific gravity (1·390) than the officinal, the residue weighed 1·882 gram. With the solution specific gravity 1·390, the tincture was then made according to the officinal formula. The specific gravity was ·965, while the officinal is stated to be about ·980.

Ten specimens of tinct. ferri chloridi, U.S.P., 1880, were obtained from leading pharmacists of Philadelphia. These answered to the tests for purity, but the specific gravities of all were found to vary between ·950 and ·970, except one, which was 1·005, and which proved to have been made with diluted alcohol instead of alcohol specific gravity ·820.

To ascertain the amount of iron present in each, a solution of potassium permanganate was made, 3·14 gm. $K_2Mn_2O_8$, being dissolved in 1000 c.c. distilled water. Theoretically, 1 c.c. of this solution should be equivalent to 0·0056 gm. pure iron; but from a number of determinations made with pure iron wire, it was ascertained to be equal to 0·00537 gm. iron, and this number was employed as the "factor of correction."

To 5 gm. of the tincture, weighed accurately, 3 gm. of metallic zinc, with dilute H_2SO_4 was added, and the mixture, heated, excluded from air until effervescence ceased. It was then cooled and quickly titrated with potassic permanganate solution, until a pink coloration of the liquid occurred. The number of c.c. used was 52·1; multiplied with 0·00537, it indicated 0·279777 gm. iron; but from this number was subtracted 0·023896, the known amount of iron contained in the zinc as impurity, which gives 0·25588 gm. in 5 grams, or 5·1176 per cent. of iron present in the tincture; this is equal to 14·8357 per cent. of Fe_2Cl_6, and to 24·6395 per cent. of $Fe_2Cl_6.12H_2O$.

The following tables will show quite a variation in the amount of iron, etc., present, even when the specific gravities are the same. This can be easily explained by the variations in the specific gravities of the liq. ferri chloridi and alcohol used:—

Spec. grav.	Use 5 gm. of tincture.				Percentage in tincture of		
	$K_2Mn_2O_8$.	Total iron.	Iron in zinc.	Iron in tincture.	Iron.	Fe_2Cl_6.	$Fe_2Cl_6.12H_2O$.
	c.c.						
·965	52·1	·279777	·023896	.25588	5·1176	14·8357	24·6395
·970	52·1	·279777	·023896	·25588	5·1176	14·8357	24·6395
·965	39·5	·212115	·023896	·188219	3·7642	10·9124	18·1137
·970	51·5	·276555	·023896	·252659	5·0532	14·6435	23·8367
·965	50·1	·269037	·023896	·245141	4·9028	14·213	23·6562
1·005	57·4	·308234	·040828	·25741	5·1482	14·9241	24·6405
·967	52·0	·279240	·023896	·25534	5·1068	14·8047	24·6405
·958	48·1	·268297	·023896	·2444	4·888	14·1704	23·5848
·960	48·6	·262982	·023896	·239086	4·7817	13·8062	23·0714
·960	53·3	·286221	·023896	·262325	5·2465	15·0936	25·3189

Attention was now directed to the action of sunlight on the tincture and aqueous solution of iron; for the latter, liquor ferri chloridi, 35 parts, was mixed with distilled water, 65 parts. The specific gravity of this solution was 1·100; it was of a yellowish-brown colour, slightly lighter than the tincture. On analysis with potassic permanganate solution, the amount of iron, etc., present was found to be as follows:—

	$K_2Mn_2O_8$.	Iron, total.	Iron in zinc.	Iron in liquid.	Percentage of		
					Iron.	Fe_2Cl_6.	$Fe_2Cl_6+12H_2O$.
	cc.						
Tincture, 5 gram . .	55·8	·299546	·023896	·27565	5·513	15·9807	26·6004
Aqueous solution, 5 gram . .	47·7	·256049	·023896	·232153	4·64402	13·4639	21·4438
Liq. ferri chlo. (U.S.P.), 1·390, 2 gram . .	53·8	·28929	·023896	·265394	13·2627	38·0511	63·334

Three specimens each of the alcoholic tinctures and solutions were then exposed to the action of the sun's rays for various lengths of time. The alcoholic tinctures were found to change to a greenish-brown or blackish-green colour, according to the duration of exposure, from partial reduction to ferrous chloride, while in both colour and composition the aqueous tincture remained unchanged. The appended table shows the amounts of ferrous salt reduced by the action of sunlight from the ferric state:—

Exposure.	$K_2Mn_2O_8$.	Iron in ferrous state	Iron in ferric state.	P. c. of ferrous iron.
Tincture, 2 weeks.	23·5	·126195	·149455	45·79
Tincture, 4 weeks.	31·4	·168618	·107032	60·909
Tincture, 6 weeks.	48·3	·259371	·016279	94·054
Aqueous solution, 2, 4 and 6 weeks.	None.	None.	..	..

A specimen each of the alcoholic and aqueous solutions was exposed to the action of sunlight and air. On examination it was seen that the reducing action of the alcohol overcame, to a considerable extent, the oxidizing action of the air, as will be seen by the following table:—

	No. c.c. $K_2Mn_2O_8$ used.	Amount of ferrous iron present.	Amount of ferric iron present.	Per cent. of ferrous iron.
Alcoholic tincture exposed to sun and air eight weeks .	32·5	·174528	·099370	63·5154

The aqueous solution was not affected in the least.

The theoretical amount and percentage of iron, etc., of the officinal solution and tincture is shown in the appended table:—

	Amount of iron.	Per cent. of iron.	Per cent. of Fe_2Cl_6.	Per cent. of $Fe_2Cl_6.12K_2O$.
Liq. ferri chloridi in 2 gm. .	·2604	13·02	37·6878	68·8211
Tinct. ferri chloridi in 5 gm. .	·22820	4·564	13·2308	22·015

The estimations of the percentage strength of the officinal preparations were made from the gravimetric test of the Pharmacopœia, the accuracy of which has been shown to be doubtful. The percentage of anhydrous ferric chloride stated in the Pharmacopœia description of liq. ferri chloridi is 37·8. As seen by the foregoing tables, the pharmacopœial solution and tincture contain less iron and iron salts than the commercial preparations, and also the preparations made for these experiments, although the pharmacopœial preparations are said to be of higher specific gravities.

Professor Attfield strongly advocates the discarding of the alcohol in the tincture. He holds that it is unnecessary, expensive, and positively injurious. The only advantage claimed for its use is that it reacts with free acid to form chloric ether, which is believed, by some practitioners, to be of medicinal advantage. If chloric ether is desired, why not dissolve a specified amount in alcohol and, when so desired, add it to the aqueous tincture, which is not altered by light and air? In this way an expensive ingredient would be dispensed with and a known amount of ether obtained.

STUDIES IN THE CHEMISTRY OF TARTARIC ACID.*

BY THE LATE B. J. GROSJEAN.†

1. Action of Solutions of Potassium and Sodium Sulphate on Calcium Tartrate.

The observations recorded in this section were commenced in 1876, and continued at intervals in the two following years.

Although a solution of calcium sulphate produces no precipitate in solutions of neutral tartrates, yet an excess of moist gypsum will, as is well known, precipitate almost the whole of the tartaric acid from neutral solutions of potassium tartrate. This reaction is, in fact, regularly employed in the manufacture of tartaric acid. The crude tartar in the factory is first boiled with water and neutralized with chalk (whiting). Half the tartaric acid is thus precipitated as calcium tartrate, while the other half remains in solution as neutral tartrate of potassium. The addition of an excess of moist gypsum decomposes this potassium tartrate, sulphate of potassium and calcium tartrate being produced. Mr. Grosjean has found that under certain conditions the reaction last mentioned may be entirely reversed, and that by attacking calcium tartrate with a hot and sufficiently strong solution of potassium or sodium sulphate, practically the whole of the tartaric acid may be brought into solution as tartrate of potassium or sodium. The results obtained with solution or potassium sulphate shall be first mentioned.

1. Four grams of calcium tartrate were heated with 30 c.c. of water, 10 grams of potassium sulphate next added, and the whole heated in a water-bath for half an hour. The contents of the beaker were then placed on a vacuum filter, and the residue quickly washed with water. The small quantity of lime in the filtrate and washings was removed with a little potassium oxalate, the liquid concentrated to 60 c.c., and the tartaric acid present precipitated as acid potassium tartrate by the addition of 2 grams of citric acid and 3 grams of potassium chloride. The tartaric acid obtained amounted to 2·1931 grams. The calcium tartrate taken (analysed by digestion with potassium oxalate and precipitation with citric acid) had contained 2·2033 grams of tartaric acid. The action of the potassium sulphate was thus very complete, 99·5 per cent. of the tartaric acid taken being obtained as potassium tartrate.

2. A duplicate experiment was made, the only alteration being that after heating the whole was allowed to stand an hour and become cold before filtering commenced. This alteration did not distinctly affect the result, the tartaric acid found in solution being 2·1627 grams, or 98·2 per cent. of that taken as calcium tartrate.

Two series of experiments were next made to ascertain the effect of varying proportions of potassium sulphate, and also the influence of varying degrees of dilution. The mode of conducting the experiments was in general that above described. The calcium tartrate employed was not quite pure; the tartaric acid it contained was determined by the neutralizing power of its ash. The amount of water present during each digestion was also somewhat roughly ascertained. The results of the experiments nevertheless plainly indicate the general influence which different proportions of potassium sulphate and of water exert in this reaction. The results will be found in Table I.

Table I.—Tartaric Acid obtained as Potassium Tartrate by the Action of Potassium Sulphate on Calcium Tartrate.

No.	Materials taken—grams.			Tartaric acid obtained as potassium tartrate.		
	Tartaric acid as calcium tartrate.	Potassium sulphate.	Water.	In grams	For 100 taken.	For 100 of potassium sulphate.
1.	2·2033	10	30	2·1931	99·5	21·9
2.	—	—	—	2·1627	98·2	21·6
a	1·1270	5	15	1·0690	94·9	21·4
b	—	—	25	1·0035	89·0	20·1
c	—	—	50	0·9478	84·1	19·0
d	—	—	100	0·7332	65·1	14·7
e	0·5635	2·5	15	0·4650	83·4	18·6
f	—	2·0	—	0·3557	63·1	17·8
g	—	1·0	—	0·0060	1·1	0·6

In experiments *a—d* the quantities of calcium tartrate (2 grams) and of potassium sulphate (5 grams) remain constant, while the quantity of water is varied. The results plainly show that as the proportion of water increases, the decomposing effect of the potassium sulphate diminishes.

In experiments *e—g* the proportion of potassium sulphate is varied, the other bodies remaining constant. We here see the prejudicial influence of dilution intensified by a gradual reduction in the proportion of the potassium sulphate. According to the last experiment, 1 gram of potassium sulphate with 15 c.c. of water has scarcely any decomposing effect when heated with 1 gram of calcium tartrate.

Mr. Grosjean soon ascertained that the product of the action of potassium sulphate on calcium tartrate was not calcium sulphate, but the double sulphate of calcium and potassium. He found also that the latter salt was readily decomposed by water. Ditte (*Compt. Rend.*, 79, 1254; *Journ. Chem. Soc.*, 1875, 332) has shown that the double sulphate can exist in contact with water only when a certain excess of potassium sulphate is present in solution. At 15° the solution must contain at least 2·5 per cent. of potassium sulphate for the double salt to remain permanent; if less is present, the double salt is decomposed by the water till sufficient potassium sulphate is brought into solution to produce the condition of equilibrium mentioned. The higher the temperature the greater will be the excess of potassium sulphate required to produce equilibrium. Mr. Grosjean studied the action of water on the double sulphate of calcium and potassium at a temperature of about 20°. Three successive treatments with water gave solutions containing respectively 2·96, 2·86, 2·81 per cent. of potassium sulphate. These results agree with the earlier ones of Ditte, with which Mr. Grosjean was, I believe, at this time unacquainted. The same three solutions contained respectively 0·19, 0·17, 0·17 per cent. of calcium sulphate.

The facts just mentioned seem to throw some light on the results of the previous experiments. If we look at the reaction between potassium sulphate and calcium tartrate in its simplest aspect, and shut out from view any mere influence of mass, we shall probably conclude that calcium tartrate containing 1 gram of tartaric acid would require for its decomposition the amount of potassium sulphate (2·323 grams) necessary to produce sulphate of calcium and potassium, with, in addition, an excess of potassium sulphate amounting to 2·5 per cent. of the solution at 15°, and increasing with a rise in the temperature

* From the *Journal of the Society of Chemical Industry*, Aug. 29, 1883.

† Mr. B. J. Grosjean was for many years the chemist at Sir J. B. Lawes's Tartaric and Citric Acid Factory, Millwall. The following abstract of some of his unpublished investigations has been compiled by Mr. R. Warington from reports made by Mr. Grosjean, and from his Laboratory Note-books. The results are made public by Sir J. B. Lawes's permission. Further investigations by Mr. Grosjean will be found in the *Journ. of the Chem. Soc.* for July last. See also *Pharm. Journ.* [3], xiii., 435.

employed. With each increase in the dilution there would clearly be an increase in the quantity of potassium sulphate required to produce the excess demanded. Mr. Grosjean does not appear to have made any trials as to the possibility of the reaction taking place at a low temperature. All his experiments were conducted near a boiling heat.

The reaction with sodium sulphate differs in several respects from that with potassium sulphate. The precipitate produced by the action on the calcium tartrate is not nearly so bulky. To what extent it consists of a double sulphate of calcium and sodium was not determined. At a temperature near boiling, and with a favourable proportion of water, a considerably smaller quantity of sodium sulphate than of potassium sulphate is required to decompose a unit of calcium tartrate. On cooling, however, a reverse action sets in, and a considerable part of the tartaric acid again becomes tartrate of calcium. In the case of potassium sulphate we have already seen that the action is not reversed on cooling.

The experiments quoted in the following table are best comparable with those numbered *a—g* in the trials with potassium sulphate. The reaction was in all cases conducted on a water-bath, and the contents of the beaker transferred while hot to a vacuum filter. The tartaric acid dissolved was determined by the ignition method.

Table II.—Tartaric Acid obtained as Sodium Tartrate by the Action of Sodium Sulphate on Calcium Tartrate.

No	Materials taken—Grams.			Tartaric acid obtained as sodium tartrate.		
	Tartaric acid as calcium tartrate.	Sodium sulphate.	Water.	Grams.	For 100 taken.	For 100 of sodium sulphate.
1	2·2212	6·00	15	1·0830	48·7	18·1
2	1·6629	6 00	30	1·6425	98·8	27·4
3	1·1106	3·00	—	0·9214	83·0	30·7
4	—	1·50	—	0·4551	41·0	30·3
5	—	0·75	—	0·2168	19·5	28 9

It appears from these experiments that sodium sulphate may be used economically as a 10 per cent. solution. At this strength 3 grams of sodium sulphate are almost as efficient as 5 grams of potassium sulphate, as may be seen by comparing experiments *c* in Table I. with experiment three in Table II. In experiment one the inferior result per unit of sodium sulphate seems due to the employment of too small a proportion of water. When the sodium sulphate does not exceed 10 per cent. of the solution, very considerable variations, both in the degree of dilution, and the proportion of calcium tartrate present, may apparently occur without producing any large alteration in the decomposing efficiency of the unit of sodium sulphate: a result certainly different from that observed in the experiments with potassium sulphate.

It is clear that further experiments are required to elucidate the subject.* If, however, we may assume that a double sulphate of sodium and calcium was not formed in experiments two to five, many of the differences from the results obtained with potassium sulphate admit of at least a partial explanation. On this hypothesis the sodium sulphate would not be partially precipitated with the calcium sulphate, and a much smaller proportion of sodium sulphate than of potassium sulphate would therefore be required to decompose a unit of calcium tartrate. Dilution would also have a far less injurious effect on the sodium reaction, for here it is not necessary, as in the potassium reaction, to maintain a certain percentage of alkali sulphate in the solution in order to determine the reaction with the calcium tartrate. But this advantage on the side of the sodium sulphate is confined to a high temperature, for, on cooling, the calcium sulphate again combines with the tartaric acid. Not so in the potassium reaction. Here there is no calcium sulphate, and the double sulphate of calcium and potassium that is present becomes, as we have seen, more stable as the solution cools.

If any of the solutions of potassium or sodium tartrate obtained in the above experiments are considerably diluted, and an excess of solid sulphate of calcium added, nearly the whole of the tartaric acid will be precipitated as calcium tartrate.

(*To be continued.*)

* Fritzsche (*J. Pr. Chem.*, 72, 294) obtained the double sulphate of sodium and calcium only in very strong solutions.

MANUFACTURE OF CAMPHOR IN JAPAN.*

The manufacture of camphor is an important industry on the island of Kiu Shiu (Kew Shew).

From the port of Nagasaki there were exported in the year 1882, 15,186·18 piculs, valued at 227,792 dollars. A picul is 133⅓ pounds. From other ports of the island not yet open to foreign trade, a large quantity was shipped by native merchants in native vessels to Shanghai in China, and Hong Kong, whence it finds its way to India and England; little or none of it is exported to the United States. The camphor tree grows abundantly all over this portion of Japan. It is found alike on high elevations and in the valleys and lowlands. It is a hardy, vigorous, long-lived tree, and flourishes in all situations.

Many of these trees attain an enormous size. There are a number in the vicinity of Nagasaki which measure ten and twelve feet in diameter. The ancient temple of Osuwa at Nagasaki is situated in a magnificent grove of many hundred grand old camphor trees, which are of great age and size, and are still beautiful and vigorous. I am told that there are trees in other places in Kiu Shiu measuring as much as twenty feet in diameter. The body or trunk of the tree usually runs up twenty and thirty feet without limbs, then branching out in all directions, forming a well proportioned, beautiful tree, evergreen and very ornamental.

The leaf is small, elliptical in shape, slightly serrated, and of a vivid dark-green colour all the year round, except for a week or two in the early spring, when the young leaves are of a delicate tender green. The seed or berry grows in clusters and resembles black currants in size and appearance. The wood is used for many purposes, its fine grain rendering it especially valuable for cabinet work, while it is used also for ship-building. The roots make excellent knees for ships.

I have sent many seeds of the camphor tree to the United States, in the hope of adding to our own arboriculture.

In the manufacture of camphor the tree is necessarily destroyed, but, by a stringent law of the land, another is planted in its stead. The simple method of manufacture employed by the natives is as follows:—

The tree is felled to the earth and cut into small pieces, or, more properly speaking, into chips.

A large metal pot is partially filled with water and placed over a slow fire. A wooden tub is fitted to the top of the pot and the chips of camphor wood are placed in this. The bottom of the tub is perforated, so as to permit the steam to pass up among the chips.

A steam-tight cover is fitted on the tub. From this tub a bamboo pipe leads to another tub, through which the inclosed steam, the generated camphor, and oil flow. This second tub is connected in like manner with a third.

The third tub is divided into two compartments, one above the other, the dividing floor being perforated with small holes, to allow the water and oil to pass to the lower compartment. The upper compartment is supplied with a layer of straw, which catches and holds the camphor in crystal in deposit as it passes to the cooling process. The camphor is then separated from the straw, packed in wooden tubs of 133⅓ pounds each, and is ready for market.

After each boiling the water runs off through a faucet, leaving the oil, which is used by the natives for illuminating and other purposes.

* Report by Consul Jones, of Nagasaki. Reprinted from the *St. Louis Druggist*, August 18, 1883.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 8, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

THE INFLUENCE OF LEBLANC'S DISCOVERY OF THE PROCESS FOR MAKING ALKALI UPON THE HISTORY OF CHEMICAL MANUFACTURES.

ABOUT ninety years have now elapsed since the outbreak of war consequent upon the French revolution led to the stoppage of the importation into France of barilla from Spain, and caused the National Convention to consult the Academy of Sciences as to the possibility of obtaining a supply of the indispensable alkali from a native source. The chemists of that body were unanimous in pointing to common salt as the most promising and suitable material, and upon their report a prize of twelve thousand francs was offered for the person who should work out the best practicable process for obtaining from it what was required. The offer called forth thirteen competitors, one of whom was NICOLAS LEBLANC, a pharmacien, with his process —essentially the same as practised in the present day—of treating the common salt with sulphuric acid, and converting the sulphate of soda formed into carbonate by calcination with a mixture of coal and chalk. The award was made in favour of LEBLANC; but by that time the Academy had ceased to exist, and the well-earned reward was not forthcoming. Nor was this the last of LEBLANC'S misfortunes; there was an unsuccessful attempt to carry out the manufacture to which the sequel was bankruptcy, followed by a miserable struggle for existence and then—suicide! His lot, like that of many another inventor, was to lack comforts and even food whilst living and after death to be covered with honour, which, it appears, is now to culminate in the erection of a statue by the municipality of Issodoun, the town where he was born. On a recent occasion this project was brought under the notice of the Academy of Sciences, which now represents the body dissolved by the Convention, by its eloquent and gifted Perpetual Secretary, M. DUMAS, who availed himself of the opportunity to deliver a discourse on the "historical *rôle* of the discovery of artificial soda extracted from sea-salt," in which he recounted some facts that are well worth remembering at a time when it seems possible that if LEBLANC'S process be not altogether abandoned, it will not much longer be carried on primarily for the manufacture of carbonate of soda.

Few have been the discoveries that have so largely and beneficially affected the human race as that of utilizing common salt in the production of carbonate of soda, and M. DUMAS does not hesitate to couple the names of LEBLANC and WATT as those of the two men whose inventions have been most prolific of benefits to mankind. Although probably there will be many who—not being Frenchmen—will hardly be prepared to accede to this claim in its entirety, it must be admitted that the consequences of LEBLANC'S discovery have been very important and far reaching. Looking to the production of carbonate of soda alone, as the immediate object of the process, it is estimated that the present annual consumption of it in the two hemispheres reaches seven or eight hundred thousand tons, and M. DUMAS speculates as to whether the amount used, more or less unwittingly, by individuals does not approach or even equal the amount of common salt necessary to supply their wants. As the manufacture of soda by the LEBLANC process spread there was an immense development in the manufacture of sulphuric acid and a proportionately increased demand for sulphur, which eventually pressed the hitherto useless pyrities into useful service. On the other hand there was an enormous quantity of gaseous hydrochloric acid set at liberty by the decomposition of the salt. The primary result, therefore, of the institution of works for the manufacture of soda from sea-salt was not only to place at the disposal of those who carried on the glass, soap, and other industries the supply of alkali of which they were in need, but also to provide in unlimited quantity two powerful acids at fabulously reduced prices. A secondary result was to place at the disposition of the manufacturers of textile fabrics and paper a new product derived from hydrochloric acid, "chloride of lime," which for the rapid bleaching of vegetable tissues has taken the place formerly occupied by the slow action of light and moist air. These four agents, a powerful alkali, two energetic acids, and a bleaching powder that nothing has yet replaced, imparted an immeasurable impetus to the industry of chemical products, whilst the necessity which has existed for avoiding the accumulation of bye-products that would be detrimental to the public health and convenience has been a very fertile source of chemical discovery. For instance, the manufacture of chlorine and chloride of lime used up peroxide of manganese and produced chloride of manganese in large quantities. The peroxide was a natural product, limited in its supply, and an increased demand was followed by an exaltation of the price, whilst the accumulations of chloride sterilized the land and contaminated the watercourses. But chemists set to work and the difficulty was overcome by the discovery of an economical method of regenerating the peroxide. In like manner much ingenuity and skill have been devoted to the recovery of the sulphur from alkali waste.

At the present time the LEBLANC process is under a cloud, and the conditions under which it may be able to survive the rivalry of the more modern ammonia process have been eloquently discussed on a recent occasion by the present President of the Society of Chemical Industry. It may be that it will take a fresh lease of life, and with new objects to be attained may regain in some degree its former importance. But however this may be there is some ground for the congratulations of M. DUMAS that the discovery of the ammonia process did not precede LEBLANC'S invention, instead of following it at an interval of nearly a century. But whether it be true, as he affirms, that if the reverse had been the case the industry of chemical products would be yet unborn, that manufacturers would not now have at their disposal cheap sulphuric and hydrochloric acids and chloride of lime, and that agriculturists would not have learnt the use of acid phosphate of lime, is at least somewhat doubtful. In any case the results of the discovery of NICOLAS LEBLANC have been sufficiently beneficial to the world to justify the tardy honour which is to be offered to his memory in his native city, and that is a fact which can hardly be affected by speculations as to what might have been had he lived a century later.

BRITISH PHARMACEUTICAL CONFERENCE.

WE need hardly remind the majority of our readers that the British Pharmaceutical Conference is this year to hold its Annual Meeting in Southport, under the presidency of Professor ATTFIELD, F.R.S., on Tuesday the 18th and Wednesday the 19th inst. In a recent number (see before, p. 9) we alluded to the general arrangements, and need only repeat that the meeting will take place in the Assembly Rooms of the Prince of Wales Hotel, commencing at half-past ten each day, with an interval in the middle of the day for an opportunity to enjoy the hospitality of the local members at luncheon. We are informed that it is now definitely arranged that an opportunity shall be afforded to members, after the close of the meeting on Wednesday, to inspect the works of the Glaciarium and that a demonstration of GAMGEE'S process of making the ice will on that occasion be made. The Local Committee will also invite members to visit St. Helen's on Thursday. Special saloon carriages for the accommodation of the company will be attached to the train leaving Chapel Street Station at 8.10 a.m., and permission has been obtained for the inspection at St. Helen's of the Union Plate Glass Works, the Copper Smelting Works of Messrs. BIBBY, SONS AND Co., and the Chemical Works of Messrs. KURTZ AND Co. The return journey will be made in time for members to be present at a garden party to be held in the Botanical Gardens, Churchtown. In addition to the attractions of the Gardens and Fernery, a full military band will play a selection of music, a company of CHARLES HALLÉ'S choir will give a series of part-songs, glees and choruses throughout the afternoon, and Mr. LEO GRINDON will exhibit a collection of rare and interesting plants, and deliver a short descriptive lecture upon them. Double tickets of invitation will be issued to members, so that it may be hoped that a large proportion of the company will consist of members of the fair sex, whose presence will doubtless add greatly to the enjoyment of the occasion. It will be seen from the list below that as regards the business portion of the proceedings the papers deal with subjects having great pharmaceutical interest, and as regards the entertainment of visitors it is evident that the Local Committee must have laboured indefatigably to provide such a full and attractive programme as we have sketched out on this and on a previous occasion. We therefore venture to anticipate that the combined prospects of scientific and social intercourse will induce a large number of members to visit Southport, and that the forthcoming meeting will be as numerously attended as any of its predecessors. For the convenience of those who will have to travel from London, it may be again stated that through carriages will be attached to the trains leaving Euston at 7.15 a.m., 11 a.m., 1.30 p.m., 3 p.m., and 4 p.m., on the 17th, 18th, and 19th inst.

We are informed by the General Secretaries that the following papers have already been promised for the meeting:—

1. Second Report on the Differences between the Essential Oils of Cinnamon and Cassia. By A. H. JACKSON, B.Sc.
2. Bitter Principles of Nerium Odorum: Preliminary Report. By H. G. GREENISH, F.I.C.
3. Report upon the Quantitative Separation of Strychnine and Brucine. By WYNDHAM R. DUNSTAN F.C.S., and F. W. SHORT.
4. Report on Tincture of Nux Vomica. By WYNDHAM R. DUNSTAN, F.C.S., and F. W. SHORT.
5. The Preservation of Medicinal Herbs by Ensilage. By Professor QUINLAN, M.D., M.R.I.A.
6. The Pharmaceutical Aspects of the Mullein Plant. By Professor QUINLAN, M.D., M.R.I.A.
7. Aconitine for Internal Exhibition: its Certainty and Safety. By T. B. GROVES, F.C.S.
8. Contribution to the Pharmacy of the Pomegranate. By L. SIEBOLD, F.I.C., F.C.S.
9. Experiments on the Ointment Bases. By W. WILLMOTT.
10. Suggestions for Combinations of Collodion. By J. B. BARNES, F.C.S.
11. Sweet Spirit of Nitre. By A. C. ABRAHAM.
12. Sesame Oil: its Suitability for Pharmaceutical Purposes. By T. MABEN.
13. Sesame Oil: Report on its Suitability for Pharmaceutical Purposes. By M. CONROY, F.C.S.
14. The Composition of Easton's Syrup. By R. H. DAVIES, F.I.C., F.C.S.
15. The Odorous Principles of Henbane. By A. W. GERRARD, F.C.S.
16. Does Cod Liver Oil contain Iodine? By E. C. C. STANFORD, F.C.S.
17. Additional Notes on the Bitter Principle of Hymenodictyon Excelsum. By W. A. H. NAYLOR, F.C.S.
18. On the Trees yielding Benzoin. By E. M. HOLMES, F.L.S.
19. On some Asphalts and Pitches of Commerce. By E. DAVIES, F.I.C., F.C.S.
20. A paper by B. D. DOTT, F.R.S.E.

We are informed by a local correspondent that in the case of accidental poisoning at Partick, to which reference has been made previously, the prosecution of the dispenser has been abandoned. It is understood that it was found that the bottle used in the dispensing while distinctly labelled "Tinct. actææ" contained a mixture of the tinctures of actæa and aconite. Also that a supply of tinct. of actæa had been procured from two wholesale houses, by either of which aconite might have been sent by mistake. In addition the shop had been recently refitted with recess-labelled bottles, and the mistake might have been made in transferring the preparations to the new bottles. There was thus no case against the assistant, and he was discharged by the Crown. There however, remains still a possibility of a civil action against the proprietor.

* * *

In an interesting paper on "Modern Therapeutical Tendencies," contributed to the *British Medical Journal*, Dr. J. H. Bennet refers to the want of pharmaceutical knowledge in the rising generation of medical practitioners. Evidence of this is to be found, he thinks, in the advertising columns of the medical journals. The young doctors of the present day not knowing how to prescribe, the chemists of the present day prove equal to the occasion and provide them with formulæ ready cut and dried, which appear to be rapidly gaining ground. Surely, Dr. Bennet says, a well-informed medical practitioner ought to know how to combine and prescribe medicinal agents better than his chemist. Dr. Bennet adopts somewhat of a monitory tone towards pharmacists on this subject, warning them that the system cuts both ways, since it is antagonistic to their legitimate business, and that while building up the fortunes of a few large advertising houses, they diminish their own profits, notwithstanding that they receive a large commission. We do not think, however, that pharmacists need to be reminded of this fact. It is the first business of the dispesnser to meet the wishes of the prescriber by using, as nearly as possible, the exact articles ordered in a prescription, and as long as prescribers allow themselves to be persuaded into abandoning the Pharmacopœia in favour of the private formulary the dispenser has no option as to following his lead.

* * *

An Act to regulate the practice of pharmacy in the state of Delaware has been passed, which makes it illegal for other than registered persons to "conduct any pharmacy or store vending at retail, dispensing or compounding medicine or poisons within the corporate limits of any town of five hundred inhabitants or over" in that state. The first Board of examiners is to be nominated by the State Medical Association and is to consist of the "most skilled and intelligent pharmacists in the state;" the examiners, however, are not to receive any remuneration, neither is the nature of the examination defined.

* * *

In the opinion of Mr. Morris, the Director of the Government Plantations in Jamaica, who has recently visited British Guiana, the cinchona plant is very unlikely to thrive in either British Honduras or British Guiana, and as he has not much faith in the systematic cultivation of it in its natural home in the South American States, whilst all attempts at its naturalization in the United States have failed, he thinks it very likely that for many years to come Jamaica will remain the site of the only successful cinchona plantations in the New World. In that island plantations are now being laid out by private persons on a large scale, and during the last two years the Government has sold twelve patents, or runs, of high forest land, containing about five thousand acres, under conditions which require that at least one-sixth shall be planted with cinchona at the end of five years.

* * *

Some little excitement has been created among importers of cinchona alkaloids and their salts into the United States by the discovery that when the Act was recently passed repealing the duty on quinine and its salts and cinchonidine, sulphate of cinchonidine—probably through an oversight—was not mentioned. The Act provides that all alkaloids and their salts, by whatever name known, if not specially enumerated as exempt, shall pay a duty of 25 per cent. *ad valorem*. As the enumeration in the free list is limited to "quinia, sulphate of, salts of, and cinchonidia," the collectors at the ports have decided that sulphate of cinchonidine is liable to pay the duty, and notwithstanding an appeal to the authorities they will probably maintain their ground.

* * *

One of the inevitable consequences, however, of maintaining high import duties is shown in the significant statement that in consequence of the rigorous action of the Government in prosecuting opium smugglers on the Pacific coast, the duties on opium collected at San Francisco during the last fiscal year amount to one million dollars in excess of the amount collected from the same source in the previous year.

* * *

According to the *British Medical Journal*, a student in the College of New York has been fatally poisoned by morphia supplied in a capsule in the place of quinine. The proprietor of the drug store from which the capsule was obtained, and the assistant who sold it, have been committed for trial.

* *

It may be useful to some of our readers who use Professor Babington's 'Manual of Botany' to know that the author has prepared two pages of corrections and additions for the eighth edition, copies of which may be obtained gratis from the publisher, Mr. Van Voorst.

* * *

In a communication to the French Academy of Sciences M. Krechel has called attention to an adulteration of milk effected by the addition to it of an aqueous solution of commercial glucose, having the same density.

* * *

An attempt to organize amongst manufacturers and dealers in proprietary articles in the United States, a mutual protection association for the defence of trade marks, which was set on foot about a year ago, appears to have collapsed, only six firms having shown any disposition to join it.

Proceedings of Scientific Societies.

ROYAL INSTITUTION OF GREAT BRITAIN.

Weather Knowledge in 1883.*

BY ROBERT HENRY SCOTT, M.A., F.R.S.,

Secretary to the Meteorological Council.

Rather more than ten years since I had the honour of delivering a Friday evening lecture in this theatre, and my subject on that occasion was somewhat similar to that which I have chosen for this evening. It was then "Recent Progress in Weather Knowledge," and to-night I must endeavour to lay before you the results of ten years' further experience of a work of which the complexity becomes daily more patent.

Dealing first with the forecasting of the character of seasons. In 1873 the theory of a connection between the frequency of sun-spots and the weather had been recently promulgated, and appeared to promise most valuable results. It is universally admitted that the presence of spots on the solar surface indicates increased activity in his gaseous envelope, which ought to and must affect our atmosphere.

A connection between the frequency of sun-spots and the prevalence of hurricanes in the Indian Ocean was the first phenomenon which was cited as a proof that such influence is traceable, and the statistics brought forward appeared to confirm the idea. The periodicity of rainfall was the next subject studied, and as an outcome of the changes in rainfall distribution the recurrence of famines has furnished the text for numerous reports and pamphlets. Another subject dealt with has been temperature, but as to this one set of investigators holds that years of sun-spot frequency correspond to years of excessive heat, while another set maintains that they correspond to years of excessive cold!

This discordance has been somewhat allayed by the suggestion that the causes which produce heat in one region produce cold in another. On the whole, however, it may be said that the precise mode in which the sun exercises his action on our atmosphere has not as yet been explained, and as far as the climate of Western Europe is concerned, the warmest adherents of sun-spot influence must admit that observations of the condition of the sun's surface cannot as yet be depended on as a sound basis for prophecy of coming weather.

That this assertion cannot well be disputed appears from the figures which follow:—

Winter Half-Year.

	Temperature. °	No. of sun-spots.
1876–7	43·7	13
1877–8	43·4	8
1878–9	39·3	3
1879–80	41·4	24
1880–1	40·0	44
1881–2	43·7	64
1882–3	41·8	74

The first column gives the mean temperature of the entire United Kingdom for the six months October—March, for the last seven years, and the second gives the number of sun-spots observed at Kew during the same period.

No approach to concordance is traceable between the two columns of figures.

If we go further afield and compare the general temperature of the globe, at least the closest approximation to it which is attainable, with the sun-spot curve for the thirty-five years ending with 1875, as has been done by Dr. Köppen,† we see that though for some part of the time some of the temperature curves appear to agree with the curve of sun-spots, the accordance in one hemisphere is associated with a striking discordance in the other.

The figures which I have cited therefore support the statement that the precise nature of the relation between what we may call solar and terrestrial weather has not as yet been demonstrated.

As regards the whole question of prediction of the seasons, either by sun-spots or by any other means, the same author, Dr. Köppen, has published several papers "On Protracted Periods of Weather," devoting his attention especially to severe winters, and he gives the following summary of his results.*

"The main feature of the entire investigation has been to prove that, for certain intervals, strongly marked periodical influences make their appearance and then vanish entirely, at times being replaced by others of a totally different character. No law has as yet been discovered for these changes, and so the outcome of the inquiry is on the whole negative, and indicates that all forecasting of the seasons is the merest guesswork."

We may therefore conclude that at the present date there is no immediate prospect of any one being able to state what the character of a future season will be, much less to tell a farmer in spring what crops he should put in with the prospect of a favourable period for the harvest.

I next come to the subject of daily forecasting, a branch of the work of all Meteorological Institutes, which has grown up in Europe within the last ten years. It has really been forced upon meteorologists by the demand of the public to see in the newspapers some statement as to probable weather.

The brilliant successes achieved in this line by the Chief Signal Office at Washington have attracted general notice, and the public of every nation in Europe has expected that their own offices shall do as much for them as that of Washington does for the States of the Union.

The public has, however, naturally forgotten to take into consideration several most important advantages which the Signal Office enjoys over its compeers. Firstly, an extensive continent from which to gather its reports, with one language and one telegraphic system; secondly, a military organization, which ensures due training and proper subordination of the employés to their chiefs; and thirdly and finally, a most liberal supply of funds.

In all these particulars European systems fall far behind that of the United States. Our continent is not large, and it is cut up by inland seas like the Mediterranean and the Baltic, while for us, in these islands the ocean lies to the westward, and from that we can at present gather no reports.

Moreover, the difference of languages and habits between the different states has been found, hitherto, to present insuperable difficulties to the introduction of an absolutely uniform system of reporting.

To take one instance of the difficulty of organizing weather reports in Europe, information as to the state of Sea Disturbance on our shores is justly considered one of the most important observations for our coast observers, but when we came to devise an international code for reporting, we found that inland organizations, such as that of Austria, objected to setting apart any space in the code for such, to them, uninteresting details.

My audience will therefore see that it is not easy for us Europeans to devise a system of weather reporting which shall meet with universal acceptance.

Again, supposing that the code were satisfactorily arranged as regards the reports of instrumental observations, it is found to be practically impossible to organize a system of notices of the general appearance of the sky and the weather, in fact, of the very indications which are the most valuable of all to the skilled weather watcher.

* Read Friday, May 4, 1883.

† 'Zeitschrift der österreichischen meteorologischen Gesellschaft,' Bd. xvi., p. 149.

* *Ibid.*, p. 196.

Here is the crowning defect of all centralized weather services like our own; the forecaster, situated at a distance of some hundred miles from his most important stations, has to draw his conclusions at second hand, from information at best scanty for each station, frequently unpunctual in its arrival, and also at times entirely deficient at the most critical moment, owing to interruptions in telegraphic communication during stormy weather.

The only practical mode of partially overcoming this difficulty of excessive centralization, would entail very considerable expense. It would be the maintenance in the chief centres of population, of local offices, charged with the preparation of forecasts for their own special neighbourhoods, and I fear that neither the Government nor the local authorities would give money for such an experiment.

No serious attempt at local forecasting is made in Europe, except by one German newspaper, the *Magdeburger Zeitung*, for the scheme started in France by Leverrier shortly before his death, of local forecasting by experts appointed by the Communal Authorities, was speedily brought to a stop after his death by a demand from the French Postal Authorities for the repayment of the expense of telegraphy.

We are thus obliged to forecast for the whole country, and as the various portions of these inlands are variously circumstanced as regards proximity to the sea, and as to the mountainous or flat character of their surface, an attempt has been made to group the counties together into a series of districts, the boundaries of which are determined by the general character of the agriculture most developed within them. Thus the western districts are mainly grass producing, while the eastern are corn producing.

This division is necessarily more or less of an arbitrary nature, as the separation between a grazing and an arable region is not a hard and fast line, and of course a driving shower does not cease to fall on crossing a county boundary. But supposing a forecast is drawn up for any one district, it is necessarily limited by the exigencies of telegraphy to a very few words, and it is simply impossible to frame it so as to be correct for the whole of the district. If there is a range of hills crossing the country, the wind which produces rain on the weather slope of the ridge brings dry weather to its lee side. This is a consequence of the well-known principle, that air forced to rise over an obstacle like a hill, is cooled at the rate of about 1° F. for every 300 feet, and is also expanded by the pressure on it being reduced. Both of these actions reduce its capacity for containing moisture in the state of vapour, and rain is produced as the air ascends. Once it has crossed the ridge the reverse action takes place, the air is heated and compressed by descent. It thus becomes capable of containing more moisture, and is felt as a warm and dry wind.

To give an instance of this action on a somewhat large scale, I may cite the district of Elgin and Nairnshire, on the south coast of the Moray Firth. This comparatively flat area is bounded on the south and south-east by the Grampians, and on the west by the hills of Inverness-shire and Rossshire, and all the air from the south and west has had to travel up a series of successive hill sides on its passage from the Atlantic. The result is, that the region I have named has a rainfall not more than one half that of the upper valleys of the Grampians, and yet it is situated in the same district for forecasting. Such is the exceptionally dry character of this strip of coast, that one summer a friend of mine who has a fishing on the Spey told me that for some weeks while the river was in spate, showing that rain fell on the hills, and the fishermen out in the Firth had rain almost every night, not a drop fell at Nairn.

My hearers will, therefore, perceive that the same wording will not suit a whole district, unless it be judiciously phrased so as to bear more than one interpretation.

The figures which I give in Table I. are obtained in a very general way; the forecast for the district is tested by as many reports from that district as are available. This mode, therefore, gives a higher figure for correctness than would be obtained by testing them for a single place.

The second series of figures, in Table II., however, are obtained by a different method, and one which is comparatively free from the objection just stated, as the observers who furnish the data are quite independent of the office, and the forecast is tested by the weather they themselves experience.

Table I. Forecasts at 6 p.m. appearing next morning.

	Quite correct.	Partially, more than half, correct.	Partially, more than half, wrong.	Quite wrong.	Sum of Cols. I and II.
Scotland, N.	38	41	15	6	79
„ E.	36	43	15	6	79
England, N.E.	35	42	17	6	77
„ E.	37	42	15	6	79
Midland Counties	34	43	17	6	77
England, S.	40	42	13	5	82
Scotland, W.	31	40	20	9	71
England, N.W.	33	42	18	7	75
„ S.W.	35	40	18	7	75
Ireland, N.	34	42	17	7	76
„ S.	35	39	17	9	74
General average	35	41	17	7	76

Table II. Hay Harvest Forecasts.

	Quite correct.	Partially, more than half, correct.	Partially, more than half, wrong.	Quite wrong	Sum of Cols. I and II.
Scotland, N.	44	38	15	3	82
„ E.	44	38	14	4	82
England, N.E.	38	37	20	5	75
„ E.	46	34	15	5	80
Midland Counties	48	37	13	2	85
England, S.	43	40	14	3	83
Scotland, W.	36	39	15	10	75
England, N.W.	39	38	19	4	77
„ S.W.	42	37	16	5	79
Ireland, N.	32	39	22	7	71
„ S.	39	35	21	5	74
General average	41	37	17	5	78

These latter are the results of the Hay Harvest Forecasts, a system which has been in operation for the past four years. Forecasts drawn at 4 p.m. are sent daily for a month to a number of gentlemen, largely interested in farming in various parts of the country, on the conditions that they disseminate the information in their immediate neighbourhoods, and that they keep and send to us a careful comparison of the forecasts with the weather. The general average of the whole agrees sufficiently closely with that determined by the office from its own data.

I find on inquiry, from all the European offices which issue forecasts, that the percentages of success which they claim officially are almost identical with that shown on the diagrams. They are on the whole about 80, but no one is really contented with the results. The critics of foreign forecasts are just as severe on their own systems as the writers of newspaper letters are on us over here, and as one of my correspondents, the gentleman who manages the Magdeburg office, remarks, those who are least content are the forecasters themselves, though naturally they do not publish their dissatisfaction.

To give one illustration, out of many, of the difficulty of our task in England, the same gentleman whom I have just quoted says: "Our greatest trouble is the lateness of arrival of the English telegrams, and, without news from England, no one in Germany can dream of forecasting." Now we, in these islands, as is so often said, can apparently never hope for daily telegraphic news from signal ships in the Atlantic, so that ocean must keep its wonted silence, and our forecasting must be even more hazardous that that of our German neighbours.

Another development of forecasting, and in fact its earliest form, the desire to carry out which gave rise to the whole system of weather telegraphy, and as a result of the latter, to the science of Modern Meteorology, is the issue of Storm Warnings. These were instituted in this country by FitzRoy, in 1866. They were temporarily suspended at Christmas 1866, and resumed a year later, and the diagram gives the average results for the entire United Kingdom, from the year 1870, being the first year for which the figures were regularly submitted to Parliament. The interval of twelve years divides itself naturally into two periods of equal length, the break between which happens so coincide with the institution of an evening, in addition to the afternoon service of reports.

This was carried on, in the first instsnce, at the sole cost of the *Times* newspaper, and in order to furnish materials for drawing the chart in its morning issue, and it is only within the last three years that the expense of this part of our work has been borne by the Government.

The figures show at the first glance an improvement of 8 per cent. in the first column, and this is a considerable advance, but my audience must not take away the idea that if the receipt of four hours' later intelligence raises the percentage of success, we might anticipate the possibility of warning the coasts for all storms, if the reporting hours were extended to midnight, or the service were even continuous.

The extension of the reporting service would enable us in London to know what was taking place on the coasts far better than we do, but we could not impart our knowledge to those whom we wish to benefit. Practically, storm warnings must be issued before sundown, for no port at present will bear the expense of maintaining lamps for night signals. If we allow an hour or so for the warning message to reach the distant stations, and most of them take much longer than that, we see that in winter a warning to a Scotch port must leave London at 2 p.m. to be in time to be communicated by signal. Warnings issued at 7 p.m. rarely come to the fisherman's knowledge till next morning, even if they should reach the telegraph station before that office closes for the night.

Accordingly the figures in the table give a somewhat too favourable idea of our real success in warning.

	Warnings justified		Warnings not justified.	Warnings		Warnings issued in error.
	by Gales.	by Strong Winds.		Late.	Partially late.	
1870–5	47·6	26·8	18·4	1·5	3·8	1·9
1876–81	56·4	23·5	15·8	0·8	3·1	0·3
1870–81	52·0	25·1	17·1	1·2	3·5	1·1

The diagram also does not show the storms which have been missed. Of these there are instances every year. That of October 23–4, 1882, was a most striking case. The storm came on so suddenly, not setting in at any station before midnight, and raging with full fury at 8 a.m., that with our present knowledge it appears to have been impossible to have caught it.

It would take me too long were I to continue this subject, and I would only impress upon my hearers that accidents must happen, like that of October last, and that we must only not let them discourage us, and do our honest best.

The practical result of our forecasting of weather is that while we are generally fairly correct as to the direction and force of wind, we are most liable to fail in predicting rain, especially as to its amount. In fact, not only we, but every Meteorological Office in Europe, have to confess inability to foretell rain, *quantitatively*, to say whether the rain expected to fall will be only slight, or a deluge. In no single case have exceptionally heavy falls, either local, like thunderstorms, or general rains, been foretold. I take as instances, the rain of April 13, 1878, in London, which burst so many sewers; the hail storm at Richmond, August 3, 1879, which will long be remembered in Kew Gardens; or lastly, the snow storm of January 18, 1881.

These failures are very serious defects in practice, and apparently are in great measure attributable to our own ignorance of the conditions of the upper strata of the atmosphere.

Attempts have been made in various directions to organize systems of upper strata observations. These may be classified under three heads, *Personal*, *Mechanical*, and *Optical*.

By *personal observations*, I mean those made on mountain stations cr in balloon ascents.

Of mountain stations we have not yet had a fair trial in these islands, for no mountain observatory, deserving the name, has yet been built. The Scottish Meteorological Society are endeavouring, with great zeal and considerable success, to raise funds to build and maintain a station on Ben Nevis, the highest spot in the United Kingdom, and to place it in telegraphic connection with Fort William, and so with the postal telegraph wires in general, but hitherto all that has been done is that the observer, Mr. C. L. Wragge, has with a most praiseworthy exertion of energy, and in the face of great difficulties, climbed the 4000 feet before 9 a.m. *daily* for four and a half months in 1881, and for five months in 1882. To give an idea of what he occasionally experienced, I may quote his words in a letter of November 1, 1882, printed in *Nature*:—"The track was snowed up, and it was necessary to force a way through great banks and drifts of snow. The average depth was 2 feet; once we got off our course in the blackness of thick cloud-fog, and trackless snow."

Mr. Wragge, on each occasion, as soon as he reached Fort William on his return, generally about 3 p.m., sent a telegram to us in Londan. This never arrived before 5 p.m., so that it was practically useless for all forecasting or storm warning on the day on which the observation was made. We must therefore reserve our judgment as to the usefulness of the proposed station until it is in efficient working order, and the observations can reach us more promptly.

As regards balloons the observations are necessarily sporadic and uncertain. No ascent is possible if the wind is at all strong. No captive ascent can attain any great height, and no free ascent can be made with a certainty of being able to send off a telegraphic message when the observer reaches *terra firma*, for he may come down miles from a telegraph station.

The admitted impractibility of guiding a balloon, and the liability to accidents, in the case of a squall, either on leaving the ground or on returning to it, of both of which recent instances, one unfortunately fatal, are on record, render it unadvisable to rest any hopes of permanently extending our knowledge of the upper currents of the atmosphere by the aid of aeronauts. Moreover, they can never give us reports at a fixed hour every day for the purpose of completing our charts.

The *mechanical* method of observation may be soon dismissed: it consists either in sending up instruments in small captive balloons, or attached to kites, or in placing them on elevated peaks. In all these cases the registration is to be effected by means of electricity. The apparatus devised by Sir W. Siemens, and lent by him to the Meteorological Society, has been in operation on Boston church tower for several months, and has worked well, and the same may be said of Olland's telemeteorograph on the tower of Utrecht Cathedral, but the obtaining of records from such an elevation as can be secured on the loftiest buildings, is not obtaining them from the upper currents of the air, and we have yet to prove the practicability of raising an electric thermometer to a height of, say, 2000 feet, and maintaining it there in all ordinary weathers, before we can say that much is to be expected from mechanical upper current observation.

Lastly, we come to *optical* modes of observing the condition of the air above us. These are the only ones which as yet give us much encouragement, and of them I shall only mention two. Spectroscopy and cirrus cloud observations.

The former has an enthusiastic advocate in Professor Piazzi Smyth, whose repeated letters to the newspapers have at least attracted the notice of many who have not seen his copiously illustrated work on the subject, 'Madeira Spectroscopic.' Professor Smyth maintains that by observations of his rain band in the spectrum, he can form an accurate estimate of the amount of moisture suspended in the air. This belief of his is not as yet, however, accepted as an article of faith by meteorologists at large, and even, if it were, it still remains to be proved how much warning of coming rain such phenomena will afford. If they only give it for a few hours, the advantage they present to us is not very material.

Under any circumstances there are great obstacles to the general introduction of spectroscopic observations at telegraphic reporting stations. The instruments are comparatively costly, and their use requires more skill and delicacy of handling than we can expect from men of the rank of our ordinary telegraphic reporters.

Lastly, we come to the observation of the clouds, especially of the upper clouds, which has been of late almost reduced to a science, mainly by the labours of the Rev. W. Clement Ley in this country, and of Professor H. Hildebrandsson, of Upsala, in Sweden, around whom a knot of observers are gathering. Mr. Ley is the most enthusiastic, and also by far the most experienced of the authorities upon the subject, and he said of himself in a lecture delivered a few years ago, that he had spent one-twelfth part of his waking existence in watching cloud motion. What he advances therefore must be received with due respect.

For his own district, the Midlands, he claims to be almost infallible as regards weather, when he can secure an observation, and from our experience of his telegrams to us his announcements for the country in general are frequently astonishingly correct. In few words, the principle which he applies is the motion of the highest stratum of clouds, the "cirrus" of Howard and its relatives. He has shown that the various motions of these clouds can be explained by the view that the air slowly whirls out of a cyclonic area in the upper strata, in directions opposite to those of the wind motion at the earth's surface.

Thus, for instance, when pressure is higher over France or Germany than it is in Scotland, a motion of cirrus from north-west indicates the existence of a depression situated to the west of us, and as that depression advances on us the first wind we shall feel will be South or South-east, certainly not North-west.

Similar rules have been laid down for cirrus motion in other azimuths, and from its rate conclusions may be drawn as to the motion of the depression whence it takes its rise.

This seems exceedingly promising, but now comes the other side of the picture. Mr. Ley himself admits that the faculty of cloud observing is incommunicable by simple teaching. The motions of these clouds are so gradual, and are apparently so liable to be confounded with the motions of other and lower strata, that a great exercise of judgment is requisite before an opinion is pronounced.

Supposing, even, we have only one stratum to deal with, the head must be kept immovable during the period of observation, and the motion of the cloud across or past a fixed object, like a chimney, watched. Lastly, the observations cannot be always taken at fixed hours, at the fixed observing epochs, but must be made whenever opportunity offers. The observers, therefore, must have abundance of leisure, and that is a commodity hard to meet with in these busy times.

What is then the general conclusion we can draw as to weather knowledge and its prospects in 1883? I have endeavoured to show you that *weather knowledge* is practically *weather prediction*, and that, for the seasons, in Europe at least, no trustworthy basis for prediction has as yet been established.

For the daily forecasting of weather much has been effected, but much more remains to be done, and the most important advance we can make is in the direction of training observers in the difficult art of upper cloud observation, the most promising field of study at present.

The inquiry into Atlantic weather which is now being carried on in our Office, and which enables us to prepare daily weather maps of the ocean with nearly four hundred observations on each, will, it is hoped, throw light on how and where some of the storms which visit us take their rise, but it will certainly show what actual condition over the ocean accompanied each manifestation and movement of cirriform clouds at our stations, and will thus afford data for laying down rules to determine the position and track of a storm-centre before it reaches our coasts.

Cirrus observations are in fact the only practical means we have of, so to speak, annulling our insular and isolated position, and of extending our outposts over the Atlantic.

SOCIETY OF ARTS.

Solid and Liquid Illuminating Agents.*

BY LEOPOLD FIELD, F.C.S.

Lecture V.

Quitting the consideration of those substances which are yielded to us by the perennially renewed productiveness of the modern earth, we came to a class of luminants which may be considered as treasures from the catacombs of the dead world—from the storehouses of the young sun's heat, garnered in a newly verdant vegetation. You will recollect that, in the first lecture, I drew your attention to a great class of bodies which are now included under the common designation of paraffins, and which include such familiar substances as naphtha, bitumen, asphalt, petroleum, benzene, and paraffin proper. Of the origin of these substances science affords us such ambiguous teaching, that it remains still open to anyone furnished with certain data to form his own theory on the subject. I have told you that marsh gas is a concomitant of slow organic decomposition, especially of vegetals. Now, as in the vicinity of all great sources of mineral luminants gaseous jets are of very common occurrence, it is not unreasonable to suppose that once living organisms are the primary sources of the paraffins. Yet it will not do to adopt this theory too readily, as certain warrantable men have hazarded their opinions in a contrary direction. For instance, Berthelot—than whom none have a better right to speak—suggests the following hypothesis. Acting on the supposition that

* Cantor Lectures: Reprinted from the *Journal of the Society of Arts*.

Daubrée's theory of the presence of free alkalies in the earth's interior is correct, he presumes that the carbonic acid with which the earth is impregnated comes into contact with metallic sodium, forming acetylides. Steam, acting on these, would generate acetylene, and under the circumstances of extreme heat and pressure, we might well presume that bituminous products could be aggregated, as we know that hydrogen acting upon acetylene produces olefiant gas, or ethylene. Thus we might presume that paraffins have been formed by purely mineral combinations, especially as we know that the reactions presumed to have there taken place can be exhibited with tolerable ease on the lecture table. We also know that hydrocarbons have a great tendency to molecular condensation. But the objection to this (and it is a very serious one) is, that the conditions of such extreme subterraneous heat and pressure can only obtain far below the strata in which the last vestiges of petroleum are found. We must, I think, conform to the organic theory, and grant further that the sources of petroleum are various of their kind. For instance, Illinois limestone is found to be composed of corals, in each cell of which a small particle of oil is hermetically sealed up, for which it is impossible to account, otherwise than by supposing it to be the result of the decomposition of the animalcule under the pressure of its own gases. Professor Peckham believes petroleum to be the primary product of decomposition of animal and vegetal organisms, and that the viscid and solid compounds, as bitumen and asphalt, are the results of inspissation. In Ritchie County, West Virginia, a vertical seam of asphalt cuts a horizontal coal seam in yellow sandstone, which is supposed to be the solidified distillate of petroleum wells below, especially as oil and gas springs abound in the neighbourhood. Petroleum is also found in the West of Canada, where there are no coal measures at all; this invalidates the theory of petroleum being always the product of distillation of coal by subterraneous heat, although, as we shall see afterwards, there are good grounds for supposing this to be probable in some cases. Petroleum exists in strata of all ages, from the lowest Silurian to the Tertiary. It has even been found in the Laurentian, which was supposed to be destitute of organisms until the discovery of the eozöon. In fossil shells it is frequently found. Orthocerata sometimes hold several ounces. In Western Pennsylvania, oil is found *below* the coal strata. In the Niagara limestone of Ohio, petroleum occurs, thick and tarry, in the cavities of shells. Ohio slate contains bitumen in thin plates, and oil springs are found in the bottom layers of sandstone overlying slate. As the animal remains in slate are too few to account for the quantity of bitumen found, we must suppose that in this case it is the product of decomposition of seaweed spores and drift. That tarry matter is sometimes considerably present in slate is evident, from the fact that the piers of the suspension bridge at Cincinnati, which are made of slate, drip with oil when the sun plays upon them. From these instances given of the heterogeneous sources of petroleum, you may judge how difficult it is to form any theory of formation which shall embrace all conditions in its hypotheses. It is generally conceded that the formation of coal is based on a different action, petroleum never having been found under such circumstances as to leave no doubt of its derivation from the decomposition of wood. The chemistry of petroleum is obscure, for we cannot tell what its composition is before distilling; and yet, on the other hand, it is impossible to arrive at any ideas concerning its constitution without having recourse to that process. The composition of petroleum varies considerably, which points to the varied nature of its sources. For instance, in rocks of the Tertiary age, which contain fossil remains of complex organisms, we find a petroleum rich in nitrogen, and of putrescent odour, as the petroleum from Miocene Coast Range, South California. Further, petroleum, found in such rocks as contain low organisms, is almost devoid of nitrogen.

One noteworthy fact must not be overlooked; that the incline of the various strata has much to do with the way in which petroleum is accumulated. It may be stated, as a general rule, that petroleum wells are only to be found at the bottom of inclined strata. Thus, in Canada, where the layers are horizontal, very little petroleum is found; whereas in Pennsylvania and Ohio, the oil-bearing rocks, which are just below the surface in Canada, dip beneath the Devonian and Silurian, which furnish reservoirs for the oil, condensing above and percolating downwards. In this case, the petroleum may be presumed to be the product of subterranean distillation; in proof of which may be adduced the vast evolution of gas at such places.

In its natural condition, petroleum is too dark and impure for any regular employment. To those circumstances, no doubt, it is due that the great uses of this wonderful oil remained so long unknown. The aborigines in North America knew it under the name of Seneca oil. They used it with pigments to paint their skins, and also in their religious rites, which circumstance is mentioned by the commander of Fort Duquesne, in 1750. Seneca oil was sold largely as a medicine, being, no doubt, exceeding efficacious in cutaneous disorders. Later on, we find the Dutch druggists vending "Haarlem oil," also a petroleum. The gaseous form was used first to evaporate sea-water for salt. This was done nearly forty years ago at Malta, Morgan County.

I will dismiss the gaseous petroleums with a few brief remarks, as they have not much to do with illuminating. The principal gas wells are in Butler County, and the two largest wells are the Burns and Delameter. The latter well is at very high pressure. The tube is $5\frac{5}{8}$ inches in the bore, and the gas issues from this at a pressure of 100 lbs. to the square inch. It drives a huge engine, and the gas issuing from the escape pipe, lighted, gives a flame nearly forty feet high. After being conveyed through twenty-eight miles of pipe (6-in.) to Pittsburg, it is yet at sufficient pressure to drive powerful machinery. For twelve years gas has been furnished with undiminished vigour. The amount of gas evolved may be roughly taken as 1,000,000 cubic feet per hour, which is equivalent to 3000 tons daily. Its light is equal to that of seven and a half candles, and it gives, weight by weight, 25 per cent. more than bitumen. Its composition averages 82 per cent. marsh gas, 10 per cent. ethylene, and $7\frac{1}{2}$ per cent. hydrogen, with traces of various other gases.

The history of the discovery of petroleum in quantity, and of the rise of the industry, is very interesting. The first notice of petroleum, as an illuminating agent, was given by Dr. Hildreth, in 1819. He alludes to it as being burnt in workshops and factories. Thirty-five years elapsed since his writing before the Pennsylvania Rock Oil Company was formed, in 1854, for the purpose of gathering oil in Oil Creek, Pennsylvania. Their process of collecting was a slow one, inasmuch as it consisted in drawing cloths over the surface of the naphthalized ground, which were squeezed into tubs. But in 1858, Colonel Drake, the superintendent of that company, conceived the idea of boring for petroleum, after the manner of an artesian well. Disregarding the ridicule which naturally fell to his share, his hopes were realized in August, 1859, and he began to pump oil at the rate of 400 gallons a day. The excitement was tremendous. Land in the vicinity increased a thousandfold in value, and "derricks" sprang up like mushrooms. Well after well was opened, and a corresponding number of fortunes made. But this enormous supply soon surfeited the market, as the condition of the petroleum had not been perfected sufficiently to create an adequate demand. In 1861, the price had sunk to 25 cents per barrel; whereas before it had realized 55 cents per gallon. The rapidity with which the production took place was such that, in 1860, the quantity was 50,000 barrels; in 1865, 2,500,000; and in 1873, nearly 10,000,000 barrels. At present, the oil region of Pennsylvania covers 400 square miles, on which are established 3000 working mills. If you will refer to what I said about the inclination of strata being requisite for the formation of oil wells, you will understand that, as a matter of course, the best wells lie deepest, and a large amount of very solid slate rock and sand has to be penetrated before "striking oil." The first step in prospecting is the driving of iron pipes, six inches in diameter, into the earth with a ram, until the solid rock is reached. This has to be bored through, and is perhaps one hundred feet thick, usually slate. Then comes a layer of sand, which is rapidly traversed; then another layer of rock, and so through, sometimes, four or five alternations of sand and slate, until a depth of five hundred feet is reached, although occasionally the oil lies much nearer the surface. The tube is then secured, and the oil pumped. Few oil companies put down their wells themselves now, as this forms a separate branch of labour. Organized companies exist, who contract to bore at so much per foot. The average depth is about two hundred feet. A great desideratum of the oil seeker is to find a flowing well, which, next to gas-wells, are the most astonishing phenomena of this remarkable industry. The first flowing well struck was on the farm of a man named Funk, and is known as the Funk well. In June, 1861, the boring commenced, but no sooner had the pipe touched the oil, than it commenced flowing in great volume at the rate of 250 barrels a day. In spite of all prophecies as to its speedy cessation, the Funk well flowed fifteen months, and the lucky owner cleared his "pile." Meanwhile, on a neighbouring farm, the "Phillips" well had burst forth, yielding over 2000 barrels, daily. Thereupon the "Empire" well commenced spouting at the portentous rate of 4000 barrels per diem. This was rather a surfeit of riches, inasmuch that no possible demand could be expected to secure so vast a supply; and the oil, when once it commenced to flow, could by no possibility be stopped. The price fell to 20 cents per barrel; then 15 cents; then 10 cents; at last the barrel itself was of greater value than the oil, and could not be procured. Finally, all the coopers in the country could not supply barrels at the rate the oil was produced; in vain they dammed it; the oil overflowed the creek, and covered the water for miles with a nauseous film. At length, by building enormous tanks, they stored the oil until the market should recover from its surfeit. For nearly a year this enormous supply continued. There are some flowing wells which do not give a continuous yield. Some cease for an hour, some for a week, and others even for several months, then continue at their usual rate. By the perfection of apparatus for its refinement and consumption, supply and demand have equilibrized, and the petroleum industry is now as standard as that of any other mineral. The average total yield of crude oil is 75,000 barrels per diem from over 18,000 wells. The number of barrels of refined oil exported last year from New York was 6,614,865, at a price of from 6¾ cents to 8¾ cents per gallon.

Petroleum, as it flows from the pump, is valueless for any save the crudest purposes, being a mixture of solid paraffins and heavy oils with others almost gaseous. To render it useful, it has to be distilled. The process of purification so closely resembles that employed in the treatment of the oil from shale, that one description will suffice for both, and will follow in due course. I will here give the different products of petroleum in their order, as they differ somewhat from those of shale oil:—

	Specific Gravity.	Boiling point.	Use.
Cymogen (butane)	·578-·603	0·° C.	Refrigerating.
Rhigolene	·603-·629	18·°	Anæsthesia.
Gasolene	·629-·673	—	Naphthalizing gas, and in air gas.
Naphtha	·673-·723	—	As a solvent, also in oilcloths, etc., street lamps.
Benzine	·723-·744	—	As a solvent, and in paints, etc.
Kerosene	·744-·838	—	Lamp oil.
Paraffin oil	·838-·906	—	Lubricating.

The products then grow viscid, and it is from these that the substance called "vaseline" is made.

Owing to the great danger of burning in lamps such petroleum as has not been freed from the lighter hydrocarbons (as only too emphatically attested by many mournful accidents), the testing of petroleum oil has become a Government office, and much labour and research have been spent in devising the best means for ascertaining the precise point at which the oil "flashes." By flashing point, we understand the degree of temperature at which an inflammable vapour is given off; and, however heavy the bulk of the oil may be, if it contain any proportion, however small, of the lighter oil, it will ignite at the flashing point of the latter. There are two chief systems of testing: the one being known as the open test, which, from its simplicity, was much affected in the mining districts. I have here some petroleum in a tin vessel, which I place in this beaker of hot water, wherein is a thermometer. Passing this taper over the surface of the oil, I observe a blue flash—in fact, you see the petroleum has taken fire, and is blazing furiously. I pour a few drops of the blazing oil in water, and you will notice that, instead of extinguishing it, this process animates the flame. But this method is far too rough and ready, and contains too many sources of error, to be adopted where such vital interests are at stake. Without entering into the reasons which have led our Government to adopt the instrument devised by Sir Frederick Abel for the accurate determination of the flashing point of light oils, I will give you a brief explanation of the apparatus itself. Its main objects are, to secure a uniform rate of heat and light, freedom from all air currents, and absolutely equal and constant conditions of testing. This copper vessel, six inches in diameter and six inches deep, surrounded by an air chamber, is full of water, which is heated by a spirit lamp below. The receptacle for the oil is two inches in diameter, and fits into the lid of the outer vessel, being immersed in the water to the depth of one and a half inch. This is also surrounded by an air chamber, which conveys the heat from the water to the oil at a slow and uniform rate. The thermometer, with its bulb in the water, is fixed on the lid of the water vessel, and another thermometer enters the oil. Before commencing the experiment, the water is heated to 130° Fahr. precisely; after which the increase in temperature from the lamp proceeds at the uniform rate of two degrees per minute. The lid of the oil cover is a tiny lamp, the flame of which, being no larger than a pea, can hardly be visible to you at this distance. By a sliding inclined plane, the nozzle of this lamp is lowered into the oil receptacle simultaneously with the withdrawal of the slide, while the proportion of air in the chamber is kept constant by this little hole in the side, which opens and shuts concurrently with that in the top. Every time an opening and shutting takes place, a mixture of oil vapour and air comes into contact with the flame. The time during which the slide is opened is determined exactly by the beats of a pendulum. At a certain point, a blue flash fills the interior of the oil cup, and the temperature of the thermometer denotes the flashing point of the oil. According to the open test, the flashing point decreed as the standard of safety by the Act of 1871, was 100° Fahr., but Sir Frederick Abel, after a careful investigation of the conduct of oil which had been tested under those regulations, showed that, with his close test, the flashing point was 27° below that obtained by even the most careful open test. He, therefore, recommended 73° as the standard of safety with his apparatus, and this has been adopted by the Government. What I have said of petroleum refers also in a great measure to paraffin oil; indeed, the similitude between these two sources is very considerable; the difference lying mainly in the relative proportion of olefins and paraffins which they contain.

At this juncture we will quit petroleum for paraffin, and apply ourselves to a cursory study of this important industry. I mentioned Reichenbach as having obtained paraffin, in 1830, from wood tar. Dr. Christison, of Edinburgh, however, extracted the same substance from Rangoon tar almost simultaneously and independently. In 1835, Dumas, the great French chemist, obtained the wax from coal tar, but it did not rise beyond the status of a chemical curiosity until 1850. In fact, in that year, Professor Abel sent my father, then vice-consul in Chili, a little specimen of a few grains in a tube, as one of the curiosities of the day. To the late Dr. James Young belongs the honour of creating the paraffin industry. In 1848, his attention was called by Dr. Lyon Playfair to the presence of petroleum on the top of a coal seam at Alfreton, in Derbyshire. Mr. Young at once started his operations, and succeeded in extracting a considerable quantity of paraffin, a light burning oil, and a heavy lubricating grease. This supply soon drying up he sought other fields for his enterprise. He theorized that the petroleum had been formed by the action of heat upon the coal, and that the vapour, passing through the sandstone, had become condensed into liquid. Whether this theory was right or wrong does not matter; his results were eminently satisfactory. In 1850, he took out his celebrated patent, which, simple though its provisions were, defied all attempts at infringement, which were numerous. You are aware that, if heat be applied strongly and suddenly to coal, nearly all the volatile portion comes over as gas, the residue being tar, from which again a great number of remarkable and valuable substances, such as benzol, anilin, anthracene and phenol, are obtained. But Young discovered that, by increasing the temperature gradually, and never allowing it to rise above 600° Fahr., a thick oil distils over, which yields paraffin wax and burning and lubricating oils. I must, however, mention the invention of Rees Reece, which immediately preceded that of Young, and referred to treating peat. He first of all distils the peat tolerably rapidly in an apparatus. The tar thus obtained he distils at as low a temperature as possible, collecting half the products in one vessel, and distilling over the remaining half in a second receiver. In this second distillate he finds paraffin crystals and paraffin liquid. The crystals are separated by filtration through hair-sieves and pressure after the manner of stearin. The paraffin thus obtained is distilled, moulded, and hot-pressed. I have on the table some magnificent specimens of every step of this process, kindly lent me by Professor Bloxam, of King's College. You see here the peat, which may be considered as the first step in the formation of coal. Here is lignite, or brown coal, extensively used in Germany. This dark thick mass is the first running; this bottle contains the lighter hydrocarbons; this light brown crystalline semi-solid is a mixture of paraffin crystals and oil, and these again are the several refinements of the wax, and the burning and lubricating oils. But the yield from peat is not to be compared with that from shale, which was the substance ultimately fixed upon by Dr. Young as the basis of his process. The first material he used on a large scale was the celebrated Boghead coal, or Torbane Hill mineral. This valuable substance contained 70 per cent. of volatile matter, of which the major proportion was hydrocarbon. A very interesting lawsuit, in 1853, had as its issue whether Torbane Hill mineral could justly be considered as coal. Now, as Mr. Young claims coal in his patent, its validity depended on this delicate question. It was ultimately decided against Mr. Gillespie, who had raised it. But this mineral had but a short though brilliant career, and, since 1862, paraffin oil owns as its only source bituminous shale, which abounds in Linlithgow and Midlothian. At present, the amount of this appears inexhaustible, which compensates to a certain extent for its poverty compared with the Bog-head mineral. Between twenty-two and thirty-eight gallons of crude oil per ton are obtained from shale, which is about one-fourth of the quantity yielded by Bog-head coal. The enormous supply of oil from America, however, causes the English companies to strain every nerve to meet the competition. They are at a considerable disadvantage to start with, inasmuch as petroleum flows from the soil in the same state of purity as the shale oil attains after having undergone distillation.

I will now give a sketch of the method at present employed in obtaining paraffin from shale. The earliest form of retort, still largely used, is a round or oval cylinder, furnished with a hopper on top. The dimensions are about 2 feet in diameter by 9 feet high. The retort is charged by means of the hopper, and at the bottom it opens into a trough of water, which acts as a luting. The vapours leave the retort at the top, and a current of steam enters the bottom. We will, however, discuss the process as conducted in the Henderson retort. Each chamber contains a set of four retorts 15 feet long, capable of holding 18 cwt. of shale. A platform on the top is provided with rails, on which trollies run to and fro, charged with the shale, which they empty into the retorts. The great advantage of this form of apparatus is the manner in which the shale, by being discharged into the furnace below, is made, by the combustion of the residual carbon, to continue the distillation of the fresh material. The combustion-chamber below receives the spent shale, which is admitted by a trap. The combustion, at first sluggish, is assisted by the admission of the incondensable gases produced in distillation. In order to produce an equable temperature throughout, the flame is never allowed to touch the retorts. The heated gas alone enters the oven, in which the retorts are placed, by means of the flue. By this arrangement the whole of the apparatus is maintained at a temperature of about 800° Fahr., as against 1200° or 1500° in the old retorts. The products of distillation by the two methods, as you see by these two samples, differ considerably in appearance. The new process yields an oil of a bright green colour of about ·870° sp. gr., against this dark pitchy oil of nearly ·890° from the old retorts. The new process gives also $2\frac{1}{2}$ per cent. less refuse and about 2 per cent. more paraffin.* The amount of sulphate of ammonia produced is also very much larger by the new process, owing, no doubt, to the superheated steam employed. This product, at first almost disregarded, is now one of the pivots on which the success or failure of a factory turns. After leaving the retort, the vapour passes through a series of upright pipes fitted into a trough, after the manner employed in the distillation of palm oil; by this means about one-third of the vapours are condensed, the products consisting mainly of ammoniacal liquor, with about 25 per cent. crude oil. The uncondensed portion passes through a tower over which paraffin oil trickles, which takes up a very great proportion of the light vapours. The crude oil, after separating from the ammoniacal liquors, is pumped into a still, and brought to dryness in a current of superheated steam. After passing through a system of condensers, the liquid, which has now assumed a brighter green tint, is received into a suitable vessel. In the retort there remains a very fine pure coke. The oil is next freed from water, and then, by violent agitation with strong sulphuric acid, from the

* See correspondence as to respective merits of new and old systems. *Proceedings of the Institution of Civil Engineers*, vol. lxvi., part iv.

tarry impurities. After two or three such agitations, and subsequent separation of sediment, the oil is treated with a solution of caustic soda, to neutralize the acid, and then with a little warm water, which washes out the residual soda. The amount of acid and soda used depends considerably on the nature of the oil. The effect of this process on the distillate is to reduce its gravity to between ·830 and ·845, it having lost about 15 per cent. in the process of refinement. It is now subjected to fractional distillation. I have here a small apparatus which will, perhaps, explain the process better than words can do to those who are unacquainted with the operation. In this retort there is a mixture of various light and heavy oils. A thermometer is passed through the tube of the retort, which is connected with a glass condenser. As long as any oil of lighter boiling point than the others remains undistilled, the temperature will not rise beyond the boiling point of that oil. While, therefore, the thermometer remains constant, the products of distillation may be presumed to be of one kind. As soon as the light oil is exhausted, the temperature rises until the boiling point of the next lightest oil is reached, after which it will remain constant until the whole of that is distilled, and so on until the distillation is finished. Upon this convenient property the distillation of paraffin oils is based. The first distillate, which is exceedingly light, is set apart for naphtha. Oils of sp. gr. ranging from 770° to 850° are reserved for burning; and distillation is then continued till the liquid in the still has reached a depth of between 12 and 18 inches. The last fraction is very heavy, and contains nearly 30 per cent. of paraffin. The burning oil is purified with repeated washes of acid and soda, and again distilled. The distillate is similarly treated—this time with less acid—and it is then distilled again, the fractions being carefully separated. The specimens on the table will show you the different fractions and their employments. The distillate from ·760° to ·790° is "No. 2 burning oil;" from ·790° to ·806° "No. 1 burning oil;" ·806° to ·820° "lighthouse oil;" while the fractions from 825° to 840° are mixed respectively with No. 1 and No. 2. Various purifications have still to be undergone by No. 1 oil before it assumes the beautiful limpidity which gives it the name of "crystal" oil. The liquid from the coke tower is mixed with the first distillate from the purified oil, heated with acid and soda, and distilled. The runnings from 640° to 660° are set aside as gasoline; from 700° to 720° they are termed naphtha. The names of the various fractional oils from petroleum and shale oil are much the same. I will refer you, therefore to what was said under the former head for the names. In the next lecture, I shall point out the difference in their chemical constitution.

We have now to consider the process of purifying the paraffin scale. The heavy oil obtained from the last stage of the first distillation is crystallized from the oil. The hard scale is that which separates by itself in ordinary weather, and the residual oil from this is subjected to artificial refrigeration, in which process gasoline is largely employed. This yields the soft scale. The separation of the solid from the liquid paraffin is a point of immense importance, and no less the refinement of the solid paraffin from all traces of oil. The former object is attained by repeated refrigerations and filtrations under pressure; the latter by washing the scales repeatedly with naphtha, which keeps the oil in solution and deposits the refined paraffin. Finally the paraffin is agitated with very fine animal charcoal; and upon the selection of this article also much depends. Upon filtration from charcoal the paraffin is run into circular moulds, and, when cool, presents the magnificent appearance which you see in this cake from Messrs. Young's Works. I must here express my obligations to Mr. Fyfe, the manager of that Company, for his discriminating kindness, which has provided me with such numerous and well-chosen specimens. The oil which is pressed from the soft paraffin scale is called "blue" oil, from its peculiar colour; and this, after acidification and treatment with soda, furnishes lubricating oils. The melting point of the best paraffin is about 130° F., ranging down to 100° F., below which it is unsuitable for making into candles. The above is an outline of the manufacture of paraffin, which can only be filled in by reference to the works on the subject. Indeed I have been forestalled in this branch again by Mr. Brunton, who, a short time ago, read a most exhaustive paper on the paraffin industry before the Institution of Civil Engineers. I have reserved the account of the probable constitution of the various forms of paraffin and petroleum, and other points connected therewith, for the final lecture.

Obituary.

Notice has been received of the death of the following:—

On the 2nd of June, Mr. William Willock, Chemist and Druggist, King Street, Kilmarnock. Aged 54 years.

On the 25th of July, Mr. William Williams Mildren, Chemist and Druggist, Caledonian Road, N. Aged 39 years.

On the 28th of July, Mr. Thomas Bourhill Cairns, Chemist and Druggist, Dalkeith. Aged 31 years.

On the 31st of July, Mr. Samuel Gammidge, Pharmaceutical Chemist, Belgrave Gate, Leicester. Aged 54 years. Mr. Gammidge had been a Member of the Pharmaceutical Society since 1853.

On the 10th of August, Mr. John Mather, Chemist and Druggist, Scholes Street, Wigan. Aged 46 years.

On the 16th of August, Mr. Thomas Jackson Palmer, Chemist and Druggist, East Grinstead. Aged 71 years.

On the 19th of August, Mr. Samuel Blackmore Charles Tatam, Chemist and Druggist, King Street, Plymouth. Aged 28 years. Mr. Tatam was an Associate in Business of the Pharmaceutical Society.

On the 20th of August, Mr. Peter Bramwell Drinkwater, Chemist and Druggist, London Road, Manchester. Aged 38 years. Mr. Drinkwater had been a Member of the Pharmaceutical Society since 1878.

On the 22nd of August, Mr. Henry Norman, Chemist and Druggist, St. Peter's Street, Canterbury. Aged 41 years.

On the 23rd of August, Mr. Robert Coulson, Chemist and Druggist, Forest Gate. Aged 72 years,

On the 24th of August, Mr. John Downward, Chemist and Druggist. Market Street, Ulverston. Aged 78 years.

BOOKS RECEIVED.

The Vegetable Materia Medica of Western India. By W. Dymock. Part II. London: Trübner and Co. From the Arthur.

Workshop Receipts. (Second Series). By Robert Haldane. London: E. & F. N. Spon. 1883. From the Publishers.

Les Produits de la Nature Japonaise et Chinoise. Par A. J. C. Geetrs. Partie Inorganique et Minéralogique. 2me Partie. Yokohama: L. Levy and S. Salabelle. 1883. From the Publishers.

Semen Abri Precatorii (Jequerity). Eene Pharmacognostiche Studie van M. Greshoff. From the Author.

A Few Words on Anæsthetics. By R. T. Freeman, L.R.C.P. London: J. and A. Churchill. 1883. From the Publishers.

The Outbreak of Cholera in Egypt. By G. V. N. From the Author.

Correspondence.

The Duties and Responsibilities of the Chemist in Cases of Accidental Poisoning.

Sir,—It has long been my desire to draw the attention of your readers to the above subject, and to solicit opinions thereon.

In cases of accidental poisoning chemists are often called upon, and it is really a matter of much difficulty to determine how far chemists ought to proceed before the services of a medical man can be obtained. I do not refer so much to those cases where the poisons are both quick and fatal; in such a case when life is in immediate danger, no professional etiquette would be likely to prevent a chemist from using all the means in his power to save the life of a fellow-creature. But there are what might be called the minor cases of poisoning, where small quantities of salt of sorrel, salt of tartar, nitre, turpentine, ammonia, and such like are swallowed, and the result, although not immediate, may be serious enough. The most recent under my observation was an instance of taking salt of sorrel for rochelle salts. The drug was obtained at my own pharmacy, and although I used every means to obviate danger, I fear paterfamilias has not forgiven me because I did not go to the house and see the victim. The case is as follows: I, like most suburban chemists, am well used to washer-women coming direct from the wash-tub, with the soap still frothing on their hands, for salt of sorrel. One morning last week, a woman of said type and apparently from the wash-tub came to my shop and asked for a penny-worth of "some sort of salt." I at once concluded from her appearance that it was the usual order for salt of sorrel, and having mentioned that name, she answered, "Yes." I weighed out the quantity, and when labelling I always make a point of repeating the name, and the word poison, to be careful. My customer, whose tongue betrayed the isle from which she came, passed out without saying anything to assure me of her having heard my word of warning. In about half an hour she returned in a great state of excitement to tell me I had given her poison, and that she had given it in water to the lady for whom she was working, I at once gave her some prepared chalk to be administered in some water or milk, and to be followed by a mustard emetic. I also told her to call in the doctor. I said there would be no immediate danger, if she gave the chalk and emetic, as directed. The patient fortunately vomited shortly after, and on the arrival of the doctor, some hours after, he found the patient out of danger, but was surprised to learn that I (the chemist) had not gone to see the antidotes administered. I consider I did all that I would have ventured to do, without leaving the shop, and surely, the administration of the chalk and mustard might be safely left with the members of the household. As a natural sequence I was visited in the evening by two men, who lectured me most unreasonably; not only did they accuse me of a direct blunder, but based a furious attack upon the remark of the doctor, "that he (the doctor) was surprised the chemist did not attend!" I may mention that I was never asked or sent for, and had no idea where my Hibernian customer had come from. As an instance of the carelessness of some people, I discovered that this woman who was entrusted with the giving of medicine could neither read nor write. The package was distinctly labelled "Salt of Sorrel, Poison."

I shall be glad to hear the opinion of your readers and fellow pharmacists.

Mors.

Visit to Hop Gardens.

Sir,—To-day being the last early closing day of the season, I thought I would stroll through the largest hop garden in the district, and you may judge the size when I say it took me forty minutes to leisurely walk through it. It was a beautiful sight to see the bine covering and hanging from the immense number of poles (which are arranged in threes for greater support), and bearing the hops or strobiles. I have seena lrger, but never before such a uniformly greenish-yellow tint, which, with the darker green leaf and equal distances of the poles, had a beautiful and symmetrical effect. I have noticed a stronger aroma before in passing through a hop garden, but possibly the lack of this may be accounted for by the deficiency of rain of late; the quality seems to be very good this year, and wonderfully abundant. On returning home by another path I came to a hop oast or kiln, and seeing the fires were burning I was curious enough to peep inside the building, which was a large square structure, adjoining it also being a circular building tapering like a small steeple with a rotating ventilator on top.

The foreman kindly offered to show me over it and I gladly availed myself of the opportunity; as hop picking began last Monday (August 27), the process of drying was in full swing.

I was first taken to the upper floor, where were hops lying about in heaps, and was permitted to walk through them by pressing the feet forward so as not to injure the hops. In the centre was a circular hole in the floor, from which was suspended a bag or pocket into which the hops were being pressed ready to be despatched. I must confess the aroma from such a large quantity was not so powerful as I should have anticipated, yet it was very agreeable. From the same floor I ascended four or five steps that led to a large door, which on being opened exposed to view a large dark room (drying room), the floor, made of hair, being covered with hops drying, the warmth and SO_2 which affected the olfactory nerves and also set up throat irritation forcibly reminded me I was bending over a rather large coke and sulphur fire. On descending to the ground floor I was shown the fires, there being three, one for each drying chamber. There was almost an entire absence of SO_2 in any part of the building, except of course the large chambers where the fires were and the drying rooms above them; no doubt the draught carried it towards the ventilators on the top of the building. Seeing a heap of charcoal, I was informed the fires were first lighted with that, and kept up with the coke. I was then taken to the round tower, where was a large circular chamber with "three" coke and sulphur fires, and having a drying chamber above. Outside the building there were numbers of pockets of freshly picked hops, feeling damp, most of them being above the ground on slanting hurdles; these were to undergo the process of drying before the morning. It was dark, being nearly a quarter to eight when I was privileged with an insight into a hop-kiln in use.

Milton, Kent. A. S.

"*Occhio.*"—Your first question we are unable to answer. The physiological and remedial properties of boracic acid are not so well known as might be wished. It was formerly used as a sedative in some disorders of the brain, and it has been used internally for chronic cystitis, diphtheria, and chronic dyspepsia with fetid eructations. Used externally it has an antiseptic action, and it is the principal ingredient in an ointment used by Mr. Lister.

Herbalist.—(1) *Sedum acre.* (2) *Honkeneya Peploides.* (3) *Sedum villosum.* (4) The plant should be sent when in flower. (5) *Iris Pseudacoris.*

Inquirer.—(1) *Galium verum.* (2) *Erodium cicutarium.* (3) *Lychnis vespertina.* (4) *Petasites fragrans.* (5) *Linaria vulgaris.* (6) *Hyperioum perforatum.*

E. J. Cox.—*Bupleurum rotundifolium.*

T. M. C.—*Epilobium parviflorum.*

Junior.—*Menyanthes trifoliata* (Nat. Ord. Gentianaceæ). It is said to produce obscuration of vision, and has been recommended as an anthelmintic and as a bitter tonic when the liver is inactive.

Sumbul.—The information essential for the answering of your question has not been forwarded.

"*Farr.*"—(1) *Chiococca racemosa.* (2) *Gastridium lendigerum.* (3) *Kœleria cristata.*

T. Morgan.—We have no knowledge of its use in medicine. The root is said to be edible and the leaves afford bowstring hemp. The root of *S. lanuginosa* made into an ointment is used for pains in the limbs in the East Indies.

G. H. J. J.—Leguminosæ: "bastard cabbage bark;" "worm bark." It is anthelmintic, but requires great care in its administration, an overdose producing vomiting, delirium and fever. The powder in doses of 3 or 4 grains purges like jalap.

"*Valerian.*"—(1) *Fucus nodosus.* (2) *Fucus platycarpus.* (3) *Fucus canaliculatus.* (4) *Chœrophyllum temulentum.* (5) *Alchemilla vulgaris.* (6) *Anthyllis vulneraria.*

Communications, Letters, etc., have been received from Messrs. Atkinson, Shields, Boyce, Benger, X. Y. Z., Biberon.

INTERNATIONAL PHARMACEUTICAL EXHIBITION IN VIENNA.

(Concluded from p. 184.)

Group V.—*Drugs, Chemical Products, Pharmaceutical Preparations and Wares intended for Use in Medicine*—continued.

Section B.—Pharmaceutical Products.

Exhibits from Austro-Hungary, 39; France, 18; Germany, 11; United States, 4; England, 2; Spain, 2; Switzerland, 2; Russia, 2; Turkey, 2; Italy, 1; Norway, 1; Belgium, 1; Holland, 1; Portugal, 1; Brazil, 1: total, 88.

Jurors: Messrs. Hirsch (Frankfurt), Kofler (Dornbirn), Limousin (Paris), Martensen (St. Petersburg), Méhu (Paris), Nedwed (Gratz), Pernwerth (Meran), Scholz (Villach).

This section was perhaps the most important division in the exhibition, since it numbered more than twice as many exhibitors as contributed to any of the other entire groups. One of the most interesting cases in it, that of Gehe and Co., of Dresden, well illustrated the difficulty which attends the carrying out of any attempt at classification, since although it contained a number of extracts, powders, scale preparations, etc., which warranted it being placed among the pharmaceutical products, the most notable features in it were a series of chemical products, which would have given it high rank in Section A, and a collection of drugs which was unsurpassed so far as it went by anything in Section C. The difficulty was, however, probably insuperable, and was productive of no particular inconvenience; the fact is only mentioned here to explain the necessity for sometimes reverting to a class of goods that has been referred to under a previous group or section. All the pharmaceutical preparations shown by Gehe and Co. were included in the upper part of a very fine wall case. It was noticed that several of the thick extracts of the new P.G. were represented by dry extracts, whilst in the dry extract of cannabis indica the firm had adhered to the use of dextrine as ordered in the P.G., 1870, for the dilution of dry narcotic extracts, instead of using liquorice powder, as ordered in the new P.G. As specialties there were ext. farinæ tritici sicc. solub., ext. farinæ leguminosarum, ext. quebracho blanco cort. Penzoldt. sicc., and a yellow porous ext. malti sicc., prepared *in vacuo*. The powders were very fine, the materials for those of ergot and henbane, sabadilla and black mustard seeds having been deprived of oil previously to grinding; but it was most surprising to find that under the name of "pulvis taracanæ" a powder of the *Blatta orientalis* still holds a place in the materia medica. Rhubarb and other drugs cut in small cubes were also shown. There were about fifty different kinds of essential oils in the case, some of them, such as patchouli, peppermint, zedoary, fennel, arnica flowers, etc., being illustrated also by their crystalline constituents. Among the chemical preparations may be mentioned, quinine arsenate and the soluble compound of that alkaloid with carbamide and hydrochloric acid; aspidospermine in brownish-white minute crystals and the citrate of a full brown colour; cocaine as a flesh-coloured powder; aconitine in minute crystals; caffeine salicylate, sulphate and hydrobromate, the last-mentioned in crystals two inches long; colchicine tannate; chinoline tartrate as a somewhat dirty white powder; "pure brucine;" hyoscyamine, amorphous coloured and in crystals; jaborine, the second alkaloid from jaborandi leaves; asaron; cubebin; convolvulin; convallamarin as a fawn coloured powder; β-naphtol, paraldehyde and papayotine. Without having by any means exhausted the list of noteworthy articles in the upper part of Gehe and Co.'s case, it is necessary to pass on to the drugs, which were shown in the lower part of it, but unfortunately in such a position that they could not be seen without stooping uncomfortably. The first object that caught the eye was a splendid exudation of manna *in situ* on a stem of *Fraxinus Ornus* about four feet long. Behind it were a number of Tonquin, Himalaya and Nepaul musk pods, as removed from the animals with skin and adjoining parts of the belly. Some "lacca alba in bacillis" appeared at the first glance almost like hanks of white silk. Masses of "agaricus" (larch agaric), which is reported to be coming into some request again for the manufacture of agaricin, were there of two shapes, one somewhat like a truncated cone, about a foot in height. "Quebracho blanco" was illustrated by the wood, bark, leaves, flowers and fruit of *Aspidosperma Quebracho*, and "quebracho colorado" by the wood of *Loxopterygium Lorentzii*. Of *Carica Papaya* there were the fruit cut open, the flowers preserved in liquid and a mounted leaf, about two feet in diameter. Close by were some fine pieces of the Russian rhubarb that has disappeared from commerce during the last twenty years. A number of different kinds of vanilla were also shown, including two from Mexico, one slender and flattish and the other more nearly approaching the round Bourbon kind; a broad flatter variety from Brazil and a long flat variety from Guyaya. Besides these there were specimens of Japan "brick" tea, described as a "caffeine material," kava kava, coto and other barks. From the foregoing it will be seen that this exhibit was a very instructive one, and well deserved the diploma of honour that was awarded to it.

Another case which presented this mixed character, and was also of considerable merit, was that of Parke, Davis and Co., of Detroit, U.S. It contained samples of most of the numerous vegetable drugs that have been introduced during recent years to the medical profession in the United States as remedies in various disorders, with more or less justification, several of which are now attracting attention in this country and on the Continent. Each drug was accompanied by one or more of the pharmaceutical preparations of it associated with the name of this firm, as well as official preparations of those that have been included in the new United States Pharmacopœia. Some of the exhibits represented different parts of the plants, as for instance the bark from the root and from the branches of *Euonymus atropurpureus*, the former of which yields a brown euonymin and the latter a green compound, which is said to be simply a mixture of the brown euonymin and chlorophyll. In the United States and on the Continent the brown variety is almost exclusively used, but in this country the green appears to be used almost to an equal extent with the brown. Some little time since it was mentioned (*Pharm. Journ.*, [3], xiii., 798) that one of these American drugs named manaca (*Franciscea uniflora*) had been submitted to a preliminary examination by Professor Dragendorff, who had observed indications of the presence of an alkaloid. It is now stated that this has been confirmed by further experiments and that an accompanying fluorescent body proves to be æsculin. The case of J. Schorm, of Vienna, too, would, as before mentioned, have been at least as appropriately placed in the section devoted to chemical products, since in this respect it ranked amongst the best in the exhibition. It contained among other things a series of products illustrating the skilful researches of Dr. Schorm upon the chemistry of the hemlock (*Pharm. Journ.*, [3], xii., 363), including the "pure" coniine, colourless and boiling at 168° C.; coniine hydrobromate in very fine crystals; coniine hydriodate in crystals, and other salts, as well as crystalline masses of conhydrine, which Dr. Schorm, in the paper referred to, states that he obtains in the residuary fraction, boiling above 169° C., from the purification of coniine.

Turning now to the exhibits in this section more strictly in keeping with its official description mention may be made first of one from the pharmacy of the General Hospital, Vienna, in connection with which, as already mentioned (before, p. 141), the manufacture of medicinal preparations for the supply of other hospitals is carried on under the superintendence of the Vienna Haupt-Gremium. Amongst the articles here shown were "caustic arrows," prepared from zinc chloride, for use in carcinoma; pellets of caustic potash, for bullet wounds; caustic pencils of alum, and of copper and zinc sulphates; various gelatine preparations, for external use in skin diseases (see before, p. 63), containing respectively 1 per cent. of carbolic acid, 10 per cent. of chrysarobin, 50 per cent. of iodoform, 5 per cent. of pyrogallic acid, 10 per cent. of salicylic acid and 10 per cent. of zinc oxide; a 10 per cent. carbolic gauze; a 50 per cent. iodoform gauze and a plaster of the same strength, as well as other external appliances suggestive of the extent to which iodoform is now used as a dressing. Notwithstanding that there was a special section for dressings, there were several excellent displays of plasters here, among which may be mentioned those of Seabury and Johnson, of New York; R. Jacobi, of Elberfeld; and E. Dieterich, of Helfenberg. Some very good elastic bougies, uniform in appearance, said to be made from a "basis of cacao butter," as well as some very good looking medicated gelatine squares, for hypodermic use, were shown by C. Haubner, of Vienna. Close by, A. Sauter, of Geneva, exhibited suppositories of cacao butter, made hollow for the reception of any desired medicament. These suppositories consist of two parts, the larger being the receptacle for the medicinal substance, whilst the smaller acts as a stopper. It is claimed that when placed in the rectum these suppositories become liquefied in from five to ten minutes, and that in the meanwhile a complete intermixture of the medicine with the fat is effected. As they are moulded by pressure, instead of the fat being melted, they present a very homogeneous appearance. Gelatine capsules; compressed tablets, in which the drug to be administered is sometimes alone and sometimes mixed with cane sugar, sugar of milk, or chocolate; medicated "sugar-plums;" coated pills and various other articles of pharmaceutical confectionery, were too numerous to allude to in detail, and of a nature impossible to pronounce upon as to quality from the very limited assistance afforded by outward appearance. Among these, the nitro-glycerine tablets of W. Martindale, of London, excited considerable curiosity. The one other English firm that exhibited in this section was Fletcher, Fletcher and Co., who showed their liquor ferri iodidi and other concentrated liquors. Silver medal diplomas were awarded to both these exhibitors. France was well represented in this section, although the exhibits of the Pharmacie Centrale (E. Genevoix and Co.) and the Société Française (Adrian and Co.) came far short of the splendid displays made by those firms in Paris in 1878. Numerous preparations of cinchona and its alkaloids,—conserves, tablets, pills, syrups, wines, etc.,—bore ample evidence of the wide usefulness of this article of the materia medica. It is, indeed, impossible to mention separately all that was noteworthy in this section, but an exception must be made in favour of an exhibit of chemical and pharmaceutical preparations and Brazilian drugs, from Dr. G. Peckolt, of Rio Janeiro, who has done so much valuable work in clearing up the history of South American drugs.

Among the preparations for medicinal purposes that would appear somewhat unfamiliar to the English pharmacist were some displays of fruit juices, that of raspberry preponderating, from the fact that this fruit grows freely on the Styrian slopes and many parts of the Carpathian mountains. Another indigenous class of preparations were those obtained from coniferous plants, among which may be mentioned the oil distilled from the young shoots of the dwarf pine (*Pinus Pumilio*), which has a considerable reputation as a medicine among the Hungarians, and an extract from the same plant, which is made by boiling the shoots with water, and is used as an addition to baths; and similar products from the Norway spruce fir (*Abies excelsa*). Another preparation which might attract attention by its apparently undue frequency, was cherry-laurel water; but it is official in the Austrian Pharmacopœia, and is the only form for the administration of hydrocyanic acid given in the German Pharmacopœia. A fine collection of cold-pressed oils was exhibited by H. Falkner, of Vienna, and as the tests mentioned are evidently the result of practical experience, it may be useful to quote them briefly. Almond oil (sweet): clear straw-yellow; sp. gr, at 20° C. 0·917 - 0·920; solidifies at - 20° C. to a white mass; shaken with nitric acid forms a whitish mixture, soon becoming reddish-yellow; mixture of 20 drops with 3 drops of sulphuric acid causes a yellow turbidity, afterwards becoming greenish-yellow and then brownish olive-green, the oil at the same time thickening; with lead subacetate it shows a greyish-white turbidity, but a yellowish turbidity when other oils are present; dissolves in 25 parts of cold, and 6 parts of hot alcohol, very readily in ether. Castor oil: sp. gr. 0·95 - 0·97; solidifies at - 18° C., but throws down a granular deposit of the glyceride of ricinolic acid at - 12° C.; completely soluble in absolute alcohol. Linseed oil: sp. gr. 0·93 - 0·94; with nitric acid, sp. gr. 1·3, a sulphur-yellow; 10 drops with 3 drops of sulphuric acid a red-brown resinous mass. Poppy oil: sp. gr. 0·92 - 0·925; solidifies at - 20° C.; gives with ammonia a white, and with potash solution a yellowish-white emulsion. Hempseed oil: sp. gr. 0·925 - 0·927; solidifies at - 16° C.; when fresh coloured grass-green by concentrated hydrochloric acid, and yellow-green when old. Nut oil (walnut): sp. gr. 0·925; gives a yellowish-white liniment with a solution of potash or ammonia. Mustard oil: sp. gr. 0·914; solidifies at 18° C.; coloured a dark grey-green by zinc chloride. J. F. Schutz, of Breitensee, near Vienna, exhibited pure chlorophyll, and preparations of it, intended for use in colouring fatty oils, soaps, liqueurs, tinctures, etc. Another collection worth notice was that of V. Zanni, of Constantinople, who exhibited Chian turpentine, gum mastic, and sem. anisi, all from the island of Scio, as well as salep and scammony resin.

Before leaving this section mention must be made of the important exhibit of medical appliances from the medicament branch of the Austrian war department. It consisted of a section of a field pharmacy, in three compartments; two medicine chests of different sizes; a bandage and medicine knapsack intended for an infantry or jager battalion and a similar provision for a cavalry division. The display was by no means out of place in such an exhibition, for the fact that many of the visitors were familiar with military service vested it with considerable interest. It may be added that in connection with this exhibit some very interesting information has been published concerning the organization of the military pharmaceutical service in the Austro-Hungarian empire, which will be found referred to more fully on another page.

Section C.—Drugs.

Exhibits from Austro-Hungary, 14; Germany, 1: total, 15.

Jurors: Messrs. Reichardt (Vienna), and Winkler (Innspruck).

In this section were two very valuable exhibits of drugs from collections belonging to public institutions. One of these was from the museum of the General Austrian Pharmaceutical Association, and included a large number of specimens of cinchona bark, many of which had been presented to the Society by Mr. J. E. Howard and classified by Dr. A. Vogl; also numerous specimens of opium, rhubarb, jalap, vanilla and other drugs. Another interesting feature in it was a large collection of vegetable seeds numbering 2200 different kinds. The other contribution was from the Oriental Museum, in Vienna, and included large collections of drugs from Japan, India and China, numbering some three or four hundred specimens. As it would be inconsistent with the purpose of this report to introduce a mere catalogue of names or to extend it to the length that would be required to notice, however briefly, all that was interesting in these collections, it must suffice to say here that the specimens were as a rule in admirable condition and conveniently shown, whilst it must be evident that they contained very much to attract the attention of the enthusiastic pharmacologist. Amongst the private exhibitors in this section, F. Wilhelm, of Vienna, was undoubtedly entitled to the diploma of honour awarded to him for the admirable manner in which the idea of exhibiting drugs in their original packages was carried out. In this way sarsaparilla was shown in bundles bound at the end with skin, hepatic aloes in monkey's skin, Barbadoes aloes in a gourd, balsam of peru in square iron canisters, maté in a skin with the hair still on, original canisters of star-anise oil, etc. A fine collection of the more important drugs was shown by L. Duvernoy, of Stuttgart, including a number of samples of Palembang, Sumatra and Siam benzoin; ergot, probably Russian; Hudson's Bay castoreum, the only kind now official in the P.G.; picked gum arabic and a fine white powder of gum arabic apparently precipitated by alcohol; also, wild and cultivated varieties of *Pyrethrum* flowers for insect powders. Another noticeable display, shown by F. Bednar, of Voecklabruck, Upper Austria, consisted of a number of specimens of beeswax from different countries, both in the raw condition and bleached.

Section D.—Mineral Waters, Wines, Articles of Food and Spirit.

Exhibits from Austro-Hungary, 31; Germany, 4; Russia, 3; France, 2; Switzerland, 2; England, 1; Sweden, 1; Norway, 1; Italy, 1; Roumania, 1: total, 47.

Jurors: Messrs. Fredrich (Vienna), Gruener (Hernals), Hoffmann (Klosterneuburg), and Schacht (Berlin).

Very little can be said concerning the nature of the exhibits in this section beyond what is disclosed in the title. As is usual in continental exhibitions, natural mineral waters were well represented, including, of course, in this case, the celebrated Austrian Carlsbad water, the Bohemian Pullna, and the Franz Josef and several others from springs in Hungary. There were also the more or less pure saline deposits and leys from mineral springs, which are largely in demand for baths. Cognac brandy, and Greek, Italian, Spanish, Portuguese and French wines for medicinal purposes, as well as medicated wines, were shown in a quantity indicating that the alcoholic medium for administering medicines is not losing favour in Eastern Europe. One exhibitor, G. A. Kamner, of Vienna, showed a medicated wine described as having been prepared by allowing the grape juice to ferment in contact with iron and cinchona bark, the product, it is claimed, remaining clear and unaltered indefinitely. Then there were "caravan" tea from Russia, cocoa, chocolate, coffee and coffee substitutes and mixtures. Another class of goods in this section, which may be looked upon as the outcome of recent physiological investigation, assisted, perhaps, by fashion in prescribing, consisted of numerous peptones, pepsins, diastases, malt extracts, and similar preparations, together with meat powders, flesh solutions, extract of meat (well represented by the Fray-Bentos Company), and infants' foods of all kinds. A powder of the yelk of eggs and another of the white of eggs, were shown by A. Haberkorn, of Moscow, together with other preparations of egg albumen. Lastly, there were specimens of koumiss from Russia and from Jaroslau, Galicia, where the first koumiss "curort" in Austria has recently been established. According to a statement made in connection with this establishment, the composition of the natural koumiss may be represented as follows:—

	In 1000 parts.	
	From	To
Casein	12·32	18·23
Albumin	3·14	4·10
Lactoprotein	5·71	6·08
Sugar in fresh koumiss	—	57·28
Sugar in koumiss 15 days old.	—	6·41
Alcohol in fresh koumiss	—	12·31
Alcohol in koumiss 15 days old	—	20·31
Carbonic acid, dissolved	—	3·59
Carbonic acid, free	—	4·86

Together with sodium, potassium, magnesium, calcium and iron salts, and a relatively large quantity of fat.

Section E.—Dressings, Surgical Appliances, Soaps and Perfumery.

Exhibits from Austro-Hungary, 7; Germany, 3; Switzerland, 1: total 11.

Jurors: Messrs. Fridrich (Vienna) and Mosetig (Vienna).

A considerable proportion of the articles included in this section were of the same nature as some that have already been alluded to, consisting of various kinds of textile material saturated with antiseptics and other medicaments, and need not be referred to further. Mention may be made, however, of "wood wool," the disintegrated fibre of fine-grained non-resinous wood (*Pharm. Journ.*, [3], xiii., 995), exhibited by Hartmann and Kiesling, of Hohenelbe, Bohemia, which is said to be coming in use as a surgical dressing, one advantage claimed for it being its great capacity for absorption. There were also numerous medical and surgical appliances, among which was an ingenious apparatus for applying heat to the body, consisting of spiral coils of tinned lead piping, bent in different shapes to fit the surface of different parts, through which a current of water at any desired temperature can be maintained by a siphon arrangement.

Group VI.—*Contributions to the History of Pharmacy.*

Exhibits from Austro-Hungary, 35; Germany, 1; Spain, 1; Switzerland, 2; Russia, 1: total, 40.

Jurors: Messrs. Greenish (London), Janota (Falkenau), and Peters (Nuremberg).

No attempt can be made here to deal in detail with the exhibits in this group, which was devoted to articles of purely antiquarian interest. But it must be said that probably never was such a collection brought together before. It contained treasures loaned from several public institutions in Austria, the German National Museum in old-world Nuremberg, and various private collections. One portion of it, consisting of a number of most interesting glass, majolica, and other earthenware vessels, bronze mortars and other metal utensils, many dating from the sixteenth century, were ingeniously utilized to fit up a model pharmacy of the middle ages, which was examined with interest and curiosity by nearly every visitor to the exhibition. Then there were books bearing more or less closely upon pharmaceutical subjects, dating from the earliest days of printing, as well as decrees, privileges, concessions, and indentures of all kinds, many of them of great age, some of considerable beauty, and others bearing the signatures of mighty potentates. Of course, as a rule, only the title-pages of the books could be seen, whilst the business of the documents was only partially revealed. But from one of these, a deed of apprenticeship, dated 1663, some consecutive lines were culled as indicating the requirements from intending pharmacists two centuries ago, and these may be quoted, as a concluding note, for the benefit of those who lament the great stringency of the regulations in the present day. They run thus:—"Ego Henricus Berchfeld, Pharmacopoeus, Reipublicus Ulmensis Iratus, Omnibus et singulis cujuscumque Conditionis tandem fuerint, praesertim Artis Pharmaceuticae addicis, notum facio, et hac mea manu propria attestor, Praesentem Humanissimum Juvenem Alexandrum Jacobum Ditel, postquam fundamenta latinae linguae jecerit, et deinde animum suum ad studium pharmaceuticum applicarit per quatuor annos, et ultra mea officina inservisse, et annos suae disciplinae absolvisse," etc.

STUDIES IN THE CHEMISTRY OF TARTARIC ACID.

BY THE LATE B. J. GROSJEAN.

(*Concluded from page* 188.)

II.—Destruction of Citrates and Tartrates by Hydrogen Peroxide.

The following experiment, made in 1880, will serve as an example of the results obtained:—

Five c.c. of a saturated solution of tripotassic citrate were treated with 20 c.c. of dilute sulphuric acid and 40 c.c. of a solution of hydrogen peroxide (1 vol. = 10 vols. oxygen). The whole was then boiled in a glycerine bath for two hours. At the end of this time the solution had become neutral. The acid destroyed was equivalent to about 1 gram of citric acid. When the action was pushed further by new additions of hydrogen peroxide the solution became alkaline. In a blank experiment, omitting the hydrogen peroxide, no loss of acidity was observed. On boiling a solution of potassium bitartrate, or an acidified solution of Rochelle salt, with hydrogen peroxide, the solutions became alkaline. The hydrogen peroxide has apparently no action in the cold, at least not in a short time.

III.—Destruction of Neutral Tartrates when their Solutions are heated with an Iron Salt.

The following experiments were made in 1880:—

1. A mixture containing 2 grams tartaric acid and 0·3 gram of ferrous sulphate, in 200 c.c. of water, was neutralized with potash, and then concentrated to 50 c.c. The tartaric acid was precipitated by the addition of 2·5 grams of citric acid with 5 grams of potassium chloride, and continuous stirring for ten minutes. The potassium bitartrate obtained was equal to only 91·0 per cent. of the tartaric acid taken.

2. The first-named experiment was repeated, but the neutralization with potash was omitted. The concentrated solution was precipitated with 2 c.c. of a saturated solution of potassium citrate, 0·5 gram of citric acid and 5 grams of potassium chloride being also added. The tartaric acid found was 99·6 per cent. of that taken.

Many similar experiments appeared to show that little, if any, loss of tartaric acid occurred during the evaporation of solutions containing iron when these solutions contained free tartaric acid and not tartrates. The subject, however, requires further experiments. The power of ferric salts to decompose tartaric and other organic acids under the influence of light has been noticed by many chemists.

IV.—Determination of Free Sulphuric Acid in Tartaric Acid Liquors.

The experiments detailed in this section were made in the years 1880 and 1881. They relate both to the qualitative and quantitative determination of sulphuric acid in tartaric liquors.

In a tartaric acid factory it is necessary to have some simple means of ascertaining when an excess of sulphuric acid has been added for the decomposition of calcium tartrate. The test employed by the workmen consists in adding to a portion of the liquor a few drops of solution of calcium chloride. If in a few minutes a precipitate of gypsum appears, it is known that an excess of sulphuric acid is present. This test is certainly ingenious. Barium chloride would here be quite unsuitable, as the liquor is saturated with sulphate of calcium. Mr. Grosjean made a study of this factory test. He found that under suitable conditions it was capable of detecting a very small quantity of sulphuric acid, and that by its use under known conditions a rough estimate may often be formed of the quantity of acid present.

A selection of the experiments made will be found in the following table. All experiments were made with 50 c.c. of a 10 per cent. solution of tartaric acid, to which known quantities of sulphuric acid had been added. The tartaric solution was saturated with gypsum at 35°, to imitate the conditions usual in the factory during the decomposition of calcium tartrate; the solution was cooled to

15° before treatment; the calcium chloride was employed as a saturated solution. The amount of free sulphuric acid in each solution is expressed in terms of brown oil of vitriol, and also in its equivalent of sulphuric anhydride. The former expression is employed as the one most suitable to the manufacturer, brown oil of vitriol (sp. gr. 1713) being the acid he employs.

Table III.—Results of adding Saturated Calcium Chloride Solution to 50 c.c. of a 10 per cent. Solution of Tartaric Acid containing known Quantities of Sulphuric Acid.

Sulphuric acid present. Per cent.		Calcium chloride solution taken.	Time required to produce turbidity.
Reckoned as B. O. V.	Reckoned as sulphuric anhydride.		
0·5	0·315	15 drops	Not in 2 hours
0·8	0·504	15 drops	30 minutes
1·2	0·756	15 drops	15 minutes
1·2	—	30 drops	8 minutes
1·2	—	45 drops	Turbid at once
0·8	0·504	45 drops	8 minutes
0·8	—	60 drops	5 minutes
0·8	—	90 drops	4 minutes
0·8	—	120 drops	3 minutes
0·8	—	10 c.c.	2 minutes
0·8	—	24 c.c.	Turbid at once
0·4	0·252	34 c.c.	Turbid at once
0·5	0·315	7 c.c.	5 minutes
0·2	0·126	18 c.c.*	5 minutes
0·1	0·063	25 c.c.	5 minutes

These results show that when the proportion of sulphuric acid present is very small, very large amounts of calcium chloride are required to give rise to a precipitate of gypsum. Both the delicacy and rapidity of the reaction are increased in proportion to the amount of calcium chloride employed. By constructing a table somewhat similar to the above, it becomes possible, when testing new factory liquors, containing nearly the same proportion of tartaric acid and saturated with gypsum, to ascertain approximately the percentage of free sulphuric acid present by observing the proportion of calcium chloride required to produce a turbidity in five minutes.

Mr. Grosjean found that a saturated solution of gypsum, containing neither sulphuric nor tartaric acid, yielded a precipitate on the addition of a considerable quantity of calcium chloride. It is clear, however, that gypsum alone will not produce a precipitate in the presence of much tartaric acid. A few experiments were made on the effect of varying proportions of tartaric acid. In solutions containing 1 per cent. B.O.V. an increase in the tartaric acid from 5 to 10 per cent. appears to retard the precipitation by calcium chloride.

The quantitative method already suggested for the determination of sulphuric acid in tartaric liquors (*Jour. Chem. Soc.*, 1875, 981) consisted in first pouring the liquor into alcohol to precipitate sulphates, and then precipitating the sulphuric acid in the alcoholic solution by the addition of calcium chloride. As the calcium sulphate thus obtained is apt to contain calcium tartrate, it was recommended that this precipitate should finally be dissolved in hydrochloric acid, and the sulphuric acid thrown down with barium chloride. Mr. Grosjean found, by a test experiment with a known quantity of sulphuric acid, that the whole of the sulphuric acid is not finally precipitated by barium chloride when the calcium precipitate is much contaminated by tartrate. He found it more accurate to ignite the mixed sulphate and tartrate of calcium, treat the ash with strong nitric acid to oxidize any sulphide, and then, after driving off the excess of acid by heat, to add alcohol, and collect and weigh the calcium sulphate.

* This quantity is approximate only.

V.—Determination of Tartaric Acid by Precipitation as Potassium Bitartrate.

The method formerly proposed for determining the tartaric acid in the tartaric acid liquors of a factory (*Jour. Chem. Soc.*, 1875, 976) consists in precipitating the tartaric acid with an excess of tripotassic citrate, collecting and washing the potassium bitartrate produced, and determining its amount by titration with standard alkali. Mr. Grosjean's observation that the precipitation of the bitartrate was complete after ten minutes' continuous stirring at 10° to 15° has greatly facilitated the use of this method. The washing of the precipitate was at first performed with alcohol, or with cold saturated solution of potassium bitartrate; but for these washing fluids a 5 per cent. solution of potassium chloride, saturated with potassium bitartrate, was soon substituted. Mr. Grosjean found (*Trans. Chem. Soc.*, 1879, 348) that this solution contained at 12° but one part of potassium bitartrate in 3·213 of solution.

A cognate method to the above was proposed at the same time (*Jour. Chem. Soc.*, 1875, 972) for the determination of tartaric acid in lees. In this case the whole of the tartaric acid is brought into the condition of neutral potassium tartrate by acting on the lees with potassium oxalate and neutralization with potash, and the tartaric acid is then thrown down as potassium bitartrate by the addition of citric acid.

Both these methods Mr. Grosjean patiently and thoroughly examined. His results relative to the latter form of the method have been already in part communicated to the Chemical Society (*Trans.*, 1879, 341). His experiments on the application of the method to the analysis of tartaric acid liquors have now to be described. The investigation was chiefly conducted during the years 1880 and 1881.

The conclusion finally arrived at by Mr. Grosjean was that the method was liable to two errors in opposite directions. (1) An error of excess, due to the precipitation of an acid citrate of potassium with the potassium bitartrate; (2) an error of deficiency, due to the solubility of potassium bitartrate in solutions of citric acid and citrate of potassium. He believed that perfectly correct results were only obtained when these errors balanced each other.

Mr. A. H. Allen had early called attention (*Chem. News*, 1876, 31, 278) to the precipitation of an acid potassium citrate from a solution containing citric acid and potassium acetate in proof spirit; but as no alcohol was present in our solutions, and the precipitate produced in the reaction quoted is freely soluble in the washing fluid (5 per cent. potassium chloride saturated with bitartrate) we employed, neither Mr. Grosjean nor I at first considered that the presence of an acid citrate in the washed bitartrate was at all probable. The following facts subsequently led Mr. Grosjean to a different conclusion:—

1. In trials with known quantities of tartaric acid, the acidity of the bitartrate obtained would be deficient unless a rather considerable excess of citric acid was present at the time of its precipitation (*Trans. Chem. Soc.*, 1879, 348). When the excess of citric acid was too small, and the result deficient, no further amount of bitartrate was precipitated on adding citric acid to the filtrate.

2. In test experiments with known quantities of tartaric acid the potassium bitartrate precipitated by certain proportions of potassium citrate would have an acidity equivalent to more than the tartaric acid taken. When tartaric acid was used alone the excess would seldom exceed 1 per cent., but when much free sulphuric acid was originally present the excess might reach 3 to 4 per cent., unless extreme pains were taken in washing the precipitate.

3. Great difficulty was frequently experienced in washing the bitartrate precipitate so that the acidity of the drain water should be no greater than the acidity of

the washing fluid. The first stages of the washing would be easily accomplished, but when the washing seemed nearly completed the acidity of the drain water would often obstinately remain a little above that of the washing fluid, notwithstanding a very large amount of washing. The most effective mode of washing was to stir the precipitate with a washing fluid in a beaker, and repeat this treatment several times before transferring the precipitate to the filter.

4. Precipitates of bitartrate redissolved in a small volume of hot water and thrown down again by cooling, with the addition of potassium chloride, would frequently lose 2 per cent. or more of their acidity. Bitartrate thus reprecipitated always washed with great ease.

5. Citric acid could be detected in the washed precipitates. The mother liquid obtained in reprecipitating the bitartrate (see preceding paragraph) was neutralized with soda and treated with calcium chloride. After long standing in the cold, to separate a little calcium tartrate, the clear solution was boiled and a small quantity of calcium citrate obtained.* A little citrate was equally detected in the washed bitartrate obtained in the analysis of lees by the oxalate method.

The above facts all point to an error of excess, due to the precipitation of a small quantity of an acid citrate. The liability to an opposite error from the solubility of bitartrate in citric acid, and especially in citrate of potassium, is evident from the results already published (*Journ. Chem. Soc.*, 1875, 946) relating to the solubility of potassium bitartrate in various acids and salts. Here, again, the source of error will be greater when the original solution contains sulphuric acid, the quantity of citric acid produced in the reaction being thus increased, and also the difficulty of avoiding an undue excess of potassium citrate.

In Tables IV. and V. will be found a few series of test experiments, in which the same tartaric solution was treated with varying proportions of potassium citrate. The tartaric solutions taken purposely contained (save in Series IV.) a very large proportion of sulphuric acid thus resembling the worst liquors of a factory. In all these experiments the amount of tartaric acid found (shown by the acidity of the washed precipitate) rises with increasing additions of potassium citrate till a maximum yield is obtained. Beyond this point each further addition of potassium citrate occasions a diminution in the tartaric acid obtained.

Table IV.—Determinations of Tartaric Acid in Tartaric Liquors, Varying Proportions of Potassium Citrate being Employed.

Series I.		Series II.		Series III.	
grms. Tartaric acid .... 2 Sul. acid (B.O.V.) 3		grms. Tartaric acid .... 2 Sul. acid (B.O.V.) 4		grms. Tartaric acid ....2·0 Sulph.acid(B.O.V) 4·0 Phosph anhydride 1·0 Potasium alum ..2·0 Ferrous sulphate..0·3	
Potassium citrate taken.	Product per 100 of tartaric acid.	Potassium citrate taken.	Product per 100 of tartaric acid.	Potassium citrate taken.	Product per 100 of tartaric acid.
c.c.		c.c.		c.c.	
12	99 0	13	97·6	14	90·5
13	101·3	14	101·1	15	96·7
14	97·8	16	97·6	16	97·9
16	96 2	18	96·2	17	99·6
17	94·4	23	93·1	18	100·6
18	91·4			20	98·7
				23	95·1

* Mr. Grosjean found that a good method of testing a calcium salt for tartaric acid was to dissolve in a small quantity of acetic acid, and add a considerable amount of potassium chloride. Potassium bitartrate is then precipitated if tartaric acid is present.

In each of the experiments in Series I. and II. the quantities of tartaric and sulphuric acid named in the table with 5 grams of potassium chloride, were dissolved in such a volume of water that the addition of the potassium citrate mentioned in the table would bring the whole to 50 c.c. The ingredients being mixed, the whole was stirred for ten minutes, the temperature being kept between 10° and 15°. The precipitated bitartrate was naturally mixed with much potassium sulphate. It was washed with a 5 per cent. solution of potassium chloride, saturated with bitartrate. The commencement of the washing was by decantation, 25 c.c. of the washing fluid being successively employed. The washing was continued on a vacuum filter, and was maintained till the acidity of the drain-water was permanently only very slightly above the acidity of the washing fluid: to accomplish this half a litre of the washing fluid was generally required.

The experiments in Series III. were made at an earlier date than the preceding. The ingredients taken represent a very bad old liquor. The volume of the solution was in all cases 45 c.c.: to this the potassium citrate named in the table was added, with 5 grams of potassium chloride, and the whole stirred for ten minutes at 15°. The washing was conducted on a vacuum filter, 200 c.c. of washing fluid being employed.

In Series IV. and V., Table V., the precipitation and washing were conducted exactly as in I. and II. The precipitates were then redissolved in 50 c.c. of hot water, 5 grams of potassium chloride added, and the whole quickly cooled with stirring to 15°, at which temperature stirring was continued for ten minutes. From this purified precipitate all adhering acidity was readily removed by the ordinary washing fluid. The maximum product obtained in these purified precipitates is seen to be 97·5 to 97·9 per cent. of the tartaric acid taken. The unavoidable loss attending reprecipitation from 50 c.c. of a 10 per cent. potassium chloride solution would, however, be nearly 0·5 per cent., and this may fairly be added to the above figures.

Table V.—Determinations of Tartaric Acid in Tartaric Liquors, with Varying Quantities of Potassium Citrate; the Washed Precipitates Redissolved and Reprecipitated.

Series IV.		Series V.	
Tartaric acid—2 grams.		Tartaric acid –2 grams. Sul. acid (B. O. V.)—2 grams.	
Potassium citrate taken.	Product per 100 of tartaric acid	Potassium citrate taken.	Product per 100 of tartaric acid
c.c.		c.c.	
2·0	97·4	8	95·5
2·5	97·9	10	96·2
3·0	97·4	11	97·5
—	—	12	94·1

The final conclusion arrived at by Mr. Grosjean was that in all accurate determinations of tartaric acid in factory liquors it was necessary to make a preliminary series of experiments with graduated quantities of potassium citrate, with the view of discovering the proportion of citrate which gave the precipitate of maximum acidity.

This series of experiments need not take long, as stirring for ten minutes suffices to precipitate the bitartrate, and for the present purpose a moderate amount of washing would suffice. The right proportion of citrate being ascertained, a final determination would be made with this quantity, the precipitate in this last experiment being very thoroughly washed after the method employed in the experiments of Series I. and II. The acidity of the bitartrate thus obtained would correctly show the tartaric acid present if the original liquor contained but little sulphuric acid, or would be about 1 per cent. in excess of the truth if much sulphuric acid was present.*

In Mr. Grosjean's already published paper (*Trans. Chem. Soc.*, 1879, 352), he states that he is in the habit of removing excess of sulphuric acid from a tartaric liquor by neutralization with potash, and allowing the potassium sulphate to crystallize out before proceeding to the precipitation of the tartaric acid, which is then effected by citric acid. This method was afterwards abandoned. In impure liquors the potash produced a gelatinous precipitate difficult to wash. Experience also showed that a neutralized tartaric liquor containing iron suffered loss of tartaric acid during concentration. (See Section III. of this paper.) The precipitation of the impure tartaric liquor with excess of whiting, and the decomposition of the precipitate with potassium oxalate, recommended by him in the same paper (*ibid.*, 352), were also given up, test experiments showing low results, the cause of which was, however, not fully traced out. In the case of very bad old liquors it is possible that potassium alum may be precipitated on adding the potassium citrate. This precipitation of alum is due, Mr. Grosjean showed, to its small solubility in a solution containing potassium sulphate, a salt which is formed in abundance on adding potassium citrate to a liquor rich in sulphuric acid. When alum has been precipitated along with the potassium bitartrate the result of the analysis will show a deficiency, if the washing is conducted with the usual 5 per cent. solution of potassium chloride saturated with bitartrate. The alum readily dissolves in this fluid, and forms a solution in which potassium bitartrate is readily soluble. Mr. Grosjean confirms the former observation (*Jour. Chem. Soc.*, 1875, 979) that the presence of phosphoric acid in sufficient quantity effectually prevents the precipitation of alum. When, however, both phosphoric acid and alumina are present, it is necessary to collect the precipitated bitartrate immediately after the ten minutes' stirring, as a gelatinous precipitate of aluminium phosphate is apt eventually to occur.

VI.—Detection of Tartaric Acid in Citric Acid.

Cailletet's method (*Jour. Chem. Soc.*, 1879, abstracts 674) answers well. Three grams of citric acid, with 0·03 gram of tartaric acid (1 per cent.), were dissolved in 65 c.c. of water, 0·2 gram of sulphuric acid and 10 c.c. of a saturate solution of potassium bichromate added. In twenty minutes the solution was quite dark in colour, while a comparative solution containing citric acid only remained for several hours light coloured. Next day the purely citric solution was dark, but still transparent, while that containing 1 per cent. of tartaric acid had become opaque.

VII.—Determination of Organic Acids from the Neutralizing Capacity of the Ash of their Salts.

This simple mode of determination is frequently adopted in the analysis of tartrates and citrates. Mr. Grosjean was convinced that potassium and sodium salts must always be ignited at a low temperature, that of an ordinary spirit-lamp flame, if loss of base is to be avoided. With calcium salts no such precaution was needed.

VIII.—Standardizing of Alkali used for Titration.

The best material for standardizing alkali is pure bitartrate of potassium. It is easily prepared, may be dried without alteration at 100°, is not hygroscopic, and being of low acidity, a large weight may be taken for a determination. Delicate litmus paper answers best to ascertain the point of neutralization. If the bitartrate is prepared from commercial cream of tartar it must be first recrystallized from a hydrochloric solution to remove calcium tartrate, and again crystallized from water; but the simplest method is to start with pure tartaric acid and potassium carbonate.

* It is clearly very desirable to have some means of knowing, at least approximately, when a sufficient amount of potassium citrate has been employed. When the amount of tartaric acid present is partly known, it is useful to remember that 1 gram of tartaric acid may be precipitated by about 1 c.c. of a saturated solution of potassium citrate. When much free sulphuric acid is present, potassium sulphate is first precipitated as a fine powder. The commencement of the precipitation of bitartrate may generally be recognized by the formation of streaks on the side of the vessel when rubbed by the stirrer. When this point is reached a measured quantity of potassium citrate solution proper for the tartaric acid presumed to be present can then be added. It is obvious, also, that the citrate may be added till a drop of the clear liquid removed to a watch-glass gives no more precipitate when treated with a very small quantity of fresh citrate, and the mixture rubbed with a glass rod.—R. W.

NOTES OF CARBOLIC ACID.*

The United States Pharmacopœia says "100 parts of the crystals are liquefied by the addition of about 5 parts of water; this liquid is rendered turbid by the further addition of water until 2000 parts have been added, when a stable and clear solution is formed." This is equivalent to saying that the crystallized acid will dissolve only about 5 per cent. of water, and that water will dissolve only about 5 per cent. of the acid, and that all the proportions between these points are turbid mechanical mixtures or emulsions. This description is in more or less general accord with the older and some recent authorities, but it applies only to mixtures of phenols, and these mixtures have of late years been separated, and have been found to differ widely in many respects. That is, the phenols are now found to be as different from each other as are the alcohols, and the phenol which is written with a capital P, namely, this crystallized carbolic acid, is as different from other phenols of the class as is common ethylic alcohol from others of the class of alcohols. Some modern authorities are more accurate in their descriptions of carbolic acid, and it is unfortunate that the Pharmacopœia did not follow these. For example, the Pharmacopœia says that crystallized carbolic acid dissolves about 5 per cent. of water, while Allen—'Commercial Organic Analysis,' Phila., 1879, p. 303—states that it dissolves about 27 per cent.

Repeated trials with a commercial carbolic acid free from creasote odour, which congealed at 38° C. = 100·4° F., gave results as follows:—

To 100 c.c. of the melted crystals warm distilled water was added, ten c.c. at a time, the solution being kept at about 54° C. = 129·2° F., until 60 c.c. of water was dissolved, making a perfectly transparent solution as long as the temperature was maintained at about that point. But on cooling a few degrees the whole became an opaque white emulsion. This, on standing forty-eight hours, separated into a transparent lower portion measuring 135 c.c. and an upper stratum of 25 c.c. The upper part of this stratum, measuring about 15 c.c., was a perfectly transparent watery solution, saturated of course; the intervening portion of 10 c.c. was a white emulsion containing a very little very finely divided acid, suspended in minute cells in the watery solution. Thus this acid had dissolved not less than 35 c.c. of water, and held it in perfect solution at 20° C. = 68° F., while by the Pharmacopœia it should only have dissolved about 5 c.c. The solution contained nearly 26 per cent. of water and was saturated. Of the same acid, melted, 10 c.c. were well shaken with 90 c.c. warm water, and nearly, but not quite, all dissolved. On standing forty-eight hours the lower undissolved stratum measured 4 c.c., 6 c.c. having been held in solution in 96 c.c. of the solution, or about 6 per cent., 5 per cent. being the solubility given by the United States Pharmacopœia.

When a saturated solution of the crystals containing 6 per cent. was carefully poured upon an equal volume of purified chloroform in a graduated cylinder, and the mixture was carefully moved to and fro in the cylinder with-

* From Dr. Squibb's *Ephemeris*.

out active agitation and without making a white emulsion, as by very active agitation, the volume of the chloroform layer was increased very nearly 5 per cent. That is to say, chloroform is not as easily dissolved by water as carbolic acid is by chloroform, and therefore by care most of the acid can be dissolved out of the water without permitting the chloroform to take up much of the water, or the water much of the chloroform. All ordinary chloroform contains a small proportion of alcohol, and this is washed out by brisk agitation with water, and increases the solubility of chloroform in the water. Under these conditions the test must be inaccurate unless the chloroform dissolves the same proportion of water that the water does of chloroform, and this is not the case at the point of saturation at ordinary temperatures. Besides, when any solution of carbolic acid has been shaken with chloroform, the watery stratum smells and tastes strongly of both chloroform and carbolic acid.

When 50 c.c. of crystals saturated with water, and containing 27·18 per cent. of water, were shaken with 50 c.c. of chloroform, either with or without active agitation, the upper watery layer measured 10 c.c., indicating 20 per cent. of water when the solution contained 27·18 per cent. of water in addition to the 1 or 2 per cent. of water that the crystals originally contained.

Thus the chlorform test rigidly re-applied to a saturated solution of carbolic acid in water did not indicate the acid known to be present by 16 per cent., for the water actually contained 6 per cent., while the test indicated only 5 per cent.

Applied to carbolic acid, congealing at 38° C., saturated with water and known to contain 27·18 per cent. of water, the test indicated only 20 per cent., or say 73·5 per cent. of the water actually present. Hence the general statement that the chloroform test for solutions is practically valueless is sustained.

Some very good authorities state that benzene will wash all the carbolic acid out of its solutions, and leave the water to be measured. But such is not the case with any benzene that is commonly accessible.

The quantity of carbolic acid dissolved in any given solution may be roughly got at by adding 6 c.c. of melted crystals to 94 c.c. of the solution in a 100 c.c. graduated cylinder, warming the mixture, shaking vigorously, and then allowing it to separate. When cold the solution is now fully saturated at the temperature of the observation, and the undissolved excess may be read off. If 2 c.c. of the 6 shall have been dissolved, then the solution already contained about 4 per cent., since a saturated solution at ordinary temperatures contains about 6 per cent.

A very nice solution has been largely employed for many years past, and its use is constantly increasing. This is generally called "Disinfectant Solution of Coal-tar Creasote, or Solution of Impure Carbolic Acid," and it should contain about 2 per cent. of the mixed phenols which constitute the "Crude Carbolic Acid," U.S.P. It is very quickly and easily made, simply by agitating well 2 parts of the crude carbolic acid, U.S.P., with 98 parts of water, and filtering through a wet paper filter.

This is a clean and colourless solution, entirely volatile, and it does not injure clothing, carpets, bedding, or anything of the kind, and therefore it may be sprinkled freely upon anything, however nice.

This solution, I believe, is the form most convenient and effective for the treatment of all superficial or cutaneous pain as an anæsthetic. If the fingers be held immersed in this solution for ten minutes, in half that time the cuticle will begin to turn white, the skin to shrivel like a washerwoman's hands, and a slight numbness will be felt. These all increase, and at the end of ten minutes are marked, and the increased numbness is accompanied by a pricking sensation suggestive of the smarting pain which longer immersion produces, and of which this is the beginning. It is a very singular characteristic of this pricking and smarting that it is much increased by holding the hand high above the head, and entirely relieved by holding it down. That is, draining out the blood increases the pricking, whilst filling the part with blood relieves it, and replaces it by a sense of fullness and numbness. The sensibility of the surface is very much diminished or lost, but this loss does not extend below the immediate surface. In ten minutes after the surface is dry, the whiteness and shrivelling disappear gradually, but the numbness and anæsthesia remain, or disappear much more slowly.

The 2 per cent. solution is too strong for such applications, and must be diluted by the addition of from one to two parts of water at the time of using it. One part solution and one part water for the thicker and less sensitive surfaces of adult males, and one part to two of water for the more delicate surfaces of women and children, the strength being adjusted to each case. If applied too strong the pain will, after a time, recur, or be increased, and if too weak will be but imperfectly relieved, but either the one or the other extreme can be surely determined if the part can be alternately held high and low, for if the pain be from applications too strong it will be increased on elevating the part and diminished on holding it down. But if the pain be from the burn through the application of solution too weak to control it, it will be increased by holding the part low. The best, and indeed the only proper way of applying the solution to burns, erysipelas, etc., is by very thin cloths—such as old worn muslin or handkerchiefs. A saucer is kept by the side of the patient supplied with the proper dilution for the case, and the cloths are wetted from time to time as indicated by the return of pain. If the burn be a grave one or the pain severe, the cloths should be frequently changed during the first few hours at least. Later the cloths may be covered with light oiled silk, so that the patient may not be disturbed during sleep. In slight burns or scalds of fingers, hand, wrist, etc., it is often sufficient to wrap the part in the thin cloth, and keep it wet without changing it, putting the oiled silk over the dressing only at night, to prevent evaporation. If the strength be properly adjusted to the case, and the solution be properly applied, the pain will always be relieved within ten minutes.

TESTING SUBNITRATE OF BISMUTH FOR ARSENIC, ETC.*

H. Hager publishes the following directions for testing subnitrate of bismuth, which we find in the *Pharmaceutische Centralhalle*:—

The preparation should dissolve completely to a clear solution in nitrate acid of 1·185 spec. grav. Now, it happens that the subarseniate of bismuth also forms a clear solution with pure nitrate acid of this strength, but not when the acid is saturated with subnitrate of bismuth. It requires eight parts of this acid to form a clear solution of one part of subnitrate of bismuth in fifteen minutes. If 0·5 gram of the subnitrate is treated with 4 grams of nitric acid, and does not dissolve in half an hour with occasional shaking, but is either turbid or exhibits a slight opalescence when viewed from above, it contains arsenic; a considerable quantity in the former case, in the latter but little. All commercial samples that I have tested were contaminated with arsenic.

The optical test for arsenic acid is easy, and can be made even by those who are not chemists. It depends on the fact that arseniate of ammonia is not decomposed by heat into its two components, but rather undergoes an elementary decomposition, turning brown. The test is made as follows, and at the same time it may be tested for alkalies. About three or four grams of caustic ammonia are poured upon a gram of subnitrate of bismuth, and warmed from 30° to 40° C. (86° to 104° F.), and shaken, then filtered while warm. Arseniate of ammonia dissolves with difficulty in cold ammonia, but easily in warm. One or two drops of the filtrate are placed on a thin watch glass, and heated by moving it to and fro

* From the *Druggists' Circular and Chemical Gazette*.

over the chimney of a kerosene lamp, as long as vapours are noticed, that is, until all the nitrate of ammonia has been driven off, and a few minutes longer. On examining the residue with transmitted light, if arseniate is present a brownish colour will be observed, which becomes dark brown on the edges of the spot. Under the microscope dark grey or brown masses may or may not be seen here and there. If not, it must be heated still more. The colour of the spot as seen with the naked eye is sufficient. If potash or soda were present, the spot will not disappear on heating strongly. This experiment is entertaining and instructive, for remote traces of arseniate can be easily recognized in this way.

The test for alumina and other earths can be made in a similar manner by pouring 1½ gram of dilute acetic acid upon a gram of the bismuth preparation, warming, and when cold adding 5 c.c. of caustic ammonia with 2 c.c. of water, shaking for three minutes, filtering, evaporating the filtrate, and neutralizing with carbonate of soda. If it remains turbid, earthly salts were present.

METHOD FOR DETERMINATION OF NITROGEN.*

BY J. KJELDAHL.

The author shows the desirability of a process for effecting the determination of nitrogen in the moist way. He criticizes the process of Wanklyn and Chapman, and proposes in its stead an oxidation in an acid solution.

The sample to be operated upon is first strongly heated with sulphuric acid; and is thus almost invariably brought into such a state that its nitrogen is completely converted into ammonia by the following operation. The principle of the process is treatment with a sufficiency of concentrated sulphuric acid at a temperature not much below the boiling point of the acid. The solution thus obtained is oxidized with an excess of dry powdered permanganate. Under these circumstances the organic nitrogen is completely transformed into ammonium sulphate; the liquid is then supersaturated with soda, distilled off and determined according to the usual methods.

It is essential for this process that ammonium sulphate, at the high temperature applied, and especially during the subsequent treatment with permanganate, which is attended with a very violent reaction, does not undergo decomposition. This the author has ascertained by special experiments.

The procedure may be described as follows:—The substance is weighed into a small, tared boiling flask, in which the further treatment is to take place.

Even with solids this is a very convenient arrangement, but still more so with liquids. A liquid is weighed in, the water allowed to fly off in the evaporation niche, when the extract remains where it is wanted. Oil of vitriol is then added in a sufficient excess. The quantity may vary within tolerably wide limits, though the author always employs 10 c.c. Great care must be taken that the acid does not absorb ammonia. The author has often found traces of nitrogen in the so-called pure acid of commerce, for which a small correction must be made.

The flask is then placed upon a piece of wire-gauze over a small gas flame. As a rule the contents become back and tarry, but on continued heating a brisk reaction sets in with escape of gas, during which the substance is completely dissolved. On account of the escape of sulphurous acid and of white fumes this operation should be conducted under a draught hood. To prevent loss by spirting the flask should be set in a slanting position until the contents are come to rest. The flask should hold about 100 c.c. and have a long narrow neck. When the escape of gases has ceased the action of the sulphuric acid is not at an end; a slow oxidation goes on; the liquid first becoming a deep brown, then light brown, yellow and ultimately clear as water. To accelerate this process a little fuming sulphuric acid or phosphoric anhydride is added. With these additions a heating for two hours is sufficient to give a clear light brown liquid. With the albuminoids and their derivatives the formation of ammonia is as complete after heating for 1–2 hours as if the liquid had been rendered almost colourless by prolonged treatment. With other substances, such as are mentioned below, the addition of phosphoric anhydride is recommended, and heat is applied until the disappearance of the colour indicates that the action of the acid is at an end. The temperature should be a little below the boiling-point of the acid, as is indicated by occasional "bumps." At temperatures of 100°–150° the formation of ammonia is exceedingly imperfect. The substances for analysis do not require pulverization further than is needed for obtaining a correct average portion.

The oxidation is then effected by means of permanganate, for which no efficient substitute has been found. It is applied in the state of a fine, dry powder, which is introduced in very small portions which may quickly follow each other. The oxidation is effected in the hot liquid, though the flame is removed, and is completed in less than a minute. Although the reaction is violent and is even accompanied with small flames, there is never a loss of ammonia. The completion of the process is indicated by the appearance of a green colour. The author generally allows the flask to stand over a very gentle flame for five to ten minutes, without ascribing especial importance to this procedure. On no account must a strong heat be applied to the green liquid, as this would involve a serious loss of ammonia.

The liquid when sufficiently cool is diluted with water, when the green colour changes to a brown. When again cool it is introduced into the distillatory apparatus, which should hold about ¾ litre, and is connected with a top-piece sloping upwards to ensure the reflux of any spirts, and connected with a spiral condenser leading into an absorption apparatus charged with standard acid.

The soda lye used has the specific gravity 1·30, of which 40 c.c. are rapidly introduced into the distillatory apparatus and the stopper re-inserted. There is no perceptible loss of ammonia in this operation, and consequently no special arrangement is necessary for the introduction of the alkali.

To prevent bumping in distillation, small zinc turnings or filings are introduced before the addition of the alkali.

For substances containing about 1·5 per cent. of nitrogen, the author operates on 0·7 gram; for richer bodies, ¼ gram. The results obtained by the new method agree very closely with theory and also with the figures obtained by Will and Varrentrapp's process. In connection with this process the author has obtained good results in the analysis of the alkaloids by omitting, as usually recommended, to form a channel extending along the entire combustion tubes by gentle rapping. He considers that the danger of loss by the formation of nitrogenous vapours, which are not taken up by the acid, is greater than that of the dissociation of ammonia which is so often brought forward. For further security he adds a little pure sugar to the soda-lime at the front end of the tube. Whilst the soda-lime sinks together when heated and leaves an open way between itself and the sides of the tube, the sugar on combustion forms a porous carbonaceous mass which fills the entire width of the tube, and through which all the gases formed by the combustion of the substance are obliged to pass.

The author, when recommending his method for organic substances in general, with a certain reserve as regards some alkaloids, admits those bodies as exceptional in which the nitrogen occurs in the form of volatile acids, such as, generally speaking, the cyanides and the oxides of nitrogen. As regards the nitrates a peculiar fact must be put on record. Whilst it might be expected that the nitric acid would be in great part volatilized by heating

* From the *Zeitschrift Analyt. Chemie.* Reprinted from the *Chemical News.*

for hours with concentrated sulphuric acid in large excess it is found, on the contrary, that the greater part of the nitric acid in presence of organic matter is converted into ammonia.

GUM ACACIA.*

Gum arabic should be regarded as a generic name, while acacia is a specific name properly applied only to that kind of gum arabic used in medicine. The gum arabic from which acacia is selected comes chiefly from Kordofan, down the Nile, in sacks, to Cairo, Alexandria or Trieste. In this original condition it is called gum arabic "in sorts," that is, unsorted or unseparated. The fragments are of all shades of colour lighter than a very dark amber, and are contaminated with bark, dust, etc. At the three points mentioned the gum arabic is picked —women, children and cripples being employed in picking it, and at Trieste especially, the picking constitutes quite a large and important industry. This picking separates the fragments by colour and by freedom from adhering bark, etc., into about five grades usually, and these are called, technically, in commerce, "first picked," "second picked," "third picked," and so on, and these grades are then fitted for their special uses chiefly in the arts for "sizes" and "bodies" and in confectionery. The first and second picked are very nearly colourless, and only differ in colour by a shade or two, but the second picked is not so free from adhering specks of bark. The first three or four of these grades come into the markets in cases containing about 136 kilogrammes or 300 pounds each. The other grades come in bags. Of these grades the first picked only should constitute the acacia of the Pharmacopœias, and to this grade only does the name "Acacia" and the U.S.P. officinal description properly belong. It is, therefore, not "Gum Arabic," but is "Acacia," selected by picking as the best and purest part of gum arabic. It is true, however, that this grade is rarely bought for medicinal uses, the second and third picked, which are considerably cheaper, being generally used. If not seen together, few buyers can distinguish between "first picked" and "second picked," so that sellers by keeping the "first picked" out of their assortment are easily able to sell second for first, and so on down.

Other varieties of gum arabic come down the Nile which are well known in commerce, but the sources of which are not well determined. They are not distinguishable in appearance from the gum just mentioned, and go through all the process of picking exactly as do the other gums, and they appear in the markets together, and in "first hands," that is, in the pickers' or in the large importers' hands, the cases are seen side by side, but after leaving "first hands" the distinctions between these and true gum arabic are commonly lost. These gums are, however, of inferior quality, and are sold at a lower price. A few years ago the difference in price amounted to 20 to 25 per cent., but of late the true gum arabic has fallen somewhat in price, and now the difference is hardly greater than 10 per cent. These inferior gums have been variously called "Gum Sennaar," or in the market "Senare," "Ghezireh" and "Gedda," probably from the districts in which they are collected; the latter name being the most common, and now pretty generally applied to the whole clas of these inferior gums.

"First picked Arabic" and "First picked Gedda" are often undistinguishable even by experts, unless seen together and closely compared, and hence the cheaper is often substituted for the better and dearer gum, and still more frequently is mixed with it as an adulterant. The chief characteristic of these poorer gums is a sour smell, which, though easily recognized in the "sorts" or in the lower grades, is by no means easy in the first and second picked. Generally, however by brushing off the surface gum from the top of a case, and plunging the hands down so as to bring up a double handful from near the middle of the case, the sour odour can be detected. But if 10 or 20 per cent., of the gedda only is mixed with the true gum, it is almost impossible to detect it.

The inferiority of these gums is that they make a thinner and poorer mucilage than the true gum, and a mucilage which changes and sours sooner. The expression in the arts and in confectionery is that it "does not go so far,"—"does not make as fine a stock," and causes loss by spoiling more easily. The inference drawn by the writer from these circumstances is that these gums come from districts which are subjected to showers, or to some form of dampness which is sufficient to start a slight fermentation in the gum itself. This hypothesis is strengthened by the circumstance that a bag of fine gum which accidentally gets wet soon develops this sour smell, while others of the same lot will have the natural freedom from all smell or have the very faint, clean, sweet smell.

The uses of acacia in medicine require it in two forms, namely, in solution and in fine powder. The solution is used in various ways and for many purposes, and is officinal in the forms of a mucilage and a syrup. The mucilage contains 34 per cent. of acacia, and the syrup about 8 per cent. The solutions do not keep well, especially when there is any admixture of gedda in the acacia, or when there is the least quantity of old solution left to start the souring of the new, and therefore they should always be freshly made. To make a good solution promptly not only requires some skill, but also requires that the acacia be in a proper condition. Taking the acacia in its officinal condition the solution of the fragments is a very slow process. If it be rubbed up in a mortar enough of it goes into fine powder to make the whole clog together, and then again the process is tedious and troublesome, whilst if fine powder be taken there will be still more difficulty and the loss of more time.

Many years ago the writer made a series of trials to determine the condition best adapted to making easy and rapid solution, and the result was that a granulated acacia in the form of a coarse powder free from any fine powder was all that was needed, and a "Granulated Acacia" has been supplied to the markets ever since, and is now in common use. This is made by coarsely grinding the first picked true acacia until it all passes through a No. 50 sieve. The finer particles are then all taken out of this coarse powder by careful and thorough use of a No. 80 sieve. This leaves a very uniform, clear, coarse powder, which constitutes the granulated acacia. That which passes through the No. 80 sieve is again ground in a finer mill and passed through bolting cloth No. 120, and constitutes the powdered acacia, adapted to a different class of uses. The granulated acacia is so promptly soluble that it cannot be washed with cold water, as directed by the Pharmacopœia under the head of Mucilage of Acacia, nor is the washing needed, as the mucilage will be opalescent in either case and not very different. It is, however, true of acacia, as of other drugs, that the grinding does render the solutions more opalescent, because the particles of bark, etc., which are insoluble are ground up very fine, and because the attrition grinds off fine particles of the mill surfaces. From these circumstances it comes that the finer the powder the more opalescent the solutions made from it.

The uses of acacia in medicine are chiefly as a vehicle, a diluent or a demulcent. It is also, doubtless, an aliment of the very simplest and blandest kind. In all these offices or functions it has many duplicates and substitutes, but yet stands at the head of its class, though its advantages are often overlooked through the popular appetite for novelty and change.

As an adjuvant or corrigent for prescription uses, whether in solutions or in powders, it has no superior and perhaps no equal in covering the taste of disagreeable medicines, or in shielding the mucous surfaces against the sudden effects of acid or irritant substances, and its skilful application to its appropriate uses is too much neglected.

* From Dr. Squibb's *Ephemeris*.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 15, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

MILITARY PHARMACY IN AUSTRIA.

IT cannot be said that in this country pharmacy enjoys an excess of recognition on the part of the military authorities. In the naval service there are a certain number of appointments as dispensers and keepers of medical stores in the principal naval hospitals which are open solely to qualified pharmacists; but in the army an appointment as compounder of medicines can only be obtained by an indirect process which involves a previous enlistment as a private, followed by promotion to the rank of sergeant. In France, however, where they manage things differently, the *pharmaciens-militaires* have for nearly a century constituted an important independent organization, which about ten years ago was able to resist successfully an attempt to place it under medical control. When the French army was reorganized after the Franco-German war, this corps was augmented to one hundred and eighty-five members, consisting of an inspector, eight principals of the first-class and sixteen of the second, forty majors of the first-class and fifty-five of the second, and fifty aides-majors of the first-class and fifteen of the second. Turning to another important continental country, the recent exhibition in Vienna has furnished evidence that the connection between the trained pharmacist and the supply of medicines to the army is an object of considerable solicitude to the War Department of the Austrian empire, and some information upon the subject of the military pharmaceutical department has been supplied to our contemporary, the *Pharmaceutische Post*, by a writer evidently well acquainted with the working of the system at present obtaining in that country, which appears to be of sufficient general interest to warrant the transference of a portion of it to these columns.

The Austrian "Military Medicament Branch" belongs to the regular army establishment, and has for its object the maintenance of a stock of medical substances, instruments and utensils, corresponding to the requirements of the army in times of peace or of war; also to provide for the preparation of medicines according to the directions of the 'Military Pharmacopœia,' to supply the same to the troops and different medicine stations, or to individual patients under medical direction, and to keep the necessary accounts. At the head of the Branch is a Director, and in times of peace he has under his control eight Superintendents, seventeen subordinate officials of the first-class, eighteen of the second-class, and eighteen of the third-class, and eight attendants. The nomination of the Director and of the Superintendents is reserved to the Emperor himself, but the appointment of the other officials is made through the Minister of the War Department. In respect to position, the Director is at the disposition of the chief of the medical department of the army, and any proposals that he may wish to submit to the ministry of war have to pass through that channel. His duties comprise a general supervision of all the operations of the department. The Superintendents and officials of the higher class are usually entrusted with the management of the business in the larger medicament depots. In time of war the official body is multiplied five or six times, by drafts from one-year volunteers possessing the grade of "Magister der Pharmacie" who have been placed in the reserve, and who, after having satisfactorily passed a military-pharmaceutical examination, are nominated as military medicament officials in reserve. In time of peace the permanent military medicament establishments under the direct management of the Director are one principal depot, in connection with which there is a laboratory, twenty-six pharmacies in garrison hospitals, and ten garrison pharmacies. Other medicine establishments are, without prejudice to the superior control of the Director, more or less subordinated to various authorities with whom they come into contact. All these establishments are supplied with materials for medicines and medical instruments, etc., from the central depot. Upon the mobilization of any part of the army for operations a field depot is established, from which all the medicines required for the division are supplied to the sanitary department. The outline arrangements as to the quality and distribution of medical stores are made by an Inspection Commission, consisting of medical officers of the army and the Director of the Medicament Branch, and this Commission also determines the quantity and other conditions as to the medical materials and necessaries to be provided. The drugs required are regularly purchased once a year by written tenders from competing commercial houses and the raw materials are worked up in the laboratory attached to the central depot in Vienna, which is well provided with machinery and apparatus.

In concluding this brief sketch it may be mentioned that the characters of the drugs and the nature of the medical preparations issued by this department for use in the Austrian Army are defined in a special 'Military Pharmacopœia.' The first of these works was issued as far back as the year 1795, and is described as having been a treasury of the most wonderful mixtures and antiquated remedies. The second appeared in 1820, and it marked a decided advance in the scientific direction, many of the drugs and formulæ contained in the first being now omitted.

In 1840 a third military pharmacopœia was published, in which a list of reagents and veterinary medicines were included for the first time, whilst in 1859 this gave place to a fourth, which was fundamentally different from all its predecessors and was written in the German language instead of the Latin. Lastly, in 1872 the fifth edition appeared, and this remains in force at the present time. The principal object sought to be attained in this work appears to have been the production of active reliable medicines, occupying a comparatively small space and as little susceptible as possible to damage through rough treatment in transport or variations of temperature.

It may be useful to remind our readers who are pharmaceutical chemists and who wish to avail themselves of the exemption from jury service to which they are entitled, as to the desirability that they should without delay examine the lists of jurors which will remain suspended on the doors of all places of public worship in England and Wales until Sunday next, in order to ascertain whether their names have been improperly included as liable to serve. Should this be the case in any instance an application to have the name expunged should be made on the day of appeal, the date of which is announced on the list, and a certificate of registration may be obtained from the Registrar to produce in support of the claim. Should the claim not be made, the defaulter will be liable to be called upon to serve as a juror as long as his name remains on the jury list.

* * *

The Thirteenth Annual General Meeting of the German Pharmaceutical Association, which was held last week in Wiesbaden, was very numerously attended. On Thursday afternoon upwards of six hundred ladies and gentlemen sat down to dinner together in the great hall of the Kurhause, and on Friday nearly an equal number went on an excursion to the Niederwald.

* * *

In the afternoon of the last day of the recent exhibition in Vienna it was visited by the Archduke Carl Ludwig, who was prevented by illness from being present at the opening. His Imperial Highness made a prolonged and careful examination of the different cases, and manifested considerable interest and curiosity respecting many of the articles shown. At the close of his inspection he received the members of the executive committee and jurors who were present. In the course of a conversation with a recent President of the Pharmaceutical Society, the subject turned upon the probable locality and date of the second international pharmaceutical exhibition, and a hope was expressed that it would be held in London within three years.

* * *

It is announced on good authority that although the accounts of the Vienna exhibition have not yet been finally closed, the Executive Committee has felt itself warranted in paying over the sum of five thousand florins to the credit of the pharmaceutical benevolent fund of the "Hygiea" association.

* * *

Apropos of exhibitions it may be mentioned that for some time past there has been a growing opinion that the holding of a pharmaceutical exhibition every year in connection with the annual meeting of the German Pharmaceutical Association was undesirable. The subject was brought before the recent annual meeting by the presentation of a memorial to that effect, and it was resolved that the practice of holding exhibitions at such short intervals should be discontinued.

* * *

If we may judge from a courteous invitation that has reached us, the American Pharmaceutical Association, which has this week been meeting in Washington, has had its attention pretty equally divided between work and recreation. On Tuesday it was to meet at 3 p.m., to hear the President's Address, and the evening was to be devoted to a Concert. On Wednesday, three hours were to be spent in the election of officers and receiving the reports of committees and the remainder of the day in visiting an exhibition and various institutions, winding up with a Reception and a Ball. The morning of Thursday was to be occupied in visiting more public institutions; the reading of papers was to take up three hours in the afternoon; and "at 6.30 sharp" there was a Banquet, with "music, toasts and accessory pleasures." On Friday morning three more hours were to be spent in reading papers and in the afternoon there was to be an excursion on the Potomac, with "music and lunch," at the invitation of the local committee. On Saturday there were to be various excursions arranged by the Entertainment Committee.

* * *

There is one point in connection with this meeting in which it will differ markedly from the meeting of the British Pharmaceutical Conference in Southport next week and which is worthy of the consideration of the leaders of the British society. Every attendant at the meeting of the American Pharmaceutical Association expects to contribute towards the expenses incurred and on the present occasion coupon tickets for all the events arranged on the programme, price five dollars for each person, were issued by the General Entertainment Committee, and no person was admitted without one. For the complimentary excursion at the invitation of the local committee a special ticket was issued.

* * *

We learn from the *Medical Press and Circular* that it has been arranged by the Council of the Social Science Association that in the course of the meeting which is to commence in Huddersfield on the 3rd of October, there shall be a discussion on the question of "legislative enactment in the direction of amendment of the Sale of Poisons Act," which will be introduced by Mr. Meymott Tidy. We have reason to believe also that a legal gentleman is preparing a paper on the question for the same meeting. It is to be hoped, however, that if it be intended to make the discussion a really serviceable one in forming public opinion, those who aspire to direct it will make themselves acquainted both with the existing law and the proposals that have been put forward for its amendment by the Council of the Pharmaceutical Society. But it cannot be said that the title attributed to the Act which at present regulates the sale of poisons in this country suggests a very intimate acquaintance with the subject.

* * *

We regret to have to announce the death, on the 7th instant, at the age of seventy-six, of Mrs. Margaret Sophia Bowen, who was elected as an Annuitant on the Benevolent Fund in 1881.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council of this Society was held on Wednesday, September 5, at the College of Physicians, Kildare Street, at three o'clock.

The President, Professor Tichborne, in the chair.

The other members of the Council present were—Messrs. Brunker, Draper, Allen, Grindley, Hodgson, Simpson and Wells, Dr. Collins and Dr. Montgomery.

Mr. Fennell, the Registrar, read the minutes of the last meeting, which were confirmed.

A letter was read from the Secretary to the British Pharmaceutical Conference, requesting the Council to nominate gentlemen as delegates to the Conference which is to be held at Southport on September 18 and 19.

On the motion of Mr. Hodgson, seconded by Dr. Collins, Messrs. Payne, Minchin, Brunker and Wells were appointed delegates.

A communication was received from Mr. T. R. Lester, of Cork, presenting prescriptions to the Society.

The Registrar was directed to acknowledge the receipt of the prescriptions, and to thank the donor.

Letters were submitted from Mr. Patrick Joseph Finnegan, asking the Council to exempt him from the operation of the new rule requiring four years' study of practical pharmacy. The letters were dated from the dispensary connected with James's Gate Brewery, Dublin. The writer stated that he presented himself at the Society's Preliminary examination, held in October, 1882, but failed to pass. Subsequently the Council passed the resolution requiring four years' apprenticeship instead of two as previously. He passed his Preliminary at the next examination. A year and a half ago he entered himself as an assistant in the dispensary and had since served there. At the time he entered he did so on the faith that a certificate from the dispensary would be available for the Pharmaceutical Society; otherwise he would have entered at the Apothecaries' Hall. Afterwards he accidentally discovered that that certificate was not available because the dispensary was not an open shop. Then he made arrangements for a two years' apprenticeship, and he submitted as he entered under the old system under which only two years' apprenticeships were required, and as the resolution of the Council of the Society altering the requisite period had not yet been confirmed by the Privy Council, his present application might be granted, more especially as when he should present himself for his final examination two years hence he would have completed three and a half years. He also submitted that he ought not to be placed under a disability by reason of the Council not having considered his case.

Mr. Draper: He is wrong there, for his case was considered and it was decided that the new rule should not be retrospective.

The President: The new rule has not been approved of by the Privy Council yet.

Mr. Grindley: The new regulation has no force until it is confirmed by the Privy Council. I think his two years should be accepted.

Mr. Wells: But if the Lord Lieutenant sends back the resolution of the Council confirmed, then all who passed the Preliminary examination after January last will come under it.

Dr. Collins: Does he say that he is bound to a pharmaceutical chemist for three years?

Mr. Brunker: No, he speaks of making arrangements for that purpose

Dr. Collins: If he serves two years in an open shop we might give him credit for the year and a half in the dispensary.

Mr. Brunker: But if you give him a privilege not warranted by the regulations, how can you bind the Council that will be in office two years hence? We may take it for granted that our amended resolution introducing the new rule will be confirmed by the Privy Council.

The President: You can only meet his case by saying that a man who had entered into an apprenticeship before the confirmation of the rule shall be exempted from its operation.

Mr. Brunker: But are we going to ask the Privy Council for another amendment of our resolution? If we do that they will say that we do not know our own minds.

Dr. Collins: Would it be necessary to refer to the Privy Council at all in his case?

The President: He states that he is conforming to your present regulations. I think you must postpone the consideration of this case until you hear from the Privy Council.

Mr. Brunker: He has not conformed to them.

Mr. Grindley: But he is about to do so.

The President: The Privy Council might intimate to us that they confirmed our new regulation with the proviso that every man who had been previously apprenticed should be exempted from its operation. If that should take place he would be in a right position.

Mr. Brunker: If you open any loophole for escape from your new rule you will be flooded with applications. The speaker called attention to the terms of the resolution of the Council passed with reference to the new regulation, viz.:—"Every candidate for the licence who has not passed the Preliminary examination previous to January 3, 1883, shall be required to produce a certificate of a pharmaceutical chemist or apothecary keeping open shop, stating that he has served a *bonâ fide* apprenticeship of four years as apprentice or assistant in the sole employment of such pharmaceutical chemist or apothecary."

After some further discussion,

The Registrar was directed to write to Mr. Finnegan, stating that the consideration of his letter had been necessarily postponed.

Mr. Brunker moved the following resolution:—

> "That Mr. Fennell be directed to ask the Clerk of the Privy Council whether the resolution of January 3, last, as amended by the Privy Council, and accepted in its amended form by this Council on June 6, has yet been finally confirmed, and to inform him that inconvenience has arisen from the matter being still open."

Mr. Wells seconded the resolution, which was unanimously agreed to.

Some conversation followed upon the subject of the stopping of the supply of the *Pharmaceutical Journal* to members in accordance with a resolution passed by the Council, a report of the Law Committee was read and adopted.

Mr. Draper and Mr. Hodgson reported progress with respect to the fitting up of the Society's new premises in Harcourt Street.

Some financial business having been disposed of, the Council adjourned.

Provincial Transactions.

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION OF GREAT BRITAIN.

A meeting of the Executive Committee was held at the office of the Association, 23, Burlington Chambers, New Street, Birmingham, on September 7, at 12.45 p.m.

Mr. John Harrison (Sunderland), President, in the chair.

Mr. W. G. Cross (Shrewsbury), Vice-President.

Present:—Messrs. Andrews (London); Arblaster (Birmingham); Barclay (Birmingham); Chapman (Scarborough); Churchill (Birmingham); Hampson (London); Holdsworth (Birmingham); Jervis (Sheffield); Jones (Llanrwst); Laird (Edinburgh); Mason (Liverpool); Parker (Nottingham); Symes (Liverpool); Walker (Coventry); Williams (Manchester); Yewdall (Leeds); and the Solicitor of the Association.

The minutes of the previous meeting of the Executive were read and confirmed.

Communications were read from Messrs. Bell, Ellinor, Mackenzie and Paterson, regretting their inability to attend.

The Secretary said that at the last Annual General Meeting a resolution was passed ordering a memorandum to be presented to the House of Commons on behalf of the Association, in support of the claim of pharmacists to be associated with the members of the medical profession in a legally constituted committee, for the purpose of preparing the British Pharmacopœia; that he had therefore prepared a petition which had been presented to the House of Commons in June last, by the President of the Board of Trade.

The petition was based upon and practically identical with the Memorial of the Council of the Pharmaceutical Society to Her Majesty's Privy Council (See *Pharm. Journ.*, [3], vol. xiii., 963.)

The Secretary also reported that he had addressed a circular to the members of the General Committee, and to each local secretary of the Association, enclosing prints of the petition, and asking them to forward a copy to their local Member or Members of Parliament, with a letter requesting support in the House of Commons to the prayer of the petition. He laid on the table numerous replies that had been received from Members of Parliament, which were, almost without exception, favourable.

The report of the Sub-Committee appointed by the Law and Parliamentary Committee to deal with urgent cases was then read. The report stated that the Sub-Committee had authorized the Solicitor to defend a member of the Association, residing at Aberdare, in proceedings instituted against him by the Inland Revenue authorities, for having sold, it was alleged, spirit of wine and methylated spirit without a licence. On investigation it had been found that the spirit of wine was strongly camphorated, and that the methylated spirit contained, when purchased by the defendant, the requisite quantity of gum. The cases, however, were not taken into court, as the defendant preferred to settle the matter by the payment of a small penalty which the excise authorities intimated that they were willing to accept. The Sub-Committee had also instructed the Solicitor to apply for an adjournment of certain cases under the Sale of Food and Drugs Act, which took place at the Marylebone Police Court on August 15, last, in order that samples left with the defendant by the Inspector might be analysed by the Analytical Referee of the Association.

It was moved by Mr. Symes, seconded by Mr. Mason, and unanimously resolved:—"That the Report now read be received, adopted and entered on the minutes."

It was moved by Mr. Holdsworth, seconded by Mr. Mason, and unanimously resolved:—"That the officers of the Association, together with Messrs Andrews, Arblaster, Barclay, Bell, Chapman, Jervis, Hampson, Parker, Symes and Walker, form a Law and Parliamentary Committee for the ensuing year."

It was moved by Mr. Andrews, seconded by Mr. Chapman, and unanimously resolved:—"That the officers of the Association, together with Messrs. Arblaster, Barclay and Holdsworth, form a Finance Committee for the ensuing year."

It was moved by Mr. Laird, seconded by Mr. Parker, and unanimously resolved:—"That the officers of the Association, together with Messrs. Andrews, Arblaster, Barclay, Bell, Chapman, Ellinor, Hampson, Holdsworth, Jervis, Jones, Maltby, Mason, Parker, Symes, Walker, Williams and Yewdall, form a General Purposes Committee for the ensuing year."

The following appointments were then made for the ensuing year:—Mr. Henry Glaisyer was re-appointed Solicitor to the Association; Professor Attfield was re-appointed Analytical Referee to the Association; Mr. W. F. Haydon was re-appointed Secretary to the Association on the same terms as before; Mr. Alfred Wright was appointed Assistant-Secretary to the Association, the engagement being terminable on three months' notice from any date, security to be given to the extent of one hundred pounds; Messrs. Lloyds' Banking Company were re-appointed Bankers to the Association; Messrs. Laundy and Co., Public Accountants, were re-appointed Auditors to the Association.

The Secretary then reported the circumstances attending the issue of summonses under the Sale of Food and Drugs Act against three members of the trade, two of whom were members of the Association, and after discussion, resolutions were passed as to the steps to be taken in defence by the Solicitor to the Association.

The President said the next question on the agenda paper was to consider the means of carrying into effect the following resolution, passed at the last Annual Meeting of the members of the Association:—"That as it is most desirable that chemists and druggists generally should be united in support of a Pharmacy Bill, it be an instruction to the incoming Executive to arrange an interview with the Pharmaceutical Council to promote that object."

In reply to a question, the Secretary said that from a correspondence which had taken place between Mr. Bremridge and himself in March last, it appeared that the amendments to the Pharmacy Acts Amendment Bill formulated by the Executive Committee of the Association had been laid before the Council of the Pharmaceutical Society, and had by them been referred to their Law and Parliamentary Committee for consideration. The last communication he had received from the Secretary of the Pharmaceutical Society was dated March 14, 1883, and intimated that Mr. Bremridge was unable to state when the Law and Parliamentary Committee of the Society would meet, as he had received no instructions to summon it, and that he was unable to give any particulars as to the probability of the Bill being introduced into Parliament at an early date, as no communication had been received from the Privy Council respecting it beyond the official acknowledgment of its receipt.

Mr. Holdsworth asked if no further communication of any kind had been received from the Pharmaceutical Society since the 14th of March last in reference to the Bill.

The Secretary said none whatever.

Mr. Symes said he thought some action should have been taken by the Association before the Bill was sent by the Pharmaceutical Society to the Privy Council, as it was no secret that the Bill was being prepared, and the Association had every opportunity of expressing its views.

The Secretary said the contents of the Bill were not made known to the Association until after the Bill had been printed and a copy transmitted to the Privy Council. The Executive had taken the earliest possible opportunity at their command to examine the provisions of the Bill and report to the Pharmaceutical Council amendments they considered desirable.

Mr. Barclay said it would be remembered that at the last Annual Meeting there was a general expression of opinion that the Association had not had sufficient opportunity for making known their views with regard to the amended Pharmacy Bill. A suggestion had been made that the Association should ask for an interview with the Pharmaceutical Council.

The President said he thought the present a favourable time for the interview.

Mr. Hampson said he believed the Pharmaceutical Council were as anxious as the Association that there should be unanimity, and a Bill carried, which would be equally acceptable to both bodies. The Executive, however, had no idea of the immense labour which had been bestowed upon the present Bill by the Council.

After some further discussion, it was moved by Mr. Barclay, seconded by Mr. Mason, and unanimously resolved:—"That as it is most desirable that chemists and druggists generally should be united in support of an Amended Pharmacy Bill, the Secretary be instructed to write to the Secretary and Registrar of the Pharmaceutical Society to arrange an interview between the Pharmaceutical Council and a deputation from this Executive before such a Bill is introduced into Parliament.

Some considerable discussion took place as to the advisability of urging the Board of Inland Revenue to issue an order making it compulsory on excise officers, when purchasing spirit for analysis, to leave with the seller a portion of the article purchased, as a protection in the event of errors being made by the officials who subsequently deal with the spirit.

The President said that he thought it was extremely desirable that action should be taken in the matter for the protection of the trade, more especially as he believed that one half the penalty recoverable under proceedings of that nature went to the informer.

It was moved by Mr. Symes, seconded by Mr. Parker, and unanimously resolved:—"That the Secretary be instructed to endeavour to arrange an interview between the Commissioners of Inland Revenue and a deputation from the Executive Committee of the Association for the purpose of urging upon the Inland Revenue authorities the advisability of issuing an order making it compulsory on excise officers, when purchasing spirit for analysis, to leave with the seller portion of the spirit sold."

It was moved by Mr. Jones, seconded by Mr. Barclay, and unanimously resolved:—"That in the event of the Commissioners of Inland Revenue consenting to receive the deputation, the President, Vice-President, and Messrs. Andrews and Hampson, with power to add to their number, be requested to represent the Association."

On the motion of Mr. Barclay, seconded by Mr. Mason, a number of gentlemen were then unanimously appointed Local Secretaries of the Association for the ensuing year.

Mr. Mason suggested that for the future a meeting of the newly appointed Executive Committee should be held in London on the same day as the Annual Meeting, for the purpose of appointing Committees.

The Secretary said the proposed arrangement would be unworkable, as persons not present at the Annual Meeting were frequently appointed on the Executive and would, therefore, be unable to attend.

Mr. Yewdall said that on looking through the last published list of members of the Association he found the names of several firms who subscribed in their collective capacity 5*s.* only. He thought annual subscriptions of 5*s.* should be paid by each member of the firm.

The Secretary said that 5*s.* had always been accepted as a subscription both for firms and individuals. If any alteration was now made he thought it should cover branch businesses, as the liability to the Association of a firm of two or three members with one business was not so great as that of an individual carrying on two or three businesses.

The President said that he did not think it advisable to make any alteration in reference to the subscriptions of firms, but that when collecting subscriptions, local secretaries might very well ask each member of a firm to contribute 5*s.* to the funds.

A communication was read from a member of the Association intimating that a person residing in Northamptonshire had taken out a hawker's licence and was selling from a traveller's van, drugs, patent medicines, etc., in the various villages in the locality. The Secretary was instructed to inquire into the matter, and in the event of his finding scheduled poisons were being so sold to take proceedings for the recovery of the penalties to which the individual was rendering himself liable.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

Solid and Liquid Illuminating Agents.*

BY LEOPOLD FIELD, F.C.S.

Lecture VI.

It was stated in the last lecture, with regard to the formation of petroleum, that Berthelot's theory of a mineral origin could not be well entertained, inasmuch as the postulated degrees of heat and pressure could not be found at the depth at which the last traces of petroleum occur. It may be that a sudden decomposition of organic matter under heat and pressure, where the gases generated are confined in contact with the liquid products, would bring about the formation of paraffin and olefine. Of coal we know that it is formed from vegetal matter, and, to a vast extent, from drift and accumulation of spores. But this is not always a process of such infinite time as is generally supposed. Wood, bearing marks of human labour, has been found partially carbonized—witness the piles driven in by the Britons to retard Cæsar's advance, the outer surfaces of which had undergone a decided carbonization. We are in possession, too, of all the links which connect coal and green wood. Here are specimens of peat, taken at different depths, becoming denser and denser, and, at a depth of 14 feet, resembling lignite—though less dense—and only requiring pressure to reduce it to a true coal; and here the gradations from lignite through all the coal varieties to anthracite. We may suppose that cellulose $C_6H_{10}O_5$ (wood-fibre) is split up according to the equation—

$$2\,C_6H_{10}O_5 = 5\,CH_4 + 5\,CO_2 + C_2,$$

and this is well supported by the abundance of marsh gas and kindred hydrocarbons found in the vicinity of coal mines. The variation in constitution undergone by wood-fibre, while changing to coal is as follows:—

	Carbon.	Hydrogen.	Oxygen.
Wood	100	12·18	83·07
Peat	100	9·85	55·67
Lignite	100	8·37	42·42
Bituminous coal .	100	6·12	21·23
Anthracite . .	100	2·84	1·74

As I observed when speaking of petroleum, we cannot well form an idea of its true constitution, inasmuch as during distillation what is termed "cracking" takes place, *i.e.*, the splitting up of molecules, by which one equivalent of a dense hydrocarbon may yield two or more lighter members, perhaps even of different series. Certain it is that, by the rapid distillation of heavy oils at a high and sudden heat, products are obtained which could not have existed in the original substance. When paraffins are heated under pressure, both paraffins and olefines are formed—

$$C_{20}H_{32} = C_5H_{12} + C_{15}H_{30} = C_7H_{16} + C_{13}H_{26} = \text{etc., etc.}$$

All the known paraffins have been obtained from Pennsylvanian petroleum, and the olefines, $C_{10}H_{20} - C_{13}H_{26}$. The main difference between petroleum and shale oils lies in the amount of olefines contained, which preponderate in the shale oil, as would be supposed A gaseous petroleum consisted of 90 per cent. CH_4, 8 per cent. C_2H_6, and 2 per cent. H; while the gaseous products of distillation of shale, analysed by Coleman, gave C_4H_8, C_5H_{10}, and C_6H_{12}, all olefines. The paraffin hexane, C_6H_{14}, a main constituent of American petroleum, is closely allied to cellulose, $C_6H_{10}O_5$.

* Cantor Lectures: Reprinted from the *Journal of the Society of Arts.*

A more detailed formulation of the change would be—

Vegetable fibre	$C_{12}H_{20}\ O_{10}$	The equivalents have been doubled throughout, to avoid too small fractions,
Peat	$C_{12}H_{14\cdot4}O_5$	
Brown coal	$C_{12}H_{13\cdot}\ O_{3\cdot8}$	
Lignite	$C_{12}H_{11\cdot3}O_{3\cdot2}$	
Bituminous coal	$C_{12}H_9\ \ O_3$	
Asphalt	$C_{12}H_{7\cdot7}\ O_{1\cdot1}$	
Elastic bitumen	$C_{12}H_{22}\ \ O_{0\cdot15}$	
Petroleum	$C_{12}H_{24}$	

which last would be obtained by the whole of the oxygen being evolved with half its volume of carbon as carbonic dioxide, which would leave the proportions of carbon and hydrogen as shown.

But as, wherever wood is found in process of decomposition, the elements of hydrogen and oxygen are being evolved—as H_2O and CO_2—in such proportion to the carbon as would tend to leave the latter ultimately free—as in anthracite—we must conclude that the formation of petroleum from wood, if it ever took place, must have been carried on by some unknown and extinct process.

The following table shows the chief differences between the oils obtained severally from shale, petroleum, and coal tar:—

	Shale.	Petroleum.	Coal tar.
Naphtha	70 per cent. heptylene C_7H_{14}; various paraffins, *no* benzene	70 per cent. heptane C_7H_{16}; olefines *and* benzines	Almost entirely C_6H_6 (benzene)
Photogene	50 to 80 per cent. C_nH_{2n}, remainder $C_nH_2N+_2$	50 to 80 per cent. $C_nH_{2n}+_2$, C_nH_{2n}	—
Lubricating	C_nH_{2n}, and $C_nH_{2n}-_2$	Less C_nH_{2n}	—
Paraffin	$C_nH_{2n}+_2$, *no* vaselene	$C_nH_{2n}+_2$; wax (and vaseline)	—

We come now to the solid, and partly solid, or viscid forms of native bitumens, which are very numerous. Under the name of petroleum is understood now the liquid form of natural hydrocarbon, but there is little doubt that the viscid and solid forms, as asphalt, tar, and bitumen—I speak, of course, of natural products—are forms of petroleum which have undergone condensation, either before or after the destructive distillation or putrefaction, which we suppose to be the origin of petroleum. Such names as Rangoon tar, or Burmese naphtha, Barbadoes tar, Trinidad pitch, and the like, cannot be regarded as defining accurately the substances to which they are applied. It would be useless for me here to enter upon the difference in the chemical constitution of all these varieties, each of which has acquired a reputation rather due to the prolific nature of its special source than any particular merit. I will select Rangoon tar for a few moments' consideration, as it has a place in the early history of paraffin. You know that Mr. Rees Reece obtained paraffin on a large scale by destructive distillation of peat; and a small company was formed in 1850, for working that material. Although this company was unsuccessful, it was through its agency that the first paraffin candles were brought before the public. Now, in 1854, Dr. De La Rue took out a patent for purifying and working Rangoon tar, or Burmese naphtha. Price's Patent Candle Company took this up, and worked it on a very large scale. It is worthy of remark that, in 1859, they actually sent 10,000 gallons of their oil to New York, which would now, indeed, be equivalent to sending "coals to Newcastle." I do not know what paraffin was ever obtained from this material on a large scale, Dr. De La Rue's patent referring to its treatment with nitric acid, for separation of the olefines and benzenes. In 1851, medals were awarded to Young for paraffin oil from coal; to Wiseman, from shale; and to Moreau, from bitumen. At the Paris Exhibition of 1855, the works of Mont Auriol, near Paris, exhibited paraffin from resin, of which were distilled annually nearly 3000 tons. The amount of paraffin is, however, so small as to be useless on a large scale. It must be remembered that, although I have not mentioned lubricating oil with any particular emphasis, since it is extraneous to my theme, this is at least of equal importance with the solid paraffin and the burning oil. The amount of lubricants consumed is enormous, and, from the fact of their freedom from oxidation, absence of acid properties, and general immutability, are supplanting animal and vegetal oils in all directions. A great portion of the liquid bitumens from Burmah, Rangoon and Baku are devoted to producing lubricants. I stated, you will remember, that the attention of the Russians had been actively directed to the construction of a lamp that should burn their heavy oils, and we are told that considerable success has attended their efforts. They are reported as being able to burn oils from ·860 to ·910. The importance of this to Russia is very great, as the oil of Baku contains nearly three-fourths of its weight of such heavy oils.

Asphalt yields on distillation, both paraffin and paraffin oil; but its chief use is, as is well known, for road-making. Coming now to the solid forms of natural hydrocarbon, we have the remarkable mineral, ozokerit, which, within the last ten years, has become almost a household word. The localities where earth wax, as ozokerit is often called, is found, are exceedingly few; in fact, I may say, there is only one spot where the genuine mineral has been found in any quantity, and that is in Boryslaw in Galicia. There are, no doubt, in the neighbourhood, and perhaps at intervals along the shores of the Danube, sources of ozokerit, but, though hardly a week occurs without specimens passing through my hands from nearly all parts of the globe, and all purporting to be ozokerit, I have found none that could compare for a moment with that from Boryslaw. A great number of specimens are marl or sand, caked with thick petroleum, and yielding on distillation an almost worthless oil. I have placed on the table a number of specimens of natural bitumens, from the very lightest naphtha down to the purest ozokerit. You will, I think, find that there are few countries which are unrepresented. Professor Boverton Redwood, the Secretary to the Petroleum Association, has very kindly supplied me with samples of the chief kinds from the most noted sources, and the Rev. Urban Smith has contributed a collection which transcends in interest perhaps any on the table, inasmuch as it embraces specimens from Castleton in Derbyshire, the scene of Dr. Young's first discoveries. A very remarkable form of petroleum occurs here, namely, what is called *elastic* bitumen. You will see how remarkably resilient and indiarubberlike a body it is. Of its formation or age I am unable to give any idea, and only know that this variety has been found in but one other mine in France.

You have also, from the same spot, some very curious illustrations of the way in which petroleum occurs. Here, for instance, are long tubes, evidently formed from inspissated petroleum, and here a piece of rock, the holes of which are filled with a semi-solid bitumen. Here is some tar from Coalbrookdale, Shropshire, another ancient source of bitumen; and here again are a number of specimens of oils from Italy. Germany has recently developed a number of sources. At Oelhein, a light oil has long been found, closely resembling that of America, and at a great depth. In Bavaria, recent borings have been rewarded by a plentiful flow of light oil, rich in luminants and paraffin, which renders this variety equal to the best supplied by Pennsylvania; and in Alsatia and Austria springs are also being worked. It is singular that, with so many sources of liquid bitumen, there should be only this one spot which furnishes the solid variety, and that this should differ so widely from all the others; for, whereas the richest petroleum yields under 10 per cent. of paraffin, ozokerit, by proper treatment, can be made to give 80 to 90 per cent. In fact, there is little doubt that this mineral is nothing more than solid high-melting point paraffin, with very small percentage of oil and dirt. This large specimen of ozokerit, as it comes from the mine, has been selected for me by the largest company in Galicia, and is as good an illustration of the natural mineral as can be wished. The fine crystals which project from it in different directions are rock salt, which is never far off an ozokerit mine. The dark striæ are gypsum, infiltrated with a small amount of tarry matter. Cutting off a corner of this lump, you see, characteristic of the mineral, a deep golden yellow wax, giving by reflected light the greenish tint characteristic of all bitumens, which becomes more evident when the mineral is melted. As you see it here, although coated with the dirt of the mine, the ozokerit itself is nearly pure, all inorganic minerals traversing its substance in regular layers. By melting and clearing-down with a little acid these are readily removed. It is then cast into blocks of about one hundredweight each, which are either manufactured on the spot or exported. To obtain products from the mineral ozokerit which can be used commercially, one of two processes is resorted to. The first, which is most largely employed, is that of treating the crude wax with Nordhausen oil of vitriol, and heating it till the acid has become decomposed or evaporated. After proper decolorizing, the wax assumes a golden yellow colour, and in appearance much resembles beeswax. It is called *ceresin* from this resemblance, and can be brought almost to a pure white. Here are specimens of both white and yellow ceresin. This material, however, is not of much use for candle making, as it has a strong and unconquerable tendency to smoke, but its other uses are very great. It is largely employed as an adulterant of beeswax, in which, though, it can be readily detected by strong sulphuric acid, which decomposes the pure cerotate, leaving the mineral intact. To render ozokerit useful to the candle-maker, it has hitherto been necessary to distil it, although several patents have recently been taken out in which this process is discarded. Ujhely, who has devoted much attention to the working of earth wax, dissolves the crude material in benzine or some other spirit, in which condition it can be readily filtered through charcoal. The spirit is then distilled off in an air-tight apparatus, leaving the white paraffin behind. Preparations are being made, I am told, for carrying this out on a large scale. The process with which I am acquainted, and by which the ozokerit candles are produced, consists in distilling the crude mineral in a current of superheated steam, the apparatus employed being very similar to that used in distilling palm oil. I have on the platform the original experimental plant in which our first experiments were made. You notice the series of vertical tubes, each lower bend of which is furnished with a cock, from which the condensed distillate runs. The lighter vapours are caught in this so-called "essence tank," where they are met by a jet of water, which carries them down with it. By this means, we obtain nearly 70 per cent. of a beautiful white paraffin, melting at 142° F. Of course, as it comes from the still, the ozokerit has not this appearance; it is a dirty grey, and is subjected to a series of treatments, similar to those undergone by paraffin wax, and already described. A very ingenious process for removing the oil from the paraffin without pressing has been patented by Mr. Sterry. It consists in simply washing the wax with soap and water. I have here a model of the apparatus employed. The impure paraffin is filled into bags, which are strapped on the larger of these two revolving cylinders of framework, and the trough being filled with a weak solution of alkaline soap, at a temperature of some 10° below the melting point of the paraffin, the big cylinder is revolved pressing firmly against the tooth-like ridges in the smaller. By this means the scale is thoroughly kneaded, and the oil to a great measure extracted, under the gracious influence of the warm alkali. The paraffin thus obtained is of a pure white, but opaque, which renders it useful for a certain class of candles only. A great agent in purifying the products of distillation is fullers' earth, which is capable of rendering the most refractory substances white and transparent.

Looking back now on all the materials which the animal, vegetable, and mineral worlds afford to the candle-maker, we have tallow, wax, sperm, palmitin, stearin, and paraffin. Tallow and wax candles have been separately described, as their mode of manufacture differs from the others, or mould candles. These were, until the commercial strain produced by Young's and Chevreul's discoveries had made itself strongly perceptible, made in hand-moulds—a comparatively slow and laborious process. I have here one of the old hand-frames, which are not yet quite out of date, inasmuch as some people, for reasons best known to themselves, insist upon having their candles made in this manner; and also because there are certain sizes which are not in sufficient demand to justify making separate machines for them. As you see, the hand-frame consists of about two dozen moulds, held together by wood-work, opening into a trough at the top, the points being downwards. The wicks have to be carefully cut to size, and each one provided with a little cotton loop; a long piece of wire armed with a crotchet-hook at the end is passed out through the tip of the mould, and catches the little loop aforesaid, which is then pulled up to the base, and a short piece of wire passed through it, which is kept in position by two little notches in the upper rim of the mould. The wick is then pulled tight by the end emerging from the top and secured by a little wooden peg. When all the moulds are thus furnished, the frame is ready for filling. This is accomplished by the pouring in of the material until the trough itself is quite full, thus allowing for the contraction of the liquid in the pipe which takes place on cooling, and is very considerable. The frame is then placed in water, the temperature of which is regulated according to the nature of the material—paraffin for instance, requiring as cool a water as possible, sperm and stearine, tepid. When cooled, the superfluous material is removed from the trough by a sharp-edged trowel, and the candles extracted from the moulds by tapping the points with a mallet. The hand-made candle is readily distinguished by the little groove which the wire wick-holder makes in the base.

I am unable to say precisely when the candle machine was invented; as far as I can learn, it was introduced into this country from America, about 1848–50. Mr. E. Cowles, of Hounslow, made several improvements therein, and brought it to its present state. He has been good enough to lend me these working models, which will assist my description. From 80 to 100 moulds are enclosed in the casting box, which moulds are open at each end. The tip which forms the top of the candle is fastened to a tube of iron, through which the wick passes. These tubes are fastened to a platform, moved up and down by a rack and pinion. The wicks are wound on bobbins, enclosed in the case below. The candles, being filled into the moulds, are cooled by water surrounding the pipes, the temperature of which can be regulated by the admission of steam, through pipes at the side. When hard, the crank is turned, which works the rack and pinion, and pushes up the tips, with tubes attached. These carry up the candles, which, on emerging, are grasped by an apparatus called a nipper, made of wood, lined with indiarubber. When the candles are fully withdrawn, and held in position by the nipper, the platform with wick pipes and tips is lowered to its normal position, thus closing the ends of the moulds, and these are again filled. As soon as the superficial cake has solidified sufficiently to ensure the steadiness of the wick, the candles above, which have hitherto acted as wick-holders, are cut loose, and removed in the nipper. Thus twenty or thirty batches can be made from one set of wicks.

A great improvement in the candle was made in 1861, when Mr. J. Lyon Field patented the conical "butt," by which a candle could be adapted to any candlestick, without paper or scraping. This invention naturally demanded a different machine for carrying out its purport, as, the butt being taper, and larger at the point of junction with the candle than the diameter of the same, it would have been impossible to extract it from an ordinary mould. The moulds for the butts are cast in a separate frame, which is removed, when the candles are finished, by a chain and pulley, and the candles then pushed out of the stem moulds in the ordinary manner. The idea is not mechanical, and several other neater methods have lately been patented, with varying success.

The temperature at which the candles are poured, and the time allowed for cooling, requires much care and experience to determine. When stearine candles were first introduced, their tendency to crystallize was so great, that it militated against their introduction. Various ways of remedying this defect were resorted to—actually *arsenic* being employed—until the simple expedient of allowing the melted material to cool in the pan, under constant stirring, till close on the point of solidifying, and then pouring into warm moulds, entirely put a stop to the nuisance. The wicks also of the candles are an endless source of care. Every description and size of candle has its particular wick, of so many plaits, and so many threads. The wicks, again, have to be soaked in various preparations, accordingly as they are for wax, sperm, or stearine. Upon the ornamentation of candles, too, endless knowledge and skill has been expended. These wax candles, about fifty years old, heavy with vermilion and ultramarine, and

"With uncouth sculpture decked."

compare poorly with the exquisite forms and tints of the myriad lights on this table. The introduction of aniline colours into paraffin is a pretty discovery. You will see that, when I add a little magenta base to to this beaker of paraffin, the liquid is not coloured at all. I now dissolve the dye in stearine, forming stearate of magenta, and a drop of this, added to the paraffin, dyes it of a gorgeous pink.

We have here candles cut and carved into every grotesque and beautiful shape—the spiral, the cable, the King Alfred, and the fluted—also a great variety of inventions, based on the even burning of a candle in a case, forced up by a spring. This horological candle, for instance, where the spirally ascending spring revolves a clock-glass, illuminated by the candle within. These dumpy little candles are the so-called "moons," which are employed in spring lamps for carriages and signals. Then there are many pretty ideas for preventing guttering, and supplying a shade which shall descend with the candle, all of which are explained better by examination than description.

I must confess, though, that, to my taste, nothing is to be compared, for elegance, with a plain, white, transparent candle. Stearine candles are undoubtedly the best for work, as they never bend or gutter; but the dead white is not pleasant, and the light is not equal in brilliancy to that of paraffin. Sperm candles are also very beautiful, and it is rather surprising that they are not more used; the price, perhaps, has much to do with this. The great objection to paraffin candles is their liability to gutter, if of low melting point, and further, to bend. This plasticity of paraffin is a very curious phenomenon, as it does not seem to be affected by the melting point, except in the time taken to acquire it. Ozokerit-paraffin is of so high a melting point, that the candle is consumed, generally, before the bending point is reached. Here you will observe various paraffin candles, which have been kept in a steam cupboard, at a temperature of about 100°, for an hour. The melting points vary from 115° to 140°; the latter being ozokerit. All, you see, have bent, that of 115° nearly double, but the ozokerit has not even a slight curvature. This valuable property arises, no doubt, from the homogeneity of the earth-paraffin, while all others are mixtures of higher and lower homologues. The light of an ozokerit candle is as 10 : 7·5 of sperm, 7 of wax, 7·25 of stearic acid, and 3·5 tallow. But there can be no question that no paraffin candle, as yet, gives the amount of light which it should by theory, and which it would do were its substance vaporized in a lamp. The cost of a candle will always transcend that of other forms of luminants, but its convenience and safety, on the other hand, more than compensate for this inequality, where comfort is allowed to enter into consideration of economy. The still, the supply pipe, the burner, all are condensed into one little apparatus, and remain equidistant, and the supply equable to the demand, till the end. This it is, combined with the purity of the combustion products, that has secured the candle its popularity, and will continue to do so as long as lights are burnt by man.

Gas and electric lighting have taken high rank as sciences, and justly so, involving, as they do, such profound thought and supreme skill. But the candle and the lamp have also called forth the highest powers of great scientists to perfect them,—Chevreul and Young laboured for little else,—and they are now nearly perfect of their kind. So, while honouring to the full the authors of the greater lights, we must not forget the many workers whose labours have brought the candle from the crude, smoky wax and tallow, to the beautiful form and light it now owns, of whom more than six generations sleep in the shadow of old Lambeth church, with no other monument than that of a fair life and faithful toil.

To those of the craft, and others, who have so kindly and courteously assisted me with their knowledge and specimens, I here tender my hearty thanks.

Parliamentary and Law Proceedings.

Prosecutions of Chemists under the Sale of Food and Drugs Act.

At the Marylebone Police Court, on Tuesday, Mr. Alfred W. Pipe, chemist, of 1, King's College Road, St. John's Wood, appeared before Mr. Mansfield to answer two summonses taken out at the instance of Mr. George Smith, inspector of nuisances for the parish of Hampstead, for selling to him, on June 14, 6 ounces of "spirit of nitrous ether, B.P.," not of the quality of the article demanded, inasmuch as it did not contain the proper quantity of nitrous ether, namely, 2 per cent.

Mr. Ricketts, solicitor, appeared in support of the summonses; and Mr. Glaisyer, solicitor, defended on behalf of the Chemists and Druggists' Trade Association of Great Britain.

Mr. G. A. Smith deposed that on June 14 he applied in defendant's shop for 6 ounces of spirit of nitrous ether, B.P. He informed the defendant's assistant, who served him, that he intended to submit it to analysis, and offered to divide the sample, but the vendor said he did not want a portion. The assistant said he believed the sample was all right, and Mr. Pipe observed that he could not guarantee it to be "B.P.," but he had no intention to defraud the public. Witness took the spirit to Mr. Heisch, the public analyst of the parish.

In cross-examination the witness said he removed the label from the bottle supplied to him by the defendant, as the Act required that the analyst should not know from whom the sample had been taken. He would not swear that the bottle was not marked "sweet spirits of nitre." He handed a written order to Mr. Pipe. After being served he heard the defendant and his assistant in conversation. They said something about there being a "London Pharmacopœia" as well as a "British Pharmacopœia," and that the two authorities differed as to the constituent parts of certain preparations. Mr. Pipe also said that he kept preparations according to both standards, and that he could not guarantee what he sold to the witness to be "B.P.," as there had been some misunderstanding on the part of his assistant with regard to the bottles, but that was after the purchase was completed. He purchased at the same time 2 ounces of citrate of iron and quinine and 3 ounces of tincture of quinine; there was no charge against the defendant in respect to those articles.

Mr. Charles Heisch, analyst, said the quantity of nitrous ether in the sample submitted to him was so minute that if he had followed strictly the directions contained in the British Pharmacopœia he should have said it contained none at all. The more delicate method of testing adopted by Dr. Dupré, however, showed that it contained ·69 instead of 2 per cent. The specific gravity was ·8477 instead of ·845. It was not "spirits of nitrous ether, B.P."

In cross-examination witness said he knew the London Pharmacopœia article, and he should suppose that there would be no more profit in selling one than the other. He admitted, on looking at the last reprint of the B.P., handed to him, that the original words, "2 per cent. of nitrous ether," were altered to "2 per cent. of an ethereal liquid," and that the ethereal liquid might contain aldehyd.

Mr. Glaisyer, in defence, said his client kept both the preparations referred to. The assistant had used the wrong bottle. Furthermore, the bottle given to Mr. Smith was labelled "sweet spirits of nitre," and not "nitrous ether."

The Magistrate said he did not think the case was one to be dealt with under the Act. These proceedings would doubtless act as a caution to the defendant in the future. It appeared to him to have been an accident by which one article was sold for another without any extra profit to the vendor. There was also some uncertainty as to whether the conversation with respect to the nature of the preparation took place before or after the completion of the purchase and as to the amount of nitrous ether required. Under all the circumstances, he felt himself justified in dismissing the summons.

The Magistrate then proceeded to hear a summons against Mrs. Jane Allchin, of 1a, Elizabeth Terrace, Hampstead, who was also summoned by Mr. Smith for selling 6 ounces of spirit of nitrous ether, not containing the necessary quantity of nitrous ether, namely, 2 per cent. She was further summoned for selling 3 ounces of tincture of quinine not containing the proper quantity of sulphate of quinine, namely, 8 grains to 1 ounce.

In the first case it was admitted that sweet spirit of nitre, P.L., had been supplied for spirit of nitrous ether, B.P., and Mr. Mansfield imposed a nominal penalty of 5*s.* and 2*s.* costs.

With respect to the second snmmons, the purchase having been proved,—

Mr. Heisch said he had examined the sample of tincture of quinine and found it to contain 6·2 grains of quinine sulphate to the ounce, whereas it should contain 8 grains to the ounce. He had never known the quinine to crystallize out in cold weather. His process of analysis was to evaporate, treat with dilute sulphuric acid, add ammonia, wash the precipitate with water, dry and weigh.

For the defence, Mr. E. C. J. Davis said he had acted as an assistant to the late Mr. Allchin and Mrs. Allchin for the last five years. He made the tincture in question strictly in accordance with the British Pharmacopœia, putting 320 grains of quinine sulphate (Howard's) into 2 pints of tincture of orange; that would be 8 grains per ounce.

Professor Attfield, F.R.S., said a third portion of the divided sample had been submitted to him for analysis, and he had found quinine present equal to about $7\frac{1}{2}$ grains (7·4 grains) of sulphate per ounce. By the process a little quinine would be lost. In his opinion Mr. Heisch's method of analysis was untrustworthy. Chloroform and ether should have been employed.

The opinions of the two chemists being at variance, the summons was adjourned for fourteen days in order that a sample of the preparation might be submitted to the analysts at Somerset House.

Mr. Joseph W. Allen, of 19, Elizabeth Terrace, Hampstead, also appeared in answer to two summonses for offences under the provisions of the Act.

The first was for having sold tincture of quinine which contained only 5·66 grains to an ounce instead of 8 grains. Evidence having been given in support of the summons, Mr. Glaisyer said that unfortunately the defendant was foolish enough to refuse to take the sample which the inspector offered him, so that in respect to this and the next summons the Association he represented had no data to go upon. He was, however, instructed that the nitrous spirit was prepared according to the London Pharmacopœia, and the quinine according to the British Pharmacopœia.

Mr. Allen said he had made the tincture himself, and put the quinine sulphate in at the rate of 8 grains per ounce. Some of the quinine might have become deposited at the bottom of the stock bottle.

The Magistrate imposed a penalty of 5*s.* and 20*s.* costs.

The second summons was for supplying, when spirit of nitrous ether, B.P., was demanded, a preparation of sp. gr. ·8475, and containing ·649 nitrous ether.

Mr. Allen said he sold the preparation as he received it from a wholesale house.

Penalty of 5*s.* and 2*s.* costs.

Poisoning by Laudanum.

On Monday, Mr. S. F. Langham held an inquiry, touching the death of Mr. Augustus Lang, residing in Cambridge Street, Pimlico.

A servant stated that on the previous Tuesday night deceased went to bed earlier than usual, and at 9 o'clock he called her up, and requested her to fetch sixpennyworth of laudanum. Deceased said he wanted to take a few drops with some brandy to procure sleep. She left him with the brandy on the table, and sent a man for the laudanum. Next morning on going to his room she could obtain no answer, and, on assistance being procured, deceased was found dead in bed.

Dr. Cass, of St. George's Road, Pimlico, said that when called in on Wednesday morning the deceased had been dead some hours. The *post-mortem* examination showed that the liver weighed 100 ounces—more than twice the normal weight. The organs were much congested, but there was no smell of opium in the stomach. No doubt death was due to an overdose of opium. The bottle found near the bedside contained six teaspoonfuls of laudanum, and over four were gone. The poison should not have been supplied except on a medical certificate.

The Coroner was about summing up to the jury, when the brother of the deceased protested against the termination of the inquiry without the examination of the chemist who sold the laudanum.

The Coroner's officer said the chemist was out of town, and declined to attend; he stated that he had sold as much as a pint at a time, and in this case, as in others, he cautioned the purchaser of the poisonous properties of the drug, and properly labelled it.

The Jury returned a verdict of "Death from an overdose of laudanum, taken accidentally."—*Times.*

Correspondence.

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

The Hop Gardens, and B.P. Hops.

Sir,—Your correspondent A. S. (from Milton, Kent) last week described what is at this season of the year a very interesting and pretty sight, a visit to the hop gardens during the "hopping time," and to the drying kiln. These I have often visited in Sussex, but in this district, when I was last there (September 4), hop picking had not commenced. It is evident A. S.'s letter was written previous to the hop grower's "black Sunday," September 2, the storm of which did immense damage to the growing hops, in all but the most sheltered gardens. One farmer lamented at Rye next day that it had blown £1000 out of his pocket. Not only were the leaves on the vine battered and blighted by it, but the bracts of the strobile itself were bruised and shrivelled, as I saw them on the Tuesday, in such a manner as to make it evident they would not produce a presentable sample; at least, this was the case with all those exposed to the south, however much protected by high hawthorn hedges, etc. Still, I learn later they have not suffered much in some gardens, but the hop grower—the British farmer intensified for grumbling—grumbles in the hopes of producing advanced prices. The hop is a delicate plant, and a very precarious crop; its cultivation in Kent and Sussex is carried on with the greatest care. This is specially the case in regard to the mode they have of protecting them as much as possible from exposure to winds. A fortnight ago I passed through a large hop growing district in Bavaria, between Nuremberg and Aschaffenburg, but not where the best Bavarian hops are grown, I was told. Here I noticed the plants were grown quite in the open, like other crops, there being no division of land into fields by hedgerows, such as we have in England, and no attempts were made to shelter the hops even; as a rule too the poles were much higher than the Kentish, which made the plant more exposed. The crop was not considered a good one there. The leaves on the lower part of the vine had turned quite yellow, yet no harvesting had commenced that I saw. The plants too, having in many cases "topped the tall poles," had a spindly appearance as compared with the luxuriousness of the Kentish crops prior to the 2nd inst. Your correspondent mentions the fires made of coke and sulphur used to dry the hops in the Kentish kilns and a strong odour of SO_2 which affected him in the drying room, without stating for what purpose it is used. The sulphurous anhydride is generated for the purpose of bleaching the leafy bracts of the strobile, which otherwise would be of a dull brown colour if dried without this bleaching; it is, in my opinion, a mistaken idea, but it makes the bleached pocket of hops much more marketable, I am told.

The official hop in the British Pharmacopœia is stated to be "the dried strobile of the female plant of *Humulus Lupulus*, Linn."—not the sulphured hops of commerce (?). Are we any more justified in using bleached hops in making preparations of them than we should be in using bleached ginger? A scrupulously conscientious pharmacist of my acquaintance dries his own hops without sulphuring them to use for making his preparations. I have prepared a tincture of the fresh strobiles, equal in strength to B.P., by using a spirit equal in strength to proof spirit, and estimating the loss, ascertained by drying a sample, as water. Compared with the tincture of the sulphur-dried hops, I find it slightly more alcoholic and paler in colour; diluted with water it makes a more opaque milky mixture, has much more aroma, as well as more of the bitterness of the hop, but it is minus a part of the flavour of the tincture of the dried hop. Both the tinctures have a slightly acid reaction, the fresh apparently not less than the dried, which I expected would be the case, through the latter retaining some of the acidity from the sulphur, probably as sulphuric acid. In the London Pharmacopœia, "*Lupulus.—Humulus Lupulus*, Amentum," was ordered, not necessarily dried, and therefore it might be construed that the converse—fresh—hops were intended, but I suppose never used. It is curious, that as the citizens of London petitioned against the use of hops, "in regard they would spoyl the taste of drink, and endanger the people," whence Henry VIII. issued an injunction "not to put any hops or brimstone into the ale," that these two substances should have such a preservative action on ale in the way of preventing it, to a considerable extent, undergoing acetous fermentation. A trace of sulphur is sublimed into the hops, and probably remains as such till it is used in the beer. Hence it may be essential for brewery purposes that the hops should be sulphured. Englishmen are probably too much accustomed to the use of hops in beer to derive much benefit from them medicinally, much as they may be vaunted by advertisement. Still they have mild tonic and stomachic, as well as slight narcotic properties, mostly residing in the lupulinic glands.

10, *New Cavendish Street, W.* Wm. Martindale.

The Duties and Responsibilities of the Chemist in Cases of Accidental Poisoning.

Sir,—I have read with some interest the letter of your correspondent, "Mors'," in last week's Journal, on the above subject, and shall be glad if you will allow me to venture my opinion thereon.

The case he alludes to is one quite different to an ordinary one of petty ailments which a chemist is often called upon to prescribe for, and under the circumstances I think he acted quite right, and was quite within his province in administering the antidotes. I should certainly have gone with the woman and made sure that they were administered. I do not advocate that chemists should be permitted to visit patients or even prescribe for serious ailments; but cases of poisoning should not allow of any hesitation on the part of the chemist, in the absence of a medical man, using his utmost skill and all the knowledge he possesses in placing the person out of danger, and should he fail to do so he will have the satisfaction of knowing that he did his best.

Stoke Ferry. W. H. Newsam.

R. Brown.—Your advertisement, with enclosure, has been forwarded to the publishers, Messrs. J. and A. Churchill, 11, New Burlington Street, to whom all advertisements should be sent.

R. H. R.—We are unacquainted with any such work.

Inquirens.—(1) The preparation mentioned is a proprietary article, the formula for which has not been published. (2) You do not mention your difficulty. Probably you will find the information you require among the Dispensing Memoranda which appeared in vols. x., xi. and xii. of this Journal.

Spondalium.—Formulæ for syrup of lactophosphate of iron and lime will be found in vol. iv., p. 610, and vol. vi., p. 882, of the present series of this Journal.

X. Y. Z.—The cause of the explosion is very obscure. We are making inquiries upon the subject, and should anything explanatory be learned it shall be communicated to you.

X. Y. O.—(1) *Senecio Jacobæa.* (2) *Reseda lutea.* (3) *Lathyrus pratensis.* (4) *Veronica Beccabunga.* (5) *Ranunculus hederaceus.* (6) Probably *Silene inflata*; send a specimen in flower.

T. P. J.—The name is not included in the Register of Veterinary Surgeons published at the commencement of the present year.

Apprentice.—(1) Probably *Rumex crispus*: leaves should be sent. (2) *Sisymbrium officinale.* (3) *Carduus palustris.* (4) *Senecio Jacobæa*, probably: leaves should be sent. (5) *Geranium sylvaticum.* (6) *Achillea Ptarmica.* (7) *Calluna vulgaris.* (8) *Pedicularis sylvatica.*

J. Kemble.—Thanks. The occurrence is not common, the modification usually taking place in the filaments. A similar change takes place in the columbine.

Apprentice.—If you look through the advertising pages of this Journal, you will find the information you require.

H. J. Thomas.—Tincture of gelsemium is now official in the United States Pharmacopœia. It is made by percolating gelsemium in No. 60 powder, 15 parts, with sufficient alcohol, sp. gr. 0·820, to make 100 parts of tincture.

Communications, Letters, etc., have been received from Messrs. Benger, Cassian, Brook, Lincoln, Associate, Asparagus, Morti, R. H. R.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 22, 1883.

THE BRITISH PHARMACEUTICAL CONFERENCE AT SOUTHPORT.

THE meeting of the British Pharmaceutical Conference, which commenced in Southport, on Tuesday morning last, will be memorable in the history of that Association for the large attendance and for the admirably conceived address of the President, Professor ATTFIELD, F.R.S. This address is printed *in extenso* in another part of this Journal, and since it will no doubt be perused with interest by the majority of those into whose hands it will thus fall, it needs no lengthened analysis or even commentary in these columns; but as it has already been criticized by the general public press from points of view different to that taken by Professor ATTFIELD, we have reprinted some of the articles that have appeared on the subject in the daily papers for the purpose of enabling our readers to become acquainted with the views entertained outside their own circle. The address, it will be seen, deals with the relation of the State to pharmacy, and forms a fitting continuation of the address of last year in which Professor ATTFIELD discussed the relation of pharmacy to the State. On the present occasion the speaker, starting with the proposition that Parliament intended by its legislation in the year 1868 to "provide for the proper supply of trustworthy drugs to the public," and to ensure that no person should act towards the public as a chemist and druggist unless he had satisfied State examiners that he was properly qualified and had his name enrolled on a State register, proceeded to discuss the various ways in which this intention of the Legislature has been thwarted and the unfortunate consequences to the public and pharmacists. It must be admitted that the picture drawn of the present condition and future prospects (if there be any) of the large majority of pharmacists in Great Britain will appear to many a sombre one, but the characteristic energy of Professor ATTFIELD had placed within his reach a mass of evidence which he used with effect in support of his position. The remedy for the evil which commends itself to Professor ATTFIELD'S judgment is, in accordance with views expressed last year, the extension of the letter and spirit of the existing Pharmacy Act, so that not only the dealing in a few virulent poisons, but the "retail sale in open shops of most of the simple and "compound medicines of the British Pharmaco-"pœia" should be carried on only by qualified druggists. That these views found favour with his audience is not surprising, and it may be hoped that the steps which are to be taken to bring them under the notice of members of both Houses of Parliament will be productive of good results. Meanwhile it is a good omen that some of the leading organs of public opinion have practically endorsed more or less the claim for consideration of their grievances put forward by Professor ATTFIELD on behalf of the pharmacists of Great Britain.

With respect to the position of the Conference it is satisfactory to find from the report presented by the Executive Committee that it continues to enjoy a fair share of prosperity. The special effort made to bring the Association under the notice of chemists and druggists who had not already joined it is stated to have already resulted in a considerable accession of members, whilst the Treasurer was able to report that the income had been more than sufficient to cover the expenditure.

At the conclusion of the address the Conference was adjourned for luncheon, which was provided by the liberality of the Local Committee in an adjoining room, after which many members took the opportunity of visiting the Aquarium and Winter Garden.

In the afternoon the reading of papers was commenced and according to the usual custom the reports upon subjects for the investigation of which money had been granted from the Conference funds were taken first, priority among these being given to a second report by Mr. A. H. JACKSON on "The Differences between the Essential Oils of Cinnamon and Cassia." In his previous report Mr. JACKSON dealt chiefly with the physical behaviour of the two oils and stated his opinion that, whilst there was some difference in their specific gravity and refractive energy, there was nothing sufficiently characteristic to supply a satisfactory method of distinguishing between them. In the present report more particular attention is paid to the chemical aspect of the question. The most promising experiment consisted in a comparison of the behaviour of the residues of the two oils after the removal of all the cinnamaldehyde by treatment with potassium bisulphite and ether; but although some slight differences have been noted they are not sufficiently definite to encourage further work in that direction.

The next report was on the "Bitter Principles of *Nerium odorum*," by Mr. H. G. GREENISH, who described two substances, one crystalline and the other amorphous, and both freely soluble in spirit, separated from a solution obtained by shaking an aqueous percolate of the powdered root with chloroform until all the bitterness had been removed. The exact nature of these two substances will form the subject of a future report. In passing a vote of thanks to the reporter the opportunity was taken to pay a well-deserved compliment to Professor DYMOCK, who supplied the crude drug operated upon, and who is continually contributing in one way or another to the elucidation of the history of Indian drugs.

The "Quantitative Separation of Strychnine and Brucine" formed the subject of the third report, which was by Messrs. DUNSTAN and SHORT, and in the words of the President constitutes a distinct advance in knowledge respecting these alkaloids.

The process devised by the authors for the separation of the two alkaloids is based upon the difference in the solubility of the ferrocyanides of strychnine and brucine, produced by the double decomposition of the alkaloidal sulphates and potassium ferrocyanide. Strychnine ferrocyanide is but very slightly soluble in water, whilst brucine is much more soluble; but it has been found that in neutral solution a larger quantity of the strychnine salt remains in solution if the brucine salt be present, and in alkaline solutions the separation is not so complete as is desirable. If, however, the solution of the sulphates be acidified with sulphuric acid, the strychnine is entirely precipitated by potassium ferrocyanide, both alone and in the presence of brucine, the brucine not being precipitated under similar conditions until the strength of the solution approaches saturation and then slowly and in large silky needles, differing from the granular and heavy precipitate of the strychnine salt. In another report, upon the "Tincture of Nux-Vomica," the authors stated that, as might be expected, the difference in alkaloidal strength which in a former paper they showed to exist in the nux vomica seeds of commerce is perpetuated in the galenical preparation. They gave the results obtained in the analysis of twelve specimens of tincture of nux vomica obtained from different sources, from which it appears that whilst the strongest tincture contained 0·360 per cent. of total alkaloid, of which one-third was strychnine and the remainder brucine, the weakest only contained 0·124 per cent., or just over one-third as much total alkaloid. The relative proportion between the two alkaloids was tolerably constant throughout the series of specimens, with the exception of one, in which they were present in equal quantity. These variations in the alkaloidal strength of tincture of nux-vomica confirm the conclusions arrived at some years since by Mr. Siebold, based on the relative bitterness of dilutions of some specimens, and point to the necessity for in some way standardizing the strength of this powerful preparation, if not to the advisability of abandoning it as far as possible in favour of the liquor strychniæ. Such a course would be affected, necessarily, by a knowledge of the physiological behaviour of brucine free from strychnine, and the process of the authors for separating the two alkaloids appears to furnish a favourable opportunity for clearing up this point.

After the reports had been disposed of, the first paper read was on the "Preservation of Medicinal Herbs by Ensilage," by Professor Quinlan, and described the results of some experiments in which medicinal herbs were submitted to treatment analogous to that followed in the process of ensilage of green fodder. The herbs in a fresh state were bruised to a pulp in a mortar, and the pulp packed closely into glass bottles, leaving only room for the stoppers, which were covered with beeswax, the bottles being afterwards buried in the earth. After treatment in this way belladonna, conium, and other herbs were found to be "perfectly sweet and fit for pharmaceutical use" at the end of four months. It is evident, however, that although herbs so preserved may be still "fit for pharmaceutical" use it does not necessarily follow that they will exactly represent the "live plant," upon the relative superiority of which Dr. Quinlan enlarged, since if the process is really equivalent to ensilage the vegetable substance will undergo a certain amount of fermentation, probably lactic, which might affect the active principle, whilst, as pertinently remarked by Mr. Stanford, the product would no more represent the fresh herb than sour kraut does the fresh cabbage. However, the subject is of considerable interest, and pharmacists are indebted to Dr. Quinlan for directing attention to it and for his promise to continue his experiments under varying conditions that were suggested in the course of the discussion.

The next paper read was by the same author and dealt with the Medicinal Properties of the Mullein Plant, which he described as being useful in the early stages of pulmonary consumption in a manner similar to cod liver oil or Russian koumiss. The particular mullein to which he referred, the *Verbascum Thapsus* of botanists, is frequently spoken of by ancient Irish medical writers and has long been used in Ireland for the relief of phthisical patients. The preparation specially recommended is a decoction of the fresh leaves in milk, either in its natural state or previously peptonized. So great is the demand for this plant that it is cultivated in several parts of Ireland, and it would be interesting to ascertain the exact effect of cultivation upon it. The sample of the fresh plant shown by Dr. Quinlan, was said to be the kind used, although a "poor specimen;" but it differed so much in the colour, texture and shape of the leaf from the characters usually observed in the *Verbascum Thapsus* plant as met with wild in this country that it might have been taken for another species. It may be useful to point out that the resemblance between the leaves of young mullein plants and those of young foxglove plants calls for the exercise of discrimination.

With this paper the business proceedings of the Conference on Tuesday terminated, and the majority of the members went to witness a display of swimming in the Victoria Baths, which by the courtesy of the directors was thrown open to them.

On Wednesday morning the proceedings were resumed with the reading of some "Additional Notes on the Bitter Principle of *Hymenodictyon excelsum*," by Mr. W. A. H. Naylor. It will be remembered that in a paper read a short time since at an Evening Meeting of the Pharmaceutical Society, the author gave some preliminary information respecting a bitter alkaloidal substance that he had isolated from the bark of this Cinchonaceous plant and which he then thought to be closely allied to, if not identical with paricine. Further investigation has proved it to be a new alkaloid having a composition corresponding to the empirical formula $C_{24}H_{40}N_3$, and therefore an addition to the small class of bases devoid of oxygen. Besides "hymenodictyonine," which is the name given to the new alkaloid, Mr. NAYLOR has separated a bitter neutral principle, represented by the formula $C_{22}H_{43}O_{10}$, which he thinks may possibly be a decomposition product of a glucoside.

The next paper was a very practical one by Mr. WILLMOTT, entitled "Remarks on Experiments with the Ointment Bases," which in consequence of its great length was summarized by the author. The object of the experiments was to contribute towards clearing up the pharmaceutical side of the question as to what is the best substance to be used as a basis for ointments in respect to securing efficiency and stability, the substances experimented upon being lard, oil and wax, and mineral hydrocarbons, and the experiments having been continued over a considerable period. It will be impossible to convey any adequate idea as to the nature of this paper without the publication of the instructive tables by which it is accompanied, and the conclusions arrived at can only be mentioned here in the briefest manner. The author infers from the results of his experiments that the washing and straining, or washing and filtering, of lard are without advantage in its preparation for use as an ointment basis, the best results having followed the simple process of melting and straining. In any case the coudition of rancidity in lard is quickly developed, though it may be obviated to a very large extent by the use of benzoin. Mixtures of oil and wax are stable when the yellow unbleached wax is used, but not when the official "white wax" is used. Of the various hydrocarbons hitherto in use as ointment bases, the author is inclined to award the palm to vaseline, but he says that he has found it to develop a disagreeable odour, especially when melted with paraffin, "white wax" or spermaceti, or in the presence of carbonate or acetate of lead, but the odour is not developed when yellow wax is mixed with it. Another new hydrocarbon basis, called "white ozokerine," was reported to have given more satisfactory results.

Mr. SIEBOLD then read a note on the "Processes of the British and United States Pharmacopœia for the Determination of Hydrocyanic Acid," in which he stated that subject to the correction as to the volume of silver nitrate solution required to indicate a certain strength, first pointed out as necessary by Mr. CRIPPS, and if precautions be taken for the absence of chlorides from the magnesia and hydrochloric acid from the hydrocyanic acid, the U.S.P. process is as reliable and delicate as that of the B.P. In the discussion a preference for the B.P. process was expressed by Mr. J. WILLIAMS on the ground that hydrochloric acid is almost invariably added to hydrocyanic acid as a preservative, and Mr. SIEBOLD pointed out that where it was desired to repeat the determination one process might be conveniently used to check the other.

In a paper on "Iodine in Cod Liver Oil," Mr. E. C. C. STANFORD described the results of experiments made with the object of testing the statement attributed to GARROD that "cod liver oil" contains 0·06 per cent. The author says that if this statement were true, cod liver oil would be the richest source of iodine with which we are acquainted; but although he found iodine present in every specimen examined, it never exceeded 0·000434 per cent., the mean of six specimens being 0·000322 per cent. More than double this mean quantity (0·000517 per cent.) of iodine was found in fresh cod liver, and the metalloid was also ascertained to be present in the flesh of the cod and the Scotch herring, in herring brine and in fulmar oil. It may be remarked that this "statement that cod liver oil contains 0·06 per cent. of iodine," which in the "blue list" and by various writers has been repeatedly referred to GARROD, does not correctly describe what is said by that author, whose words are: "the proportion of iodine is *not more* than 0·05 per cent."

The time having nearly arrived for the adjournment to luncheon, Mr. HOLMES briefly communicated some information respecting the trees yielding benzoin, and exhibited specimens of the leaves and sections of the trunk of the Siam benzoin tree, and leaves, flowers and fruit of the Sumatra benzoin tree, which have recently been received from Mr. JAMIE, of Singapore.

Upon resuming, the next two papers read were by Mr. CONROY and Mr. MABEN and discussed the Suitability of Sesame Oil for Pharmaceutical Purposes. Mr. CONROY is of opinion that sesame oil cannot replace olive oil for the chief pharmaceutical uses, since from the large proportion of olein it contains plasters made with it do not "set," whilst lime liniment made with it shows a tendency to separate. But in preparations where no chemical combination takes place, and where only a bland sweet oil possessing good keeping properties is required, perhaps no better could be chosen, and he thinks it might serve as a substitute for almond oil in the preparation of ointments. Mr. MABEN's opinion of sesame oil is somewhat more favourable, since he thinks that it might not only take the place of olive or almond oil in the preparation of ointments,—except ung. hydrarg. nit.,—but that it could be made applicable to plasters by a modification of the proportions of the ingredients.

In a note on "The State of Combination in which Morphia exists in Opium," Mr. D. B. DOTT gave his reasons for believing that morphia exists in opium both as sulphate and meconate. Although sulphuric acid is present in opium in sufficient quantity to combine with the whole of the morphia, there are also other bases present with which it will unite in preference, and the residue of the acid is not sufficient to satisfy the whole of the alkaloid. On the other hand, meconic acid is not present in sufficient quantity to take up all the alkaloid, and probably forms an acid salt with the portion with which it does combine.

The apparently interminable subject of Sweet Spirit of Nitre formed the topic of a paper by Mr. A. C. Abraham. This gentleman has been led to the conviction that the generally received explanation of the official process for spirit of nitrous ether is erroneous and to impute the moderate action and constant temperature peculiar to that process rather to the action of the sulphuric acid upon nitrate of copper, or to the increase of the boiling point by the admixture of sulphuric acid, than to the formation of nitrous acid. After some experiments in which the copper was first converted into nitrate, the author eventually abandoned this for calcium nitrate and he gave a formula for a process which he says presents the advantages over the official one of giving a greater yield at a smaller cost, with a less prolonged, more regular distillation and a smaller quantity to be distilled, whilst the action which takes place is more analogous to that in the older processes. In the course of the discussion Mr. J. Williams made some suggestive observations as to the possible composition of this preparation. He said that he had prepared ten per cent. solutions of pure nitrous ether and of aldehyd, but that neither resembled "spirit of nitrous ether," and the same remark was true of a mixture of the two; but a solution of paraldehyd sufficiently resembled it to raise the question whether the aldehyd was not present in the preparation in this condensed form, its action being perhaps modified by that of nitrous ether.

The results of an Examination of some Samples of Pitch were then communicated by Mr. E. Davies, with a table of their composition, from which it appeared that the organic matter dissolved by petroleum spirit from samples of Trinidad and Syrian pitch contained 5 or 6 per cent. of sulphur, a much higher proportion than exists in any known vegetable substance. The President took the opportunity of pointing out that the asphalt used for paving purposes contains more than 90 per cent. of inorganic matter and is incombustible.

A "Contribution to the Pharmacy of the Pomegranate," was next read by Mr. L. Siebold, in which a preparation was described which consists essentially of a solution in syrup of orange peel of an extract made from an aqueous infusion of the powdered root bark of *Punica granatum*, which has been deprived of all astringent matter by treatment with sugar of lead. It is said to have a pleasant fruity flavour, and be very effective.

The subject of the next paper, which was by Mr. Conroy, was a sample of spurious scammony, which appeared to consist of "skillip" scammony and upwards of 83 per cent. of the resin from the root.

In a paper on "Aconitine for Internal Administration," Mr. T. B. Groves refers to the small extent to which medicine has up to the present time profited by the researches of chemists upon the aconite alkaloids, due, no doubt, mainly to the uncertainty arising from the varying nature of commercial "aconitines." He recommends that any person setting about the preparation of aconitine for internal administration should satisfy himself that the roots he uses are the product of *A. Napellus*, and that the alkaloid should be separated in a crystalline condition, an operation which is described as requiring ordinary skill helped by extraordinary patience. The nitrate is the salt most ready to crystallize, and from it the pure alkaloid or any of its salts can be prepared without difficulty.

In a paper on the "Composition of Easton's Syrup," Messrs. R. H. Davies and E. B. Schmidt reported the results obtained during an examination of several samples of this preparation. It was found that they varied widely in composition among one another and from a sample prepared according to Dr. Easton's formula, the strychnia, for instance, ranging from 0·6 to 3 grains per four fluid ounces, the theoretical quantity being one grain.

In an interesting paper on the Odorous Principle of Henbane, Mr. A. W. Gerrard reported that he has succeeded in separating this principle as a pale yellow unctuous semi-crystalline mass, which consists probably of a butyric ether. Mr. Gerrard expresses an opinion that the deposit which sometimes forms in tincture of henbane will be found to consist of a mixture of this principle and chlorophyll.

The last paper read was by Mr. J. B. Barnes, and contained Suggestions for Combinations of Collodion, in which a number of instances are mentioned where collodion may probably be used advantageously for the topical application of medicaments.

At the close of the reading of papers, Professor Attfield presented to Mr. Ashton, in the name of the Conference, for the use of the local pharmacists, a number of handsomely bound volumes, purchased from the Bell and Hills Fund, to which were added 'Pharmacographia' and 'Science Papers,' presented by Mr. Thomas Hanbury in memory of his brother. The place of meeting in 1884 was the next business and a cordial invitation from the pharmacists of Hastings to visit that town having been read it was unanimously accepted. The election of Officers for 1883–4 was then proceeded with, the following being the result:—

President.—J. Williams.
Vice-Presidents.—M. Carteighe, London; J. R. Young, Edinburgh; S. R. Atkins.
Treasurer.—C. Ekin, Hounslow.
General Secretaries.—F. Baden Benger, Manchester; S. Plowman, London.
Other Members of Executive Committee.—J. Borland, Kilmarnock; J. C. C. Payne, Belfast; W. A. H. Naylor, London; W. V. Radley, Southport; W. Hills, London; G. S. Taylor, London; J. C. Thresh, Buxton; J. B. Stephenson, Edinburgh.
Auditor.—T. H. Sykes, Southport.

All that now remained to be done was to pass a well-deserved and enthusiastic vote of thanks to the Local Committee,—and especially to Messrs. RADLEY, ASHTON, BALL and KERSHAW,—for the admirable arrangements made to secure the success of the Conference; another to the public bodies and private firms that had thrown open their establishments to the visits of the members; and lastly one to the President for his services in the chair. After the Conference had terminated a large number of members adjourned to the splendid Glaciarium, where a number of skaters were disporting themselves on a surface of ice. The process of ice-making which is here brought into play was described and shown. It consists in the vaporization of liquid sulphurous acid in a partial vacuum produced by pumps worked by steam; the reduction in temperature thus produced is communicated to a solution of magnesium chloride flowing through a series of pipes under the floor of the Glaciarium, and the water is thus maintained in a frozen condition.

On Thursday a party of eighty, on the invitation of the Local Committee, left Southport by the 8.10 a.m. train for St. Helens. Special saloon-carriages were provided for the accommodation of members. The weather was, unfortunately, as unfavourable as it well could be. The rain poured down persistently, and a thick mist obscured the view of the country. On nearing St. Helens, hundreds of chimneys and mine-wheels suddenly appearing and disappearing in the gloom produced a most weird effect. On arrival at St. Helens the party divided, the majority proceeding to Messrs. KURTZ and Co.'s Chemical Works. Here LEBLANC's process for making sodium carbonate; processes for making caustic soda, bleaching powder, potassium chlorate, etc., were shown, and the principles involved and details of manufacture were explained by several most courteous guides. The other members visited the Union Plate Glass Works, BISHOP's Flint Glass Works, and Messrs. BIBBY and SON's Copper Smelting Works.

The Union Plate Glass Works stand on ten acres of ground, and employ a large number of hands. The operation of casting was not going on, but the immense cast iron beds—nine inches thick at the side, and twelve inches in the centre — on which the plates are cast were shown. The cast plates of glass are annealed for about four days in flat ovens and are then ground. The first grinding is with sand, the plate being cemented to a heavy bed with plaster of paris, and a heavy iron plate as large as the glass, being moved back and forth and sideways on the surface by machinery. The next process is similar, but two plates of glass are placed together with emery between, thus grinding each other. This produces a smooth opaque surface, such as is used for door panels, etc. The third grinding is with rouge and felt, which produces a fine polish. The rouge is made by the firm, by roasting copperas.

Space will not allow us to give further detailed account of the various processes exhibited at these places, but it should be stated that Messrs. BIBBY and SONS delayed the completion of the final stage of the reduction in order to give the members present an opportunity of viewing it. Luncheon was partaken of at the "Fleece," where Mr. Alderman HARRISON occupied the chair. Mr. S. R. ATKINS, of Salisbury, in most felicitous terms proposed the Alderman's health, a toast which was cordially received and responded to in appropriate terms. The return to Southport was made at 12.45, so that members might be able to attend a garden party given by the Local Committee at the Botanic Gardens, Churchtown. The rain, if anything, had increased in the meantime, but this did not prevent upwards of four hundred ladies and gentlemen being present. They were of course confined indoors, but good entertainment was provided for them in the spacious conservatory by a company of CHAS. HALLÉ's Choir, who sang a number of part songs, glees and choruses. Mr. LEO GRINDON delivered to the general audience a popular lecture on some interesting plants, and exhibited to the scientists, more especially, some beautifully mounted specimens of rarities of the vegetable world. The Fernery and Museum also attracted numerous visitors, and so the time slipped pleasantly by. Just before the breaking up of the party, the weather cleared up somewhat and enabled the members and their friends to view the extensive gardens and ornamental water. Finally, the gathering broke up soon after six amid general expressions of pleasure derived from the meeting, and of appreciation of the efforts so successfully made by the Local Committee for the entertainment of the visiting members during the whole of their visit to Southport.

THE BRITISH ASSOCIATION.

WITHIN two or three hours of the close of the Pharmaceutical Conference the inaugural meeting of the British Association in Southport was commenced in the Pavilion of the Winter Garden. The attendance was very large, for seldom, if ever, has there been a wider spread desire evinced to be present at the delivery of the Address by the incoming President. This feeling can hardly be explained upon intelligible grounds, for there was a general expectation that much of the oration of Professor CAYLEY would be *caviare* to the majority of his audience, an expectation which was justified by the event, notwithstanding the omission of some of the profounder passages. It is our intention, in accordance with the practice in preceding years, to print the address *in extenso*, but the length of the report of the Conference proceedings necessitates its postponement until next week. On Thursday morning the proceedings in the different sections commenced with addresses from the respective Presidents, that delivered by Dr. J. H. GLADSTONE in the Chemical Section having for its subject the nature of the elements. In the Report of the Council presented to the Executive Committee it was stated that 445 old members have notified their intention to be present at the meeting in Montreal next year and 55 persons have either become members or expressed a wish to do so, with a view of taking part in it.

DEATH OF MR. ATHERTON.

IT is with great regret that we announce the death, on Saturday last, at Tunbridge Wells, of Mr. JOHN HENRY ATHERTON, who was a member of the Council of the Pharmaceutical Society from May, 1870, until May, 1878. We understand that Mr. ATHERTON had been suffering severely for some weeks past from a malignant tumour, but that, nevertheless, his death was somewhat sudden and unexpected.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

The proceedings of the Twentieth Annual Meeting of the British Pharmaceutical Conference commenced on Tuesday morning, the 18th inst., at the Prince of Wales Hotel, Southport, Professor Attfield, F.R.S., President, in the chair. The attendance of members and friends was as large as on any recent occasion, the capacity of the room set apart for the business of the meeting being taxed to the utmost.

Welcome to the Conference.

Mr. Radley, Chairman of the Local Committee, commenced the proceedings by welcoming the Conference to Southport. He said that the chemists of the town and district had been looking forward to this meeting with great pleasure, and it was their supreme desire that it might be a happy and successful gathering. Their pleasurable anticipations were awakened not only by the interest and instruction to be derived from the various papers and discussions, tending to advance those departments of science and art in which pharmacists were most directly interested, but more especially because this meeting afforded the opportunity of making the personal acquaintance of many gentlemen whose names had long been familiar to them, and at their head, Professor Attfield, whose works were well known and appreciated, not only in Great Britain and Ireland, but also on the Continent and in the United States. Southport was a young town, which had grown rapidly, and, as all knew, was not unwilling to make its vitality manifest by a little warfare, but it was not able to boast of any great treasures in the way of arts or manufactures. Their neighbours at St. Helen's, however, had kindly come to their aid, and on Thursday morning a visit would be made to some interesting works there. Naturalists would, it was hoped, find various objects of interest in the neighbourhood, and the Winter and Botanical Gardens, Glaciarium, and Baths would help to interest the visitors.

The President, in the name of the visiting members of the Conference begged to thank the members of the Local Committee, for their hearty welcome, and to assure them that it was accepted with as much earnestness as it was offered. They considered themselves fortunate in having the opportunity of visiting so thriving and interesting a town—one which had the great advantage of attracting to its shores and charming boulevards the pleasure-seeking portion of a population of no less than four millions within a radius of forty miles. He would also thank the Committee for the enthusiasm with which the idea of this visit had been received, and he trusted that before the meeting closed the local members would find, by the frankness and fulness with which the visiting members accepted their hospitality, how highly their sympathetic efforts were appreciated.

Mr. F. Baden Benger (Secretary) then read letters from Mr. Brady and Mr. Greenish, expressing their regret at not being able to be present, and stated that similar communications had been received from Professor Redwood, Messrs. Umney, Martindale, Cutting, Denzil, Kinninmont, Maben, Gerrard, Barnes, H. Long, Groves, and H. G. Greenish.

List of Delegates.

The following is a list of delegates from various societies, who were present at the meeting:—

From the *Pharmaceutical Society of Great Britain.*—Mr. S. R. Atkins (Vice-President); Messrs. E. N. Butt, W. Hills, W. V. Radley, W. D. Savage, G. F. Schacht and J. Williams.

From the *North British Branch of the Pharmaceutical Society.*—Mr. J. Nesbit (President); Messrs. J. Borland, D. B. Dott, D. Frazer, J. B. Stephenson and J. R. Young.

From the *Pharmaceutical Society of Ireland.*—Messrs. J. E. Brunker, F. J. Minchin, J. C. C. Payne and W. F. Wells, jun.

From the *School of Pharmacy Students' Association.*—Professor Attfield.

From the *Bristol Pharmaceutical Association.*—Mr. G. F. Schacht.

From the *Glasgow Chemists and Druggists' Association.*—Messrs. D. Frazer, E. C. C. Stanford and J. Nicol.

From the *Leeds Chemists' Association.*—Messrs. George Ward, R. Reynolds and P. Jefferson.

From the *Liverpool Chemists' Association.*—Mr. J. Woodcock (President); Messrs. E. Davies, C. Symes and A. C. Abraham.

From the *London Chemists' Assistants' Association.*—Mr. W. A. H. Naylor.

From the *Manchester Chemists and Druggists' Association.*—Messrs. Wilkinson, Robinson, Paine, Benger, Siebold, A. H. Jackson and Woolley.

From the *Oldham Chemists' Assistants and Apprentices' Association.*—The President.

From the *Sheffield Pharmaceutical and Chemical Society.*—Messrs. J. M. Furness, G. T. W. Newsholme and W. Ward.

Report of the Executive Committee.

Mr. Sidney Plowman (Secretary) then read the Report of the Executive Committee as follows:—

It is the duty of your Committee in this, their Twentieth Annual Report, to place before the members of the Conference an account of the business transacted by them during the past year.

Beside the ordinary details of administration, several questions of great interest to members have arisen, upon which your Committee have had to deliberate on your behalf.

It will be remembered that no decision as to the place of meeting for 1883 was arrived at by the General Meeting of the Conference at Southampton last year, but it was resolved that the selection should be left in the hands of the Executive Committee. The British Association, owing to unforeseen circumstances, was unable to visit Oxford, and had not at that time selected the place in which it would meet in 1883. At a meeting of your Committee in October last year, letters were read from both Oxford and Southport, inviting the Conference to meet in those towns in 1883. As, however, in the meantime the British Association had selected Southport as their place of meeting, and as it is the practice of the Conference to meet in the same town as the British Association, it was unanimously resolved that the Southport invitation be accepted. At the same meeting the question of local arrangements was raised, and the following resolution was passed:—

> "That it be a general instruction to the local committees of towns in which the Annual Conference is to be held, that their arrangements, both in respect to the business of the Conference and the entertainment of its members, be approved by the Executive before publication, and that the attention of local committees should be called to the report of the Executive at the Sheffield meeting, in so far as it relates to questions of entertainment."

At a subsequent meeting of the Executive Committee, in April, 1883, it was decided that the list of subjects for investigation should be revised, and, in order to carry this out, it was resolved that a copy should be sent to every member of the Committee inviting suggestions. As a result some subjects were excluded and others added, and the "blue-list" last issued includes those subjects only which possess greater or less special pharmaceutical interest.

At the same meeting the General Secretaries were instructed to issue to all registered chemists and druggists residing in Great Britain and to all pharmaceutical chemists of Ireland not already members of the Conference, a circular prominently setting forth the objects of the Con-

FINANCIAL STATEMENT FOR THE YEAR ENDING JUNE 30, 1883.

The Hon. Treasurer in Account with the British Pharmaceutical Conference.

Dr.	£	s.	d.
To Balance in hand	217	8	4
„ Sale of Year-Book by Publishers	24	0	0
„ Sale of Year-Book by Secretary	18	0	0
„ Advertisements, 1880 vol.	0	18	0
„ „ 1881 vol.	8	3	0
„ „ 1882 vol.	90	1	0
„ Subscriptions from Members	658	5	3
July, 1882. To Dividend on £250 Consols	3	13	5
1883.			
Jan. „ „ „ „	3	12	6
	£1024	1	6

Cr.				£	s.	d.
By Expenses connected with Year-Book:—						
Printing, binding, and distributing	£435	15	6			
Editor's Salary	150	0	0			
Advertising and Publishers' charges	27	9	6			
Foreign Journals	4	5	0			
				617	10	0
„ Secretary's Salary				100	0	0
„ Printing and Stationery				7	7	6
„ Sundry Expenses				4	5	8
„ Postage				47	2	6
„ Advertising				5	0	0
„ Expenses of Southampton Meeting				15	14	10
„ Secretary's Expenses, Southampton Meeting				5	0	0
„ Balance at Bank	£221	8	1			
„ Cash in Secretary's hands		12	11			
				222	1	0
				£1024	1	6

Assets July 1st, 1883		£	s.	d.
	Cash in hand	222	1	0
	Consols (stock)	250	0	0

THE BELL AND HILLS FUND.

Dr.	£	s.	d.
1882. To Balance in hand	25	5	0
July. To Dividend on £350 Consols	5	2	10
1883.			
Jan. „ „ „	5	1	6
	£35	9	4

Cr.	£	s.	d.
By purchase of Books for Southampton	9	12	6
„ Balance at Bank	25	16	10
	£35	9	4

Assets July 1st, 1883		£	s.	d.
	Cash in hand	25	16	10
	Consols (stock)	350	0	0

Audited and found correct { JAMES SPEARING, T. H. SYKES } *Auditors.*

ference, and inviting them to membership. This instruction was carried out in July at a cost of £92 11*s.* 7*d.* As a result, between 340 and 350 registered chemists have tendered their subscriptions and presented themselves as candidates for membership, and applications continue to arrive almost daily.

As the financial year ends on June 30th no account of the cost of, or of new subscriptions due to the issue of, the circular is included in the Treasurer's present financial statement.

The result of the distribution of the "blue-list" and other circulars among the pharmacists of some of the colonies has been so encouraging that the question of the desirability of appointing colonial secretaries has been discussed.

It was considered that the objects of the Conference, viz., the advancement of pharmacy and the promotion of brotherly feeling and mutual goodwill, might be best secured by such appointments, and the General Secretaries were instructed to obtain the names of suitable gentlemen in the Colonies and India willing to undertake the duties. The following have been communicated with:—Mr. H. S. Evans, F.C.S., Montreal, for Canada; Mr. W. C. Ross, Trinidad, for the West Indies; Mr. A. Walsh, Port Elizabeth, for the Cape and Natal; Mr. D. S. Kemp, Bombay, for India; Mr. E. Taylor, Brisbane, for Queensland; Mr. H. Shillinglaw, Melbourne, for Victoria; Mr. L. B. Bush, Bathurst, for New South Wales; Mr. A. P. Miller, Hobart Town, for Tasmania; Mr. T. M. Wilkinson, Dunedin, for New Zealand. Sufficient time has not elapsed for replies to be yet quite complete, but so far as they have at present been received they are most favourable. Mr. Kemp advises the appointment of a secretary in each Presidency instead of one only for the whole of India and consents to act for Bombay if appointed; but Mr. Evans in consenting to act for Canada thinks one secretary sufficient for the whole of the Dominion.

Your Committee have pleasure in reporting that they have been able to accede to three applications for money grants for the purchase of material on which to conduct researches. They are as follow:—£5 to Messrs. Dunstan and Short to investigate the pharmaceutical preparations of nux-vomica, principally in regard to their alkaloidal value; £5 to Messrs. Dunstan and Ransom to further extend the method of alkaloidal extraction with the chloroform-alcohol mixture, to be followed by a further grant of £5 if required; £2 2*s.* to Mr. W. Elborne to determine the comparative pharmaceutical value of commercial rhubarb.

Reports will be presented at this meeting from Messrs. Greenish and Jackson on subjects for the elucidation of which grants have previously been made, and a first report from Messrs. Dunstan and Short on the preparation of nux-vomica, as well as one on the quantitative separation of strychnine and brucine, will be read at this meeting. Mr. Elborne will present a report on the comparative value of commercial rhubarb at the next general meeting.

Twenty-three papers and reports have been received for the present meeting, but one was of a purely medical character and was returned to the author as being unsuited for the object of the Conference.

The Bell and Hills Fund, founded by the munificence of Mr. Thomas Hyde Hills, provides for the annual expenditure of £10 for the purchase of books for presentation to the library of the Pharmaceutical Association of the city or town in which the Conference meets from time to time. As Southport has no such association some difficulty arose as to the gift of books this year. The Local Committee, however, arranged that, if the Executive Committee could make the grant, the books should form the nucleus of a library and that the Local Secretary of the Pharmaceutical Society of Great Britain, for the time being, should undertake the charge of them and should guarantee their legitimate use. Under these circumstances it was decided that the books be presented and they are now on the table for the inspection of members.

Mr. Louis Siebold was last October re-appointed editor of the 'Year-Book,' and the manuscript, as far as it can be prepared, is now on the table.

Since the last General Meeting at Southampton, 396 candidates have been elected to membership, 20 of whom reside in the Colonies, 14 in Ireland, and 332 of the applications were sent by residents in Great Britain in response to the special circular issued last July.

Financial Statement, 1882–3.

Mr. Ekin (Treasurer) read the Financial Statement, which is printed on the preceding page.

The President moved the adoption of the report, which he said spoke for itself, and showed that the Committee had kept constantly before it the objects of the Conference, viz., the encouragement of original research, and the promotion of good fellowship amongst its members throughout that Greater Britain on which the sun never sets. It would be open to any one to put any questions with regard to it, or to discuss it in any way.

Dr. Quinlan seconded the motion, and thought the members ought to be much obliged to the gentlemen who had managed their affairs so well.

No questions being asked the motion was put and carried unanimously.

The President's Address.

The President then delivered the following address:—

The Future Supply of Drugs to the Public.

Part II.

The Relation of the State to Pharmacy.

Once more I desire to direct attention to the important question of The Future Supply of Drugs to the Public. The one side of that subject, namely, The Relation of Pharmacy to the State, I treated last year in my address to the Members of the British Pharmaceutical Conference assembled at the Nineteenth Annual Meeting, at Southampton. Again honoured with the Presidency of that body, at the Twentieth Annual Meeting, at Southport, I ask for attention to the other side, namely, The Relation of the State to Pharmacy.

I do not now purpose considering the ideal relationship of a State to Pharmacy. Nor can I within the limits of an hour's address give even an outline of the actual relationship now existing between every civilized State and the pharmacy of that State. I must confine myself at Southport, as at Southampton, to the question as to what will be the character and conditions of the supply of drugs, in the immediate future, to the individuals and households of Great Britain, so far as that character and those conditions can be predicated from the character and conditions of the present supply. What pharmacy is doing and can do for the State, in the interests of every individual in the State, I described last year; what the State is doing and can do for pharmacy, in the interests of the public, is what I now desire to consider.

A crisis in pharmacy is fast approaching. The endeavour of the British Legislature to provide for the proper supply of trustworthy drugs to the public is being seriously thwarted. The great importance of such a supply is obvious, and in 1868 Parliament enacted that after the end of that year no person should take the title "chemist and druggist," and practise under it, unless, after satisfying State Examiners that he was properly qualified, his name was duly enrolled on a State Register. Now, that it was possible for any person probably utterly unqualified and certainly unregistered to act towards the public as a chemist and druggist without actually calling himself or using the words "chemist and druggist," was not then foreseen. Yet that is exactly what is happening. The practice which has long existed in this country, especially in thinly populated districts, of some general shopkeeper, usually a grocer, selling two or three common drugs, a practice itself not always harmless, has, within the past five or ten years, developed into the sale of nearly all drugs and medicinal compounds by shopkeepers of all descriptions in nearly all districts. Indeed, in some cases, also increasing in number every year, completely furnished shops, indistinguishable in appearance from those of registered chemists and druggists, are opened by unregistered and unqualified men, who are mere distributors in retail of drugs bought wholesale; men without proper knowledge respecting the dangerous articles they deal in and without any sense of the responsibility of their position. These sham chemists and druggists, and large numbers of the general shopkeepers alluded to, sell everything the properly qualified chemist and druggist sells. The only articles which they are not supposed to sell are the few more virulent poisons scheduled in the Pharmacy Act, the sales of which, however, by the duly qualified man do not make five pounds difference to him in the course of a year.

This condition of things is not only worse than that which the Pharmacy Act of 1868 was intended to remedy, it is very much worse. For to supply such unqualified drug sellers large numbers of so-called wholesale druggists have sprung into existence respecting whose qualifications for the work nothing is known. So that at the present time the public are not only liable to be supplied with untrustworthy drugs because a flaw in an Act of Parliament allows unexamined and unregistered men to practise as chemists and druggists, but because the wholesale druggist supplying such retail vendors may himself be incompetent. Now, from wholesale druggists, men who do not keep open retail shops, the Legislature never has demanded evidence of qualification. For, firstly, the old type of wholesale druggist was a man of probity beyond suspicion—and, fortunately for the health of Great Britain, the old firms still exist, many a new one, doubtless, being as good. But, secondly, on the assumption that drugs and compounds are only supplied retail by persons who have given evidence of their fitness to manipulate such potent substances and to judge of their quality as they are sent into the shop from the warehouses of wholesale dealers—the assumption on which, apparently the Pharmacy Act of 1868 was framed—on this assumption any evidence of qualification of wholesale druggists is uncalled-for and unnecessary. Obviously, if all the retailers were qualified, the public would be amply protected. Indeed, considering the number of persons employed in a large wholesale drug house, and the extent to which division of labour is carried in such an establishment, the supplying of evidence of qualification of all who carry on different responsible operations there is perhaps not practicable. So that if any remedy is to be sought for the serious state of things I am considering—assuming that it exists, and I shall show that it does,—that remedy will scarcely be found in the requiring of evidence of qualification from wholesale druggists. It rather lies in an improvement of the Pharmacy Act as regards the retailers of drugs; but of this more later on. The serious fact for present consideration is, that whereas the law of this country, in view of the welfare of the community, in drug matters, contemplates the retail supply of drugs by properly qualified persons only, that intention is being extensively frustrated. Drugs of nearly all kinds, simple and compound, are being indiscriminately stored and sold by unqualified persons; stored with articles of food and drink, and indeed with nearly all articles required in domestic life; and sold by shopkeepers of nearly every class. Thus, drugs, besides being manipulated and vended by registered chemists and druggists, and sometimes by medical men who cannot in all cases earn a livelihood without turning their surgery into a shop, are stored and sold by barbers, booksellers, chandlers, confectioners, drapers, general dealers, grocers, hairdressers, herbalists, ironmongers, marine-store dealers, oilmen, printers, publicans, stationers, store-keepers, tailors, tobacconists, toy dealers, wine merchants. Many of these shopkeepers are no doubt in a very small way of business; many, however, are prominent men doing large trades, and too often sell the drugs at cost price as mere baits to catch customers for other, profitable, transactions. Then, as already indicated, besides these drug-sellers admittedly engaged in other trades, there are the sham chemists and druggists, the coloured show-globes in whose windows, and bottles on whose shelves mutely proclaim them chemists and druggists, but who are unregistered and unqualified.

This, I say, is an extremely serious state of things. It is, of course, an unfair and very serious condition for chemists and druggists themselves,—men who have fitted themselves for their responsible calling in the manner prescribed by Act of Parliament,—for they are thus, many of them, losing much of their means of living and of the means by which they maintain their wives and families. But it is far more serious for the public.

It is a serious state of things for the public for this chief reason, namely, that whereas purchasers of food are more or less protected from the purchase of bad food by their personal power of judging of the quality of food, purchasers of drugs cannot be protected from the purchase of bad drugs by any personal power of judging of the quality of drugs. *Caveat emptor* does not apply in the case of drugs, because the purchaser has not the requisite knowledge to enable him to *beware*. Even the aid which purchasers of food can invoke from officials under the Acts relating to adulteration cannot be obtained in the case of drugs, because, amongst other reasons, nature yields drugs which vary much in quality, and only trained chemists and druggists can properly judge of such quality. Analysts *quâ* analysts cannot be sufficiently familiar with the varying natural standards of quality of all the many medicinal articles comprehended under the term *materia medica*—if, indeed, there are any such standards—to throw their official shield in front of the public. From the evils of bad drugs the public cannot protect themselves; they cannot be protected by the machinery of the Food and Drugs Act; they have no control over either the importer of foreign drugs, the grower of indigenous drugs, or the wholesale dealer in or manipulator of drugs; as regards the retail dealer, the machinery for their protection in the Pharmacy Act is incomplete: therefore it is expedient that the machinery for their protection in the Pharmacy Act be rendered complete and effective.

Here let me endeavour to allay any alarm which the use of the word "protection" may excite in the minds of free traders. And, I say, first, that where the health of the public is at stake, and where the public cannot protect themselves, an exception to the rule of free trade may be and is allowed. For already the State does not permit free trade in some poisonous drugs. Therefore an exception to the rule of free trade is already allowed in pharmacy, hence this part of the question need not be discussed. It is only necessary to consider where the limit of exception should be fixed. The line is now drawn by the State between some poisons and others. My contention will be, that the line should encircle all poisons. Nearly all drugs are poisons, more or less. Therefore nearly all drugs should be excluded from the area of free trade. But I say, secondly, that the doctrines of free trade do not apply to pharmacy. There cannot well be true freedom of trade where the power of judging of the article traded in or demanded is all and only on one side. It is for this obvious reason that the spirit of free trade has not been and cannot be applied to those avocations commonly termed professions. The inhabitants of civilized countries having desired legal or medical assistance, and well knowing that they were unable to form any immediate judgment of the quality of that assistance, have looked for and obtained external means of protecting themselves from bad law and bad medicine—means external to themselves. Such communities have required that lawyers, doctors, and others should give some evidence of qualification to official examiners, or have aided professional men to erect certain social barriers, known as etiquette and the power of the cold shoulder, for the exclusion of quacks, charlatans, and other unqualified persons from their ranks. Now, pharmacy is largely a professional avocation. In pharmacy we are on the border line of the commercial and the professional. Pharmacy is partly a trade, partly a profession. The purchase and sale of an ounce of tincture of rhubarb is *per se* a transaction purely commercial. But if the dose is asked, or, say, the mode of administering the medicine, the transaction assumes a professional character; while the still more important question as to whether the purchaser is supplied with a trustworthy or worthless article turns entirely on the vendor's professional knowledge—chemical, botanical, and pharmaceutical knowledge. In those subjects of professional knowledge he is educated; in those subjects of professional knowledge he is examined; to the extent to which he possesses that knowledge, to that extent he is a professional man. Trade and profession form the warp and woof of pharmacy, interwoven in every part of the fabric. The doctrines of free trade cannot, I say, be applied to professions. Therefore the principles of free trade cannot be applied to pharmacy. The purchaser of drugs cannot protect himself from the purchase of bad drugs. He is not, himself, in a position of freedom in this matter. Therefore he needs protection by methods external to himself. The most ardent champion of freedom will, I am sure, recognize this principle. The Legislature has recognized it, and the public has recognized it, and it has been applied to the practice of pharmacy as to medical and to legal practice, not by excluding unqualified chemists and druggists from practice by a code of etiquette or unwritten social law—for, unfortunately, that method appears to be inapplicable in pharmacy,—but by rendering illegal the use of the name or title "chemist and druggist" by unexamined or unregistered men.

The Pharmacy Act of 1868 was, at all events, intended to provide such protection. It has partially failed, because incomplete; failed because, while requiring that chemists and druggists shall be properly educated, it has not prevented the uneducated from palming themselves off as chemists and druggists. The Act practically says sellers of drugs must be properly educated, yet allows uneducated vendors to sell drugs. The failure has arisen from a wrong method of protecting the public having been adopted,—a method which could not be foreseen to be wrong, but which has proved wrong in the working. The method adopted was that of raising a legal fence around the mere name "chemist and druggist;" the method which should, we now see, have been adopted, was that of rendering illegal the retail sale of the simple and compound drugs of the British Pharmacopœia (with certain exceptions) by any but registered chemists and druggists, with the saving of all rights, of course, to medical practitioners.

The time has come when, for the welfare of the public, the Pharmacy Act should be rendered efficient. If this be not done, a period will soon arrive when the public, unable, as I have said, to judge of the quality of drugs for themselves, will be deprived—or a great majority will be deprived—even of those external means of protecting themselves which, in most districts, they possess now; that is to say, they will lose the advantage of dealing with duly educated men; for thoroughly and legally qualified druggists will only be found in the more wealthy quarters of cities. A certain proportion of drug vendors will always, for various reasons, qualify themselves. A certain proportion of any class of men are always ready to undergo, voluntarily, a course of special education with its attendant set of examinations. Pharmacists form no exception to this rule. Before compulsory examination was instituted in pharmacy,—that is, before 1868,—about 25 per cent. of the chemists and druggists of this country voluntarily submitted to pretty much the same examination that all who would now call themselves "chemists and druggists" are compelled to pass. And therefore, even if the present tendency for the retail supply of drugs to pass into unqualified hands were allowed to continue, a few well-qualified chemists and druggists would, for various reasons, be forthcoming. These would no doubt place themselves and their shops amongst the wealthier classes in the west ends of towns and in fashionable watering places, and such classes of the public would thus be duly protected from bad pharmacy. But other classes would be unprotected from the liability to be supplied with bad, weak or spoilt drugs for daily needs or possibly for critical times when life and death are on the balance. Such a state of things must soon come to pass unless timely legislative action be taken. I say a crisis in British pharmacy is fast approaching.

But before we further consider the question of remedy, evidence must be adduced in support of the assertion that potent drugs are being sold largely in nearly all parts of the country by unregistered persons. Evidence of this kind I have gathered from about two hundred different districts in England and Scotland—districts fairly representing the whole of Great Britain. I have been supplied with direct evidence, in the form of price lists of all the important drugs in general demand issued to the public by shopkeepers other than registered chemists and druggists, and in the form of statements from competent observers as to the kind and numbers of unqualified traders who vend drugs in their respective localities. Indirect evidence has been given to me in the form of returns showing the depreciation in the value of chemists' businesses, including the cause of that depreciation, during the past five or ten years.

In November last I sent to correspondents in about three hundred districts copies of a letter the chief paragraphs of which were as follows:—"I desire to show that it is to the direct interest of the public that something should be done to prevent the rapidly increasing sale of drugs by unregistered and incompetent persons—an irregular form of trade which is said to have produced already, or largely contributed to the production of, a seriously depressed condition of retail pharmacy. To this end it is desirable I should have more exact knowledge of the stated depression, and of its extent, than any single individual can at present possess. May I beg you, therefore, in the interest of yourself and your fellow pharmacists, to help me by telling me how far the oft-recurring statement that 'pharmacy is not what it used to be,' is true in your experience. For example, how far, in your judgment, is a business worth less than formerly: how far, in your district, are drugs sold by grocers, drapers, etc., or by unregistered men pretending to be chemists and druggists: what proportion of an average drug business in your vicinity is pure pharmacy as compared with the part that has little or nothing to do with drugs; and is the pharmaceutical portion increasing or diminishing? Do you think that the taking of fewer or more concentrated medicines by patients affects the question; or that the depression in pharmacy is greater than has occurred in most callings of a general business character during the past few years? Can you throw any other light on the matter?"

The correspondents selected were, first, a chemist and druggist in most towns in Great Britain having one or more Members of Parliament or containing three Members or Business-Associates of the Pharmaceutical Society of Great Britain; second, representative pharmacists whose acquaintance I have made in my visits for twenty consecutive years, to the twenty towns at which the British Pharmaceutical Conference has assembled; thirdly, two or three different classes of persons not actually engaged in retail pharmacy, but who have daily dealings with retail pharmacists. Of the three hundred correspondents I addressed, about two hundred, either at once or on a second application, sent me full replies to the questions, many offering to contribute any further information that might be desired. The greater portion, indeed practically all the replies were, as might be expected, so far private that while I am at liberty to make public use of the information they conveyed, I am not authorized to give the names or addresses of the writers. I thank them cordially for their help, and I doubt not that were any public inquiry into the relation to each other of the State and Pharmacy to be instituted, by a Royal Commission, by a Committee of either House of Parliament, or by any other authority, the majority of them would be willing personally to substantiate their statements.

Respecting the evidence which price lists afford of the sale of drugs by tradesmen other than druggists, little need be said. Every retail trader, who, finding it expedient to hold to the fiction that number one is the first law of nature, proceeds to roll three or four, or, it may be ten or twelve businesses into one, is impelled by convenience to compile, and by policy to publish, a priced list of his many articles of sale. Most householders in this country have probably received many such lists sent to them by way of advertisement. In these lists drugs are commonly included. Every drug in ordinary demand will be found there except the few very powerful poisons scheduled in the Pharmacy Act. Indeed even these are not actually excluded, for, called, not by their own names, but by some fancy title, and classed under the misleading term "patent medicines," even the most virulent poisons are sold by these unregistered persons.

Not only, however, do such price lists afford evidence of the sale of drugs by traders other than druggists, but, the prices quoted showing only a slight trading profit above the wholesale price, the inference is fair that such vendors are as professionally unqualified as they certainly are legally unqualified, that is, unregistered. For a 5 or 10 per cent. profit may, possibly, remunerate the man who is only a trader—indeed who does not aspire to be anything more—such as a grocer or a draper, but is quite inadequate for a duly qualified chemist and druggist, who, in obedience to the demands of the public as expressed in the Pharmacy Act, and to his own sense as to what is right, has gone through a proper pupilage in pharmacy, chemistry, botany, and materia medica. As well might we expect a lawyer to thrive on a 5 or 10 per cent. profit on his stationer's work and his office expenses, or a doctor to flourish on a 5 or 10 per cent. profit on his dispensing work and his surgery expenses. These men must be remunerated for the brain work they do for the public; they are *professional* men. The druggist is in part a professional man, and must *pro tanto* be paid for his brain work. (And here, in parenthesis, I may remark that the public never stigmatize a lawyer or a doctor as "a man who gets elevenpence three farthings out of a shilling," although this pseudo-sarcasm would be far more literally true of either of them, if it were founded on the insignificant amount of their office costs or surgery expenses, than it is of the druggist. The public should not so stigmatize the druggist. They should regard the charge for a bottle of medicine as they regard the charge for a legal deed or for a medical prescription, namely, as a fee. For a fee it is, in every professional sense of the word. And in order that the public may be set right in this matter, I strongly recommend druggists to think and speak and write of their charges for medicines as fees. I do not recommend that such a view of the case be thrust on the public; for although persons are accustomed to pay two fees, indeed a whole series of fees, for their law—fees to counsel, to their clerks, to solicitors, and for stamp dues, etc.—they will say they object to pay two fees for their physic, that is, one to the physician and one to the pharmacist, forgetting that that is what they already do when they obtain medicines of a chemist and druggist whose charges and qualifications are commensurate. What I do recommend is, that when occasion arises the public be reminded that that is what they do, and that, at all events, this view of the matter be put forward by the druggist whenever he is stigmatized as an ordinary tradesman desiring more than an ordinary tradesman's profit. The public having demanded, for their own safety, by means of the Pharmacy Acts, that the retail druggist possess professional knowledge, will not knowingly stultify themselves by treating him as a tradesman only. But to resume my argument.) The public recognize the value of professional services, and not only pay professional men commensurate fees, but are only too glad to find such services at their disposal. Were any man setting himself up for a lawyer or a doctor to offer to charge the public only a trader's price of 5 or 10 per cent. profit on his expenses, he would rightly be suspected of having no professional knowledge for disposal. Just so should a vendor of drugs, who charges only a trader's price of 5 or 10 per cent. profit on the wholesale price of the drugs, be suspected of having no professional knowledge respecting those drugs at his disposal, no such knowledge as those chemists and druggists must possess who are properly qualified according to the Act passed for the safety of the public, namely, the Pharmacy Act. The traders I am now describing charge only a 5 or 10 per cent. profit on the wholesale prices of drugs, therefore they may be rightly set down as not having that knowledge which the public, through the Legislature, has decided that chemists and druggists should possess. Unfortunately, the public, while realizing the position in which they stand to men who are wholly professional, as the lawyer or the doctor, do not realize, and perhaps never will quite realize, the position in which they stand to the real chemist and druggist. For the trading side of his work for the public obscures the professional side. The druggist may do something towards inducing those of the public who raise the question, to regard this matter in the proper light, if he habitually term the charge for medicine prepared from a prescription *a fee*, as I have suggested; but probably not a century of endeavour to educate the whole of the public up to this point of treating him as in part a professional man would be quite successful. Where the public cannot judge for themselves respecting the qualifications of a professional practitioner, even to the extent to which they judge in a general way of the position in which they stand to medical or legal practitioners, there the aid of the Legislature should step in. The public cannot, as regards pharmacy, judge of the pharmaceutical ability of a vendor of drugs. Therefore the Legislature should step in and aid the public by enacting, not only as at present that every man *calling* himself chemist and druggist should be properly educated, but that every man *practising* as a chemist and druggist should be properly educated.

The price lists I have described show, first, that traders whose names are not to be found on the State Register of chemists and druggists *practise* as chemists and druggists. Secondly, they afford presumptive evidence that such traders are not properly qualified. This is a serious state of things for the public welfare, all the more so that the public cannot of themselves detect it.

Moreover, it is a condition of things pervading the whole country. Where the wealthy congregate it is not so obvious: but elsewhere its effect is only too evident, either in the reduction of the number of assistants in a chemist's shop, in the discharge of the one assistant, the conversion of the business into one of another kind, the owner still remaining on the pharmaceutical register, or in the closing of the shop altogether. Indeed, where one chemist's shop has been opened in either of our many new neighbourhoods, one has probably been closed in the older districts; for while population in Great Britain has increased by nearly 11 per cent. during the past ten years, the number of registered chemists has increased in that time only 2 per cent. That number was 13,216 ten years age, last year it was only 13,447. Nay, in view of the fact that some of the chemists and druggists now on the register do not now actually practise pharmacy, it is clear that while the general population has increased, the number of practising pharmacists has probably decreased. Certainly the number has decreased in England, if not in Scotland. What may be the exact significance of annual variations in the numbers on the register cannot perhaps be told until time has removed all who were enrolled by mere declaration before examination became compulsory. The quality of businesses, however — that is, their efficiency for the requirements of the public—has suffered, far more than the number of such businesses. For only too frequently when a druggist's earnings are reduced below the point at which he can afford to keep a qualified assistant, the latter, to earn a living, is impelled to open a small shop somewhere in the neighbourhood and, while earning little from the practice of pharmacy, and probably not more altogether than he formerly received as an assistant, he draws a certain amount of business from his, or some other assistant's, old master, who thereby is brought so much nearer to failure. The new businesses are not all equal in efficiency and general appointments to the old, and the old are depreciated. This action is going on all over the country.

Respecting the kind and numbers of unqualified persons dealing in drugs, the evidence I have received is overwhelming. Of the two hundred and seven replies to my questions, only six state that drugs are *not* sold by unregistered persons in the respective districts, one significantly states "not yet," fifty-five are either silent on the point, or allude to the old practice of grocers in thinly populated districts selling a few of the commonest drugs, while one hundred and forty-five—75 per cent.—complain more or less bitterly of the serious depreciation in the value of their businesses through the sale of drugs by unqualified and unregistered persons. Without wearying my hearers or readers, I will quote from a few of the letters.

And first, as regards unregistered persons whose shops resemble those of chemists and druggists. Comparatively these are at present few in number, but quite sufficiently numerous, and increasing in numbers sufficiently fast, to show that the evil exists and that a remedy may fairly be claimed from the governing body of the State both as the guardian of the interests of chemists and druggists, as of all separate classes, and as the guardian of the welfare of the public generally. But to quote single sentences from some of the letters. No. 1. "In this town we have so-called patent medicine shops . . . where everything except poisons is supplied the same as at a chemist's." No. 2. Here is "an open shop to all external appearance and to the eyes of the public as much a chemist's as any other, though the would-be chemist in it is without any qualification whatever." No. 3. Here "there are two men (unqualified) keeping open shops, who sell drugs, and are generally supposed by the public to be ordinary chemists and druggists." No. 4. "Drugs are sold here to a very great extent by grocers and small dealers, but also in several cases by unregistered men whose principal feature of their business is drugs with the allied articles." No. 5. "We have a few persons pretending to be chemists and druggists, who have no qualification." No. 6. "In this not very populous district we have one unregistered man trading as a chemist and druggist." No. 7. "There is a man within fifty yards of my shop carrying on business as a chemist and druggist who is unregistered." No. 8. "Two men, who failed to pass the qualifying examination under the Act, are now in business in spite of the Act, selling everything except the few scheduled poisons." No. 9. "In a population of thirty thousand about two hundred shopkeepers not chemists sell drugs, as well as two unregistered men acting as chemists and druggists." No. 10. "One man pretends to be, that is, has a shop fitted up like, a chemist and druggist." No. 11. In this not very large town "two unqualified persons' shops have coloured globes in their windows, and present such other appearances that the public cannot distinguish between them and those of registered chemists and druggists." No. 12. "There are several unregistered men in this town pretending to be chemists and druggists." No. 13. "One unregistered man pretends to be a dispensing chemist." No. 14. "We have two shops here kept by unregistered persons. They sell everything just as a chemist does. The public cannot distinguish these shops from those kept by qualified men. The windows, etc., are fitted up like ordinary druggists' shops. I know for a fact that each sells not only ordinary poisons, but the scheduled poisons, though they are too wary to be caught." Could any evidence be stronger than that of these fourteen letters to show that an Act designed for the welfare of the public in a vital matter is being systematically evaded? Here are some twenty-five or thirty cases of persons openly defying the spirit of the Act, and of the clear intention of the Legislature and of the State. From the tone of many more of my letters, I gather that this number of cases might be multiplied considerably. And such evasion of the law must grow if not checked.

As for the evidence my correspondents give of the sale of drugs on a large scale by persons who do not openly pretend to have pharmaceutical knowledge, it is too voluminous for more than a glance. I have already given an alphabetical list of twenty distinct classes of shopkeepers, other than druggists, who deal in drugs. This list is compiled from my letters, all of which agree that the drugs are sold at prices from a little below to 5 per cent. above prime cost, and very frequently as mere decoys, baits, or lures, to entice customers from other shops, and secure them as purchasers of more profitable articles. The prices which the druggist has been in the habit of getting for drugs—and which include payment for his professional knowledge, his special manipulative skill, and his personal guarantee of purity and efficacy —have been pointed out to the public by the traders described, they at the same time drawing attention to their own much lower prices, the inference insinuated being that similar savings (?) would be effected in all other things purchased from them. The unfortunate part of this matter is, I reiterate, that the public cannot, and are never likely to be able to, distinguish between good and bad drugs, or not until the health of the community has seriously suffered, and the livelihood of a large class of respectable citizens has been taken away from them. One writer says that according to the statements of a manager in one of the largest store shops of the kingdom, the drug side of a co-operative store, or store shop, seldom pays *per se*; that even if a loss accrues, the sale of drugs is a cheap advertisement for the rest of the concern; the said manager adding, "Do you suppose we should care for this trumpery return, but that it enables us to say, 'See what extortioners these chemists are; see for yourself that you save threepence or more out of every shilling by dealing with us.'" Co-operative stores are rightly classed by my correspondent with other non-pharmaceutical shops. Indeed, as regards management, they only differ in being carried on by not less than seven owners, while most druggists' shops are carried on by one owner. It seems a monstrous anomaly that the law should allow seven or more men to carry on the business of chemists and druggists, and call themselves chemists and druggists, without being qualified, while it does not allow a single owner to carry on the business of a druggist and call himself a chemist and druggist without being qualified. And, according to the judges, that is what the present Pharmacy Act allows. It is said that a co-operative store company may even sell poisons if no registered assistant is employed, but a single unregistered shopkeeper must not sell poisons, even though he employ registered assistants. Surely there is one law for the store and another for the shop. I could give scores of quotations like the following:—"Grocers, drapers, and others, now sell in this town not only epsom salt, senna, castor oil, etc., but tinctures and other preparations, and, in short, everything but poisons." "Under cover of the patent medicine stamp, poisons such as laudanum, opium paste, and other morphia preparations, are sold here pretty generally by non-pharmaceutical shopkeepers." "So-called wholesale druggists, but who are little more than retailers, supply small outsiders with all drugs, including tincture of opium." "With us the evil of drug selling by non-druggists is growing." "All the small shops here sell packeted goods and paregoric *without opium*!" "Grocers, teamen, and tailors sell so-called patents, packed goods, and proprietary articles as decoys, telling their customers that such things show fair specimens of their prices." "Men other than druggists sell drugs, but the articles I have seen are as low in quality as in price." "At the shops of the drysalters and general dealers in this neighbourhood, there is sold quite commonly, as a remedy for diarrhœa, compound tincture of rhubarb, into which is poured a few drops of laudanum." "At the shops named no doubt the public get supplied with cheap, but, to my knowledge, not with the best drugs."

And now as to the somewhat less direct evidence that "pharmacy is not what it used to be." Only thirteen of the two hundred and seven druggists who replied to my questions could say that pharmacy was as flourishing as ever in their experience. Five of those resided in Scotland, one in the western part of London, and six in the provinces, while the shop of the thirteenth was on one of the smaller islands of Great Britain. One of the provincial six explained that although the chemists of the town were doing as well as ever, they had not increased in number in a period during which the town had increased threefold in population. Only four of the thirteen—four in two hundred and seven—could say that pharmacy was distinctly better than it used to be. Three of the four resided in Scotland, the fourth was the pharmacist of one of our smaller islands. On the other hand, more than half of the letters afford unquestionable evidence that pharmacists are very much farther off prosperity than they were ten years ago. The President of one of those many Chemists and Druggists' Associations which exist as much, if not more, for the benefit of the public than of the pharmacists, says, "There is much harass amongst the general body of chemists and druggists." Another representative says, "Pharmacy in this district is much injured and much depressed, and calls earnestly for a remedy in the interests of the public, and in common fairness to ourselves." A third, writing from a large provincial town, says, "The chemists and druggists of the town have had a meeting to consider the subject of your note. Nothing but depression and hopelessness was manifested. To say that pharmacy is not what it used to be is to use a ridiculously mild phrase. It bids fair to be wrecked." A fourth, in another part of England, says, "We are suffering great trials here, and must suffer more unless the dealing and working with drugs is rectricted to druggists." A fifth, in quite another district, says, "Pharmacy in this neighbourhood has degenerated woefully. In a very few years fourteen druggists have become ten; five had the higher title of pharmaceutical chemist, now I am the only one." A chemist in the southern half of London says, "The sale of drugs by unregistered and outside persons is sapping the foundation of retail pharmacy. Within five hundred yards of my shop drugs are being sold at about 2½ per cent. profit, by four grocers, five oilmen, two herbalists, four hucksters, one saddler, three corn-dealers, one publican, and one ironmonger. . . . For the last six years my returns have steadily fallen one hundred pounds a year. A similar or worse result would be shown by my pharmaceutical neighbours." Of one town of fair size the statement is made that "pharmacy is being obliterated here; we are becoming general dealers." I could give scores of similar quotations.

In answer to my questions as to how far a business is worth less than formerly, one hundred and fifteen of my correspondents put the depreciation at an amount varying from 25 per cent. to 50 per cent. in ten years. Many gave me, in confidence, figures which showed that the loss in value was still greater. Businesses in wealthy districts appear to maintain their value chiefly because their scarcity produces a little competition for them. One correspondent, of great experience, says, "Ten years ago a business then returning £1500 or £1000 a year would readily command £500 or £300 for goodwill, but now with difficulty would realize £150. Those with returns below £1000 and above £500 a year would then fetch £200 for goodwill, but now are transferred for the mere value of stock and fixtures. Businesses turning over, annually, sums below £500 a year, were formerly worth £100 for goodwill; now hundreds of these are in the market quite unsaleable at any price." Another writer of equally wide experience says, "With the exception of one or perhaps two businesses to be found in good towns, all have very materially suffered during the past ten years." A third states that "Businesses in these counties often sell for one-third of what they would have fetched a few years ago, while for many it is difficult to get premiums at all." A chemist in the suburbs of a large city says that "pharmacy is rapidly leaving many suburban druggists. . . . The oilman and grocer and the stores are gradually destroying pharmacy. . . . A blue pill and black draught, lenitive electuary, essences, tinctures, syrups, all kinds of pills, are sold retail at prices for which I could not make the articles properly." A letter from a metropolitan suburb, densely populated, states that "One business here, estimated twenty years ago to be worth £3000, sold eight years since for £1740; the disappointed purchaser sold it three years ago for £1100; it has changed hands twice or thrice since; it would now be dear at £600. Another business in this great thoroughfare about twenty-two years ago sold for £950; it was purchased eighteen months ago for £540. A neighbour's business was valued three years ago at £800—a well stocked, well kept, double-fronted shop, useful house, good garden—it was sold to a surgeon twelve months ago for £350; its returns are now, perhaps, £300 a year." A writer in a provincial town of over one hundred thousand inhabitants, says, "I fear my account of pharmacy here would be too gloomy to receive credence. We have to eke out a living by some additional business. Altogether we feel most despondent, and I believe any chemist in the town would make a present of his fixtures to any person taking over his business and liabilities." A druggist in a smaller town writes, "Fifteen years ago an announcement that my business was for sale brought me several offers of £500. I had occasion to change my intention. But now I cannot get offers of £100." More than half of my correspondents gave statements to the same effect.

Much more varied are the answers to the question respecting the proportion which in the respective districts the pharmacy proper, of an average business, bears to the part that has little or nothing to do with drugs; while the responses elicited by the inquiry as to whether the pharmaceutical part of the business is increasing or diminishing in amount are less varied. Only in six cases do my correspondents report an absolute increase in purely pharmaceutical business. Four report an increase in returns but a decrease in profits; they have had to do more work for less wage. Several reporting a decrease both of returns and of profits, yet state that the relative returns from the pharmaceutical as against the non-pharmaceutical part of the business have increased, the explanation being that while some of the pharmaceutical portion has been taken away from them, severe competition has obliged them to relinquish very largely the sale of non-pharmaceutical goods. On the other hand, many having had the sale of drugs taken out of their hands by unqualified traders, have been compelled by the pressure of *res angusta domi*, to cultivate the sale of general goods until they have almost ceased to be chemists and druggists, and have become grocers, oilmen, general dealers, etc. Not a few, indeed, having had their half-professional, half-commercial ground cut from under them by the unqualified and unregistered traders in drugs, and not having the full commercial power and training of their competitors, have lost most of their business, whether pharmaceutical or general. With such a state of things no one will be surprised to learn that different druggists fix the proportion of pharmaceutical to non-pharmaceutical business done in their shops at figures varying from 5 to 90 per cent. Some describe the amount of their drug sales or general pharmaceutical work as "very little," "small," "very small," "very limited." Others say, "We never see a prescription." "We seldom see a prescription." "I only now make up an average of four prescriptions a week, and I am generally credited with having the best business in the town." "There are four druggists here, and we find that latterly we have dispensed about one prescription per head per week."

Many of my correspondents complain of a special feature of unfairness in the competition to which they are subjected by unqualified traders, namely, that these persons often sell drugs of very inferior quality, probably without knowing it, and that the public, in similar ignorance, as readily purchase the almost if not quite useless stuff, tempted, doubtless, by the lowness of price. Unfortunately, very few of such cases can be touched by the Food and Drugs Acts. Only in such an instance as paregoric being sold without the chief ingredient of that medicine, because its active principle is one of the substances legally deemed "poisons," does there appear to be any means of checking the practice complained of, a practice not only unfair to the druggist, but detrimental to the health of the public. Public officials sometimes express wonder as to where all the worthless or partially spoilt drugs go that are frequently exposed for sale in the large wholesale markets. My correspondents could, apparently, give information which would satisfy that wonder.

After all this evidence, I think every one will admit the following propositions. First, that pharmacy in this country, here and there in a fairly prosperous state, and nowhere yet actually *in extremis*, is nevertheless in a very seriously depressed condition. Secondly, that the prominent cause of the depression is the loss of trade in drugs of guaranteed quality and loss of professional practice of pharmacy by the responsible qualified and registered chemist and druggist, and the acquirement of trade in drugs of unguaranteed quality by the irresponsible, unqualified, and unregistered trader. As for the professional practice in drugs lost by the qualified druggist, that has not been acquired by the unqualified druggist, and therefore has been lost to the public. Thirdly, and chiefly, this condition of things is seriously prejudicial to the public welfare.

No doubt other minor causes influence the depression. And these must now be noticed shortly. But they do not in any important degree dwarf the main cause just stated.

Thus, respecting the practice of physicians prescribing more concentrated medicines than were administered formerly, only 19 per cent. of my correspondents think that it affects the question under consideration, 26 per cent. think it does not, and the remainder express no opinion. A few years ago this practice bade fair to diminish the druggist's income, he generally charging for prescribed mixtures a professional fee of a shilling or two rather than a trade price, a fee which custom had made dependent on the size of the bottle more than on anything else, a fee therefore, the value of which was in inverse proportion to the state of concentration of the medicine. But pharmacists have never, for that reason, made the matter a subject of complaint. They have rather pointed out the great danger of patients, nurses, and families being in possession of what were often deadly fluids. And the practice has gradually been relinquished. In my letters cases are still cited, however: such as 32 powerful doses of prussic acid in a single bottle of medicine; undiluted tincture of nux-vomica, or strong solution of strychnia or strong solution of arsenic, in 1 or 2 ounce quantities, so many drops to be taken in water. In one instance a whole ounce of prussic acid, enough to poison seven or eight or more people, was ordered for one patient.

Again, persons take less physic than formerly. Children in health are not now dosed weekly, even with brimstone and treacle, and healthy adults do not as a rule periodically dose themselves. Homœopathy and hydropathy have had their influence in this direction. Medical men have ceased to prescribe those complicated combinations of half a dozen or a dozen remedial agents which could scarcely be dispensed elsewhere than in the well-appointed shop of a chemist and druggist. They rely now rather on a few active principles or on the official single compounds of the Pharmacopœia. Some idea of the degree in which fewer drugs, etc., are prescribed than, say fifty years ago, may perhaps be gathered from the fact that in 1830 the cost of drugs per in-patient per annum at one of our large metropolitan hospitals, St. George's, was 16*s.* 5*d.*; while in 1880 it was less than half that sum, namely, 7*s.* 11*d.* The former figures, however, include sums for leeches, agents now seldom employed.

Speaking of hospitals, there can be little doubt that these and the many other charitable medical institutions supply advice and medicines gratuitously to large numbers of persons who can well afford to pay, not only the medical practitioner for his diagnosis, but the druggist for his physic.

Here is a third minor cause of the depression amongst chemists and druggists. In the place of many of the prescriptions which formerly found their way to the druggist, physicians not unfrequently rely on and recommend proprietary preparations, forgetting, in their laudable anxiety to cure their patients by any or every means at their disposal, that they are thereby not only instructing the public in the art of prescribing for themselves, but also in the art of prescribing drugs which are often procured from neither the doctor nor the druggist; for patients carefully scan prescriptions, read them more easily than patients did fifty years ago, draw their own conclusions respecting those now under consideration, and then consult their grocer's or storekeeper's price lists. This art of self-dosing is further fostered by the advertisers of secret remedies, an art which in the long run is harmful to patient, doctor and druggist alike, and only indirectly profitable to the twenty different classes of non-pharmaceutical shopkeepers who now deal in such things. Popular medical books and magazine articles addressed to the public all contribute to the same end. The result ensues that while the public on the whole take less physic than formerly, large numbers of those who do take such medicine, take it in a manner over which neither doctor nor druggist has any control. Not a little of this result is due to what I conceive to be mistaken policy on the part of medical practitioners. Verbally and through the press they never cease denouncing the druggist for compliance with a customer's request to be recommended a simple remedy, a practice commonly called counter prescribing, forgetting that they are thereby not only directing customers away from the druggist, but shutting the doors of their own consulting rooms to thousands of patients who had they not been thus prevented from seeking advice of the druggist would have been told by that useful functionary that the case was one demanding treatment by a medical practitioner. Most druggists can tell of many cases in which serious illnesses have probably been prevented and even life saved by their timely recommendation to the person to obtain the aid of a medical man. Besides, if you debar the public from seeking a simple remedy at th druggist's counter, either by medical denunciation or by turning over drug dealing to co-operative stores or to profit-cutting general dealers, you not only do not prevent prescribing by others than medical men—for the public always did and always will prescribe for themselves in their own way, either with or without the aid of a druggist—but you play straight into the hands of the patent-medicine monger, and the maker and distributor of secret remedies; you weaken the pharmacist and the physician; and you do harm to the physic-takers themselves. In the interest alike of pharmacist, physician and patient, this patent medicine question needs careful consideration, with a view to reform. Patent medicines may and do contain on the one hand powerful poisons, and on the other useless substances. The well-trained druggist either already knows or can form a shrewd judgment of the nature of these officially stamped articles, and, by timely caution or advice, can prevent much mischief resulting from the careless or ignorant use of a potent remedy, or from a too thoughtless reliance on worthless materials. No other shopkeeper has similar knowledge. The sale of patent medicines should, therefore, be restricted to qualified and registered chemists and druggists. By-the-bye, the pseudo-official character or guarantee and implied value given to these articles by the presence on them of "the government stamp" should be removed altogether by the withdrawal of the stamp, a substitute for the revenue it produces being found in a greatly increased charge for the licence to sell patent medicines, and perhaps a charge for a licence to sell all other medicines. Such a change would not be unpopular with druggists.

Another minor cause of the depression in pharmacy is found in the fact that many chemists and druggists have thoughtlessly encouraged the purchase wholesale and distribution retail of what are termed packed or packeted goods—be they patent medicines, proprietary preparations, simple or compound drugs, coated pills or what not—instead of themselves preparing such articles; not foreseeing that they were, so far, transforming themselves from professional men into mere trade agents, and that goods of that kind once established in trade could as easily be dealt in by non-pharmaceutical as by pharmaceutical agents, and would only command agents' profits. Such men also have not foreseen that to the extent to which druggists thrust all trouble and responsibility, whether as regards packeted drugs or any other drugs or compounds, on to the wholesale druggist, who, by the way, may or may not be a competent pharmacist, they not only make mere agents of themselves, liable to lose their agency at any time, but they sap the foundation of retail pharmacy as a separate avocation, destroying its professional part and rendering its trade portion liable to be turned into other trade channels. Worse still, their action, or rather inaction, tends to deprive the public of that safeguard against the supply of bad drugs, which the Pharmacy Acts were designed to afford. This minor cause of pharmaceutical depression will become a major influence unless soon checked. Of course many medicinal preparations always have been and always will be made better and more economically in a large wholesale way than on a small retail scale. These are exceptions. But the majority of such things could be prepared as easily and often more cheaply, if with a little trouble, by the qualified chemist and druggist; and he has only himself to thank for the extent to which, through not taking trouble, or through not working professionally, he may have experienced loss of professional or commercial advantages. He must not blame wholesale dealers for prosecuting a variety of trade he has himself relinquished. Wholesale druggists considering that drugs must pass through their hands, no matter by what agency those drugs are distributed retail, would probably prefer their old and simple *rôle*, and supply drugs to retail druggists only. But if forced by circumstances to do the retail druggist's duty of packing drugs in retail sized parcels, and to sell them to non-pharmaceutical distributors, the wholesale druggists will, of course, do so with little hesitation. The mischief is that unqualified wholesale dealers may and do start up and perform such work. And we may predict that wholesale grocers and others, finding other dealers' travellers amongst their own shopkeeping customers, will themselves begin to deal in drugs. All of which is not to the advantage either of the public, the medical profession, wholesale druggists or retail druggists. "Drugs for the druggist" is a cry in which each of these four classes of the community, in their own best interests, may unhesitatingly concur. *Pace* haters of monopoly. For certain it is that competition in this over-populated country, and the jealousies and distrust of one another inherent in human nature, and not the least in pharmaceutical human nature, will always prevent the evils of monopoly making headway in pharmacy.

The general depression in trade, especially in agriculture, which has affected this country during the past few years, has of course affected pharmacy. Druggists do not complain of this. But with scarcely an exception, my correspondents state emphatically their opinion that the depression in pharmacy is far greater than in other callings. A want of prosperity, general to the country, is shared by pharmacy; but this is only one of the minor causes of pharmaceutical depression.

During these bad times, too, the proportion of medical men who dispense their own medicines has, I am assured by nearly all my correspondents in England, greatly increased. The reverse appears to obtain in Scotland. Indeed it appears that not unfrequently in consultation cases in which a physician is called in, at all events in the southern half of Great Britain, the prescription of the physician is intercepted by and dispensed by the medical practitioner. It would seem from this as if the old days of the apothecary of past centuries were coming round again. And from what I have previously stated respecting the increasing trade in drugs by grocers and others, it would seem as if the days of the drug grocer—the parent of the drug-gist, as the latter name implies—were after more than two centuries coming round again. This state of things would be, however, for Old England, not progression but retrogression, not advancement but degradation, not evolution but devolution. *Absit omen*! No, we hope and believe that this condition of pharmacy is only temporary. Besides, the medical man of the present day is one who, while having greater professional knowledge of medicine—that is of diagnosis and therapeutics—than the old apothecary, has less professional knowledge of pharmacy. As a pupil in medicine he has had too many other subjects to study, and as a practitioner he has too many other matters to occupy his attention, to allow of his possessing the old apothecary's acquaintance with pharmacy, and still less to allow of his having anything like the modern druggist's professional knowledge of pharmacy. And as regards the future, the increasing demands on him in matters, relating to the preservation of health, as well as to those which are ever increasing his power of dealing with disease, will still further remove from him opportunities of studying pharmacy. So that the selling of medicines and raw drugs by medical men, even if it could become sufficiently general, which is not in the least degree likely, would not relieve the public from the difficulties encountered in deserting the druggist. The point to which, however, attention is now more especially drawn, is that the tendency of the medical man to be his own druggist, decreasing up to about ten years ago, has, since that time, increased, and that this increase is one of the minor causes of the depression of pharmacy during the past decade.

Improved sanitation; a more extended knowledge of hygiene; less overcrowding; a more general realization of the importance of exercise for the body, and of mental and physical recreation generally; a more temperate use of our most seductive stimulating fluid and of those dishes which are nice but not nourishing; the employment of pure water for drinking purposes; a diminished superstitious belief in the therapeutical virtue of inert substances; in short, a better knowledge of the laws of life and of health, have combined to render medical practitioners and drugs and druggists less necessary to the world than they were sixty or seventy years ago. But do the members of the noble profession of medicine, including their half-professional, half-commercial brethren of the fourth estate in medicine, namely, pharmacy, complain of this advancement in knowledge? On the contrary, these very men and others like them—by their researches and discoveries freely communicated to the world through the machinery and periodical literature of the various medical, chemical, and pharmaceutical societies, conferences, and associations—these very men are those who have most largely contributed to this advancement in the wisdom and welfare of mankind, and none glory in it more than they do themselves.

But the labourer for the good of all is at least worthy of reasonable reward when working at his calling. The pharmacist will continue his researches for the well being of his fellow men. When, however, in Great Britain, the State says to him, "It is necessary that you who deal in drugs should for the welfare of the community be properly trained as an apprentice, be educated, be examined, and be registered," and then, when the druggist has willingly complied with the demand, the State permits untrained, uneducated, unexamined, and unregistered men to deal in drugs, the trained, educated, examined, and registered man rightly feels aggrieved and turns to the State for redress. Let this always be remembered, however, namely, that not only for himself does he seek the remedy. He reminds the State that it was for the protection of the public health that he was required to be educated, examined, and registered, and that it is in the interests of the public far more even than in his own interests that he asks that this protection be saved from being a sham, as well as that it be saved from being a mere handicapping arrangement preventing him from making his way in the race for a livelihood.

Does it never occur to the man who purchases cheap physic at a co-operative store, at a general dealer's, or some other shop, to wonder what disadvantages would result if everybody adopted that course. A very little reflection would suffice to picture a few. In the middle of a night, at a time of sudden and serious illness of one whose life is precious, he will require a certain trustworthy medicine. To possess it he would give ten times the total of the small sums he saved by abandoning his reliable druggist: for excruciating pain or perhaps something worse has to be combated without delay. He does not know at which grocer's or general storekeeper's he could procure the drug, and he questions whether such a vendor would leave a bed to inquire who is knocking at the door, even if the summons were heard at all; moreover, he is not certain he could trust the medicine obtained there. Then may come an all too late regret at the shortsightedness of the policy which ignored the professional skill and ever ready service of the qualified druggist in favour of the cheap but ignorant and unsympathizing general dealer. Again, a mother has been tempted to purchase paregoric elsewhere than of a druggist, not knowing that, unless the sale is an illegal one, the article is free from that opium to which, when present in proper proportion, much of the efficacy of the medicine is due. The compound being thus weak, she almost necessarily gets into the habit of giving considerably enlarged doses to her children. Some day there happens to be in the house, by accident, paregoric of proper official strength purchased of a chemist and druggist. The usual large dose is administered. Then, perhaps, all efforts to rouse her child from its deep sleep are unavailing. But to multiply illustrations where general facts are so palpable is unnecessary. I have already, in my opening remarks, shown why the supply of drugs, when uncontrolled by the State, is seriously prejudicial to the interests of the public. Eliminate special professional knowledge from pharmacy, and let drugs be sold by any or every shopkeeper, and the public will have no guarantee that they are not supplied with drugs fair in appearance to the untrained eye, but worthless to the trained eye of the druggist, drugs which once perhaps were of good quality, but which without altering in appearance have become spoilt by age, medicines weaker than they should be, medicines stronger than they should be, poisonous fluids for external application not properly distinguished from those for internal administration; indeed the public will have no guarantee that they are not supplied with the wrong medicine altogether.

To put the matter still more broadly. Every civilized state has adopted means for ensuring the supply to the public of trustworthy drugs by professionally educated druggists. Such almost universal action would not have been taken had it not been called forth by universal necessity. The necessity is at least as great in Britain as in any country. Indeed that necessity has been partially met even in this country by the enactments relating to pharmacy. But those Acts are working incompletely. The health and welfare of every individual in this land calls for a remedy for that incompleteness.

The nature of the remedy is simple. It has more than once been foreshadowed in the course of this address. It involves no new principle. It consists merely in an extension of the spirit and letter of the existing Pharmacy Act. Under that Act about a score of medicinal substances are deemed poisons within the meaning of the Act, and are to be sold retail, as a rule, only by registered chemists and druggists. *Let that list be considerably extended*, saving all rightful interests of persons who otherwise would be unfairly prejudiced. Let the retail sale in open shop of most of the simple and compound medicines of the British Pharmacopœia be carried on only by qualified druggists. Is the question asked, "Whence is to come the machinery for giving effect to such an extension? The present machinery under the Pharmacy Act is ample for the purpose—with perhaps a few improvements in matters of what may be termed pharmaceutical police, for giving better effect to certain sections of the Act, as for instance the employment of the inspectors under the Food and Drugs Act, or other inspectors, to see that unqualified traders do not infringe the Pharmacy Acts. In sparsely populated districts let drugs be sold by unregistered persons: these acting, however, only as agents, the drugs being contained in duly secured packages bearing the name and address of a registered chemist and druggist who should be responsible for the character of the contents. The parcels post has removed most of the transit difficulties connected with such an arrangement.

But it is no part of my duty in this address to enter further on the political details of practical pharmaceutical legislation. I desire to supply the materials of politics rather than to discuss politics. I have gathered together and furnished information, and have submitted arguments that should satisfy every Englishmen that there is a serious breach in the established relationship of the State to one important branch of medicine by which the health and welfare of the State is maintained, that is, to pharmacy. I commend that information and those arguments for serious consideration by members of Parliament, by the press, and by the public. For myself, I have no manner of doubt that could the attention of every thinking man in this nation be gained for one short hour to this present relationship of the State to pharmacy, he would vote for its reform in the direction now advocated.

At the conclusion of the address,—

Mr. Kershaw (Southport) moved a vote of thanks to the President for his address, which all would agree was a very thoughtful and suggestive one, handling very cleverly a most difficult subject. The first thought which occurred to him was that he should much like it to be put into the hands of every member of Parliament, because if they were to go in for further legislation there were certain facts there stated which ought to be thoroughly pondered. Probably the best mode of showing their thanks would be to give the address full consideration and deep study. They had been reminded of what pharmacy had been, what it was now, and what it could be. There was no doubt they had fallen on evil times, when pharmacy was passing through a transition period, and things were coming to a crisis. The Act of 1868, though well intentioned, had not done what it ought; it provided for an educated class, but what it intended beyond that remained still to be done. The end to be aimed at was that the public should receive their drugs through that educated class only. The first thing necessary to the cure of any disorder was a correct diagnosis, and that the President had given them; there might be different views as to how the cure was to be attempted, but in his opinion the only course was that pointed out in the address, viz., to amend the Pharmacy Act, by enlarging the scope of the word "poison," and extending the limits of the schedule. All drugs were poisons if unskilfully used. The abuse of hospitals and dispensaries had been referred to, and there was no doubt that many of the persons who received relief from those institutions were not of the class intended to be benefited. Chemists might perhaps agitate for an improvement in that direction, and ask that out-patients should not receive medicines at dispensaries, but only prescriptions to be dispensed by chemists in the neighbourhood.

Mr. SYKES (Southport) seconded the motion. He thought the address had treated a difficult subject in a most masterly manner, though it had shown pharmacy to be in a more depressed state in some places than he had expected to hear. He hoped the subject would be seriously taken up by all the members.

Mr. MOSS (London) desired to add a word in support of the motion. There was great difficulty in criticizing such an address, the materials having been so lavishly collected and presented that it was not easy to pick out any one point for special remark. A number of facts had been brought together for the first time, and so marshalled, that it appeared as if the position taken up must be impregnable to any attack from the outside. When it came to be considered thoughtfully and quietly, as he hoped it would be by all, they might hope that it might be fruitful of suggestion, and that some plan of action might be determined upon which would remove the wheels of the chariot of pharmacy from the rut in which at present they seemed to be imbedded.

Mr. ATKINS (Salisbury) remarked that the present address formed a very fitting pendant, giving the other side of the shield, to that presented last year at Southampton. The President then dealt with the trinity of the collection, preparation, and distribution of drugs and chemicals; to-day he had dealt with the relation of the State to pharmacy on one particular point, viz., distribution. He felt that the President had painted the picture in the most sombre tints; he would not say that they were unduly sombre; indeed, in the face of such facts as had been cited, it was difficult to contend that the picture was otherwise than correct; but remembering that the darkest hour of night was nearest the dawn, they would hope for better things before long. At the same time he believed that some portions of the difficulty were irremediable in themselves. As the President had pointed out, there was an increased knowledge of sanitation on the part of the public, and a decrease in the quantity of drugs administered, and, as his own experience would bear out, another important fact was the large amount of eleemosynary administration of medicine. It was obvious, therefore, that there were many facts to be faced, over which they had no power. There were, however, remedies which might be applied, and, as they were aware, the Council of the Pharmaceutical Society had for some time been at work on an amended Pharmacy Act. It was no longer a question of free trade, but of lawful and justifiable protection. The State wisely demanded education, qualification, examination and registration, and having done that, those who, having complied with the demand, asked for a fair share of protection were thoroughly warranted in doing so. They might say to the State, "If you will have free trade, have it all round; but if you demand from us education and skill to dispense wisely, then we ask for some professional protection." He was very glad that a man so eminent as the President had taken up this subject, which, if treated by smaller men, might have led to invidious remark. The *res angusta domi* could not be lost sight of, and he was very grateful to the President for what he had said.

Mr. SAVAGE (Brighton) said there was little to say after the exhaustive address of the President, except to consider the difficulties to be contended with in connection with legislation. Most of them knew that amongst members of Parliament were the warmest supporters of the co-operative store movement. Their own registered members were not perhaps altogether free from blame in this matter, but they were sometimes placed in a very difficult position. If there were a co-operative store in the immediate neighbourhood it was very difficult to tell a customer a price was 1*s.* 1½*d.* for something he could get for 9*d.* or 10*d.* It appeared to him that the only way in which legislation could be effected was for every pharmacist, each in his own locality to endeavour to influence his own representative. In some large towns medical men were adopting a course which must be very detrimental to chemists, for he had seen notices exhibited "Medicine and professional advice, 6*d.*; if the patient is visited at his own house, 1*s.*" What could a chemist do against that? He knew a case of two brothers, one of whom kept a co-operative store, and the other advertised that if anyone ordered drugs to the extent of £1 he would allow 5 per cent. off the store prices.

Dr. QUINLAN (Dublin) said he might say a word as to the way in which pharmacy was conducted in Ireland. At the beginning of this year the Government addressed a communication to the professors of Kings and Queen's Colleges, asking them to send in suggestions for an amended schedule to the Pharmacy Act. A Committee, of which he was a member, was appointed to deal with the matter and a list was sent in containing a number of things which were poisons of the most deadly character; but in reply a letter was received from the Under Secretary saying that the addition of these things to the schedule would interfere with the course of trade and manufactures. The reply of the Committee was that dangerous articles ought to be sold only by men who knew what they were selling, and who could advise their customers upon them; and the Committee insisted on the schedule, but was not able to carry it. His experience was that in Ireland anybody sold medicines who liked, but they did not, as yet, compound medicines, and the co-operative stores did not compound prescriptions; in fact with regard to medicines the Irish public seemed to prefer the apothecary or pharmaceutical chemist, perhaps because the co-operative stores had no right to sell and did not open on Sundays. With regard to hospitals and dispensaries, if time permitted, he could say a great deal. He had seen a nurse come to a hospital, and when asked where she lived, she gave the address of a man who was certainly worth a thousand a year. He had seen a patient brought to a hospital in a brougham, the property of the family; in fact, he could easily occupy half an hour with tales of the way in which the physician, apothecary and chemist were robbed. There was a great deal in what had been said about the reduction in the quantity of drugs taken; the days of drugging and drenching were over, and physicians did not use more than one-third the quantity of drugs they did formerly. A great deal of mischief was done also by the sale of ready made pills, which were sent out with little treatises accompanying them, stating they would cure almost anything, and he feared that some of his brethren did a great deal of harm by prescribing these things. The public would soon learn to get them for themselves and prescribe them for their friends, and would forget to call and pay a fee to the doctor, who originally recommended them. He quite agreed with the President that the chemist was a professional man and he had so described him in one of his papers. It was impossible for a man to practise as a pharmaceutical chemist without having had a good general education to begin with, and a special technical education superadded to it, and it was absurd to esteem such a man as a mere retail tradesman, or to suppose he was to receive only 5 or 10 per cent. on the price of his wares.

Mr. Young (Edinburgh) said it was not usual to criticize an address of this kind, but he could not sit still without expressing his approbation of all that had been said as to the condition in which pharmacy stood at present. It appeared that Scotland had suffered less from the changes which had taken place during the last ten years, than other localities; whether that arose from the Scotch habit of self-reliance, he did not know, but his own experience was that they were no worse off than before. This might arise in some measure from the increased education medical men received, which induced them to hand over their dispensing to a chemist. He thought the time was come when something should be done in the direction the President had indicated, if it could be done so as to include a larger number of drugs in the schedule. At the same time the present was an age when free trade had such a hold of the public mind that there would be great difficulty in obtaining what they required. It would depend very much on the manner in which pharmacists stood shoulder to shoulder, and endeavoured to impress the public and members of Parliament with the fact that they did not seek their own advantage only, but the welfare of the public.

Mr. Frazer (Glasgow) said that if he did not accept all the views enunciated, he could still thank the gentleman who had put them forward so clearly. Professor Attfield, with his usual clearness, had put forward his view of a very difficult question, and those who differed from him totally on this question would be glad to have before them the very clearest and fullest exposition of those views.

Dr. Symes (Liverpool) also desired to thank the President for the able manner in which he had collected so many facts bearing on the question, though he could not altogether agree with all the deductions drawn from them. His experience was that the public took more medicine than they used to; and it was now much more the custom than it used to be to call in a physician for little ailments in a family. Altogether, he felt very thankful to the President for the facts he had collected, but he hoped the case was not so bad but that with a little earnest effort it might be set right.

Mr. Schacht (Vice-President), in putting the motion to the meeting, said that his only regret was that this able and complete address, appealing to the inner sense of right and justice in every man, was addressed almost exclusively to pharmacists. They must, however, all do their utmost to let the public, *oi polloi*, the great mass of the community, understand the position, for it was from them and them alone that they could hope for any effective pressure on the Legislature. If the only remedy lay in the direction of improved legislation, they could only hope to obtain it by pressure from below. He had the greatest confidence in the good sense of the public at large, but on special subjects that good sense required to be instructed.

The motion was then put and carried by acclamation.

The President, in reply, said he was about to apologize and explain to the many eminent pharmacists present and those with whom he had been associated for many years, why he had ventured to address them on these social and political relationships of pharmacy, with which they were so much more familiar than he was, viz., that he had deliberately decided on being so obtrusive because of his conviction that these relationships would be better and more usefully put before the public by one occupying his position, than they would be by a practising pharmacist. But all these apologies and explanations were rendered unnecessary by the kind manner in which the address had been received, and he could only thank the members most heartily for the way in which the vote of thanks had been carried.

The Conference then adjourned to luncheon.

(*To be continued.*)

OPINIONS OF THE PRESS UPON THE SUBJECT OF PROFESSOR ATTFIELD'S ADDRESS.

From the *Times.*

"We report to-day an interesting address, delivered at Southport to the Annual Pharmaceutical Conference by its President, Professor Attfield, from which it appears that the conditions upon which the purity of medicines depends are at present placed in no small jeopardy. Several years ago the attention of some of the leading retail druggists of this country was directed to the evils which were then constantly arising from the imperfect knowledge of many of those who were engaged in selling drugs and in dispensing prescriptions; and hence these leading druggists formed themselves into a society, the Pharmaceutical Society, which had for its object to raise the standard of acquirement among members of the trade. Examinations were instituted, and were voluntarily passed by numbers of intending chemists, with the result that the Society was ultimately incorporated by Royal Charter, and that an Act was passed compelling all persons who wished to become chemists and druggists to undergo examination before they were permitted to engage in the calling. The position of the druggist was, in short, assimilated to that of a member of the legal or medical profession; and on the same general ground—namely, that the chemist deals in commodities of the quality of which the purchaser cannot possibly judge, and that it is therefore expedient for him to be protected by some guarantee of knowledge on the part of the seller. The Act came into operation, and for a time all went well. At last, however, it seems to have occurred to some ingenious person that, although it was necessary to pass an examination before assuming the title of 'chemist and druggist,' it was quite easy to carry on the business without assuming the title. In consequence of this discovery, many members of other trades sought to increase their earnings by combining the sale of drugs with that of other commodities. The druggist had been accustomed to charge for his wares at a rate which afforded him not only a return for his capital, but also a reward for his special skill and knowledge; while his opponents, who had neither skill nor knowledge, did not pretend to charge for them, and were content with a profit on capital alone. The effect was that the legitimate druggists were greatly undersold by these new competitors, and hence that the general prosperity of the trade has been steadily declining for some years past. Professor Attfield maintains, and it would be very difficult to dispute his conclusion, that the public have a distinct interest in arresting this decline of prosperity, and in enabling chemists to carry on their business upon reputable and profitable terms.

"The manner in which, as it is asserted, retail chemists are being pushed out of existence forms part, it need hardly be said, of the revolt against excessive retail profits which has of late years become general among people of moderate income. Professor Attfield might possibly not condemn this revolt as a whole; but he contends very forcibly that it is misdirected in the particular case with which he deals. It is manifestly true that many shopkeepers in small business struggle through life with great difficulty, but their hardships make no impression upon the public. The impression is made by the retail trader in full swing, who occupies a shop in a leading thoroughfare of some great city, and who appears to receive an income in excess of the value of the services which he renders to the public. Producing nothing, and often depending upon the taste and skill of salaried buyers for the selection of the stock on which his profits are made, he stands as an intermediary between the producer and the consumer, and levies a toll for which there seems to be no adequate justification. It would not be easy to blame him for demanding whatever prices he finds it possible to obtain; but, on the other hand, no one can blame his customers if they scrutinize his profits with some closeness, or even if they eventually take measures to diminish their own contributions to them. There are some trades, however, in which the action of the intermediary is extremely valuable, and of these that of the druggist is a conspicuous example. It is of the highest importance to all who require medicines that they should be of good quality, neither impaired by keeping nor defective by reason of faulty preparation; and yet in the whole range of articles of merchandise there can be few which are liable to so much designed or accidental variation. Many drugs are parts of plants, leaves, roots, bark, and the like, and the qualities of these will vary with soil, season, and manner of collection, besides being prone to deteriorate by lapse of time. Many others are chemical preparations which may be injuriously affected by careless manufacture; and all alike are seriously exposed to risk from that all-pervading practice of adulteration which is described by a well-known politician as a legitimate form of commercial enterprise. In order to sell any named drug with safety and propriety the seller must be thoroughly acquainted with its appearance and other peculiarities, must know how to distinguish the genuine from fraudulent imitations, and, in a word, must be capable of maintaining a check upon the wholesale dealer from whom he draws his supplies. Such work as this is not mere distribution, mere buying in bulk to sell in detail; and it deserves to be recognized and paid for as something which possesses a higher value. It may be to the interest of the public to pay for it even at a considerable rate, for the sake of having such special information always available in time of need.

"Professor Attfield maintains, therefore, that the Legislature, which has already enacted that any one calling himself a chemist and druggist shall give a guarantee of the possession of certain knowledge, should further enact that no one shall carry on the business of a chemist and druggist without calling himself so—that is to say, that only recognized and duly qualified pharmaceutical chemists shall be allowed to sell active medical preparations. He would meet the case of thinly-peopled districts, in which a chemist might not be able to find a living, by permitting other tradesmen to sell medicinal articles of common consumption in closed packets, put up under a chemist's guarantee; and there can be little doubt that some legislation on these lines is really required. Professor Attfield, as the result of extensive inquiries, pronounces chemists to be in a state of declining prosperity; and it is dangerous to the public that a chemist should be put in the position of Romeo's apothecary and should be tempted, if not to vend poisons in an unauthorized manner, yet to sell inert or adulterated drugs for the sake of a trifling addition to his scanty gains. The persons who call themselves 'wholesale' druggists, and upon whom there is no check of any kind save the knowledge of the retailer, are often very accommodating in their range of prices, and are prepared to furnish a powder or liquid of respectable appearance, called by some given name, for perhaps a sixth part of what it would cost if genuine. The grocer who deals in drugs, but who has no knowledge of them, may sell adulterated or useless stuff quite innocently, if, indeed, it be innocent for him to engage in the business at all. The value of the educated druggist is, or ought to be, that he protects the consumer, and for affording this protection he has a clear right to be paid. Professor Attfield suggests that the chemist might avowedly justify his charges by his knowledge of the things in which he deals; that he might say, in effect, 'this medicine which I sell for sixpence cost me only twopence; and if I were a grocer, I could sell it for threepence and be content. The remaining threepence is not my charge for the medicine, but for my time and trouble in ascertaining that it is genuine and unimpaired.' We think the consumer would generally admit the plea; and hence that, on the ground of special knowledge, the druggist might fairly hope to triumph over any unreasoning desire for cheapness which co-operative stores, or kindred institutions, by giving it where it can be rightly given, have perhaps fostered in conditions which prevent it from being conceded without risk to the public. When Parliament meets, we trust that the official representatives of the drug trade may be able to obtain a serious consideration of the existing state of things, and that some measure for rendering the Pharmacy Act no longer a dead letter may before long find its way into the Statute-book."

From the *Daily News.*

"Professor Attfield's address to the British Pharmaceutical Conference on Tuesday, though in a manner an address devoted to a single trading or semi-professional body, was one of considerable interest and importance to the public at large. That public is wont, from a kind of instinct, to be rather sceptical of jeremiads as to the state of particular trades and professions, and without flippancy Professor Attfield's address may be said to be something of a jeremiad. It deplores the irregular competition to which regularly qualified chemists and druggists are exposed, and it demonstrates—not insufficiently—that 'pharmacy is not what it used to be.' We have said that there is a certain tendency in the outside public to take such demonstrations as this somewhat coolly. It is felt that if a certain trade or profession is exceedingly flourishing the public may make up its mind that it is flourishing at somebody's expense, and that that somebody is probably the public itself. Professor Attfield, however, has shown very conclusively that the entire disestablishment of the qualified chemist and druggist would be a public misfortune, against which the possibility of obtaining a shilling bottle for ninepence halfpenny will not be set by any wise person. It is, moreover, quite evident that it is, as he contends, an absurdity to maintain a solemn Act on the Statute-book inflicting pains and penalties on Dick, Tom, or Harry for calling himself a chemist and druggist without qualification, while any Harry, Tom, or Dick is at liberty to keep a chemist and druggist's shop, and to sell chemicals and drugs with no more qualification, licence, or State recognition of his fitness than his neighbours the bookseller and the draper.

"Professor Attfield has a double line of attack. He argues that it is unfair to impose the tax of a certain education and preparation on the qualified druggist, while the unqualified drug-seller carries on, unhandicapped and unhampered by any such preliminary expense, a competitive trade in almost every, if not in every, article of which the State licensee is supposed to have given the qualified person the monopoly. But foreseeing the obvious answer to this argument—that legislation is not intended to keep up a profitable monopoly, but to secure the public interest—he argues further, that the public are not and cannot be as well served by these mere distributors as by professional pharmacists. Of the fact, as distinguished from the inference, of the first part of the argument there can be no doubt whatever. In London, at least in its wealthier quarters, the competition with the chemist and druggist proper is chiefly limited to the co-operative societies and to the large private stores and "universal providing" shops. But in the country it is certainly common enough to find shopkeepers of almost every trade keeping and vending all the commoner as well as many of the less common simples and compounds of the pharmacopœia. And it may be further allowed that there is force in Professor Attfield's argument that drugs, especially compounded drugs, are not properly or safely to be made the subject of unskilled distribution, that much depends on their quality or condition which cannot be left to a mere distributor to decide upon, and that in estimating druggists' charges allowance ought to be made for the fact that a man of some education and practical skill is practically putting his services at any hour of the day or night at the disposal of the neighbourhood where he sojourns. It would certainly be a forlorn hope to attempt to knock a co-operative society out of its bed at midnight to furnish the antidote or the restorative required to save life; and even the most affectionate of relatives might hesitate to call in the services of an obliging haberdasher to make up a prescription with half-a-dozen—even mild—poisons in it.

"So much will generally be granted, and the anomaly of the present Pharmacy Act may be freely recognized. But it must be questioned whether it is in the power, and still more strongly questioned whether it is within the proper province, of legislation to apply itself directly to the remedy of the state of things of which Professor Attfield complains. That state of things is due to a variety of causes by no means all of which are recognized by the Professor. In the first place, all his ingenious fencing about the charge of the regular chemist being rather a professional fee than a trade price does not parry the accusation that this charge is but too generally an exorbitant one. A certain person who, being in bad health and having to travel about much, had occasion to make constant use of a particular medicine, once had the curiosity to compare the charges of different regular chemists for it. He found that for the same supply made up from the same prescription, the charge varied from one shilling to half-a-crown, and he had the curiosity to ascertain that the prime cost was something under sixpence at retail prices for all the ingredients, the bottle, and so forth. Now it is not in drug selling only that profits of from 100 to 400 per cent. have become things of the past. Again, the chemist complains of competition, but are all the articles or even the most profitable articles of his trade strictly drugs? Does he not deal largely in perfumes, soap, mineral and aërated, but not medicinal, waters, miscellaneous toilet wares, knick-knacks of all sorts and kinds? If he throws stones at the grocer and the bookseller, may not the perfumer, the oilman, the brushmaker, the liquor seller retort on him? And with regard to the really important question of dispensing proper, are not chemists themselves liable to the charge of overstocking the market? The falling off of registered druggists which Professor Attfield mentions may not be such a great disadvantage to the trade, and it might probably, at least in large towns continue still further without any district being deprived of a qualified dispenser within easy distance. Many people must have wondered what chemists find to live upon in the suburbs of London, considering their number. The fact is that, partly from the supposed inheritance of the old apothecary status, partly from the custom of equipping the shop expensively and showily, the druggists trade has long held the position of a 'genteel business.' All genteel businesses tend to be overstocked, and it may be added that they are especially liable to dangerous competition from persons who have a keener eye to business than to gentility. Further, all distributive trade tends nowadays towards concentration, towards the cutting down of profits, and towards the substitution in large measure of comparatively unskilled labour for skilled labour. This last is to be regretted, though it is an almost inevitable result of increased population, of machinery, and of the effect of both on wages. But despite Professor Attfield's facts, we entertain very great doubts whether the duly qualified druggist is as yet scarce or likely to be scarce in any populous neighbourhood. If it became really difficult to find him, legislative efforts for his preservation would have to be made no doubt. But the Professor will hardly strengthen his case by putting in, as he does, a plea for allowing chemists to practise what is called 'counter prescribing.' In the first place a complaint of competition with the chemist in drug selling is but awkwardly mated with a recommendation of competition by the chemist in drug-prescribing. In the second we venture to think that the harm done by this amateur doctoring considerably exceeds that done by the selling of inferior, adulterated, or spoilt drugs owing to the incompetence of the seller. In short, it is possible to go with Professor Attfield so far as to allow the justice and advantage of drawing the line of outward and visible difference between the qualified and unqualified drug vendor somewhat more broadly and distinctly than is done by the Act of 1868. It may also be granted him, though not to the extent which he seems to desire that the list of drugs and compounds which none but a duly qualified person may sell on any terms might be advantageously enlarged so as to draw such a line. But the principle of any such extension must be not the protection of the chemist in the one sense, but the protection of the public in the other."

From the *Standard*.

"The address which Professor Attfield delivered on Tuesday to the Pharmaceutical Conference, while serving as a sort of 'side show' to the British Association, which is also in session in Southport, would scarcely have deserved even the much abused name of 'science.' Nor do we imagine that any such rank is claimed for it. The meeting over which Dr. Attfield presides is to a certain extent a great trade union, and his discourse touches mainly on the extent to which grocers who sell drugs physicians who prescribe proprietary articles, patients who decline to swallow physic, and general practitioners who dispense their own medicines are cutting into the business of properly qualified druggists.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Parke, Davis and Co., Swadling, King, Dewson, Umney, Haydon, Smith, Sawer, W. H. P., M. P. S., X. Y. Z., Associate.

"THE MONTH."

Falling leaves and autumnal tints indicate that the reign of flowers is nearly over for this year. The scarlet berries of the dulcamara and the purple fruits of the belladonna and the thorny "apples" of the stramonium show that fruits have taken the place of flowers, and those who are now about to commence their botanical studies will do well to make the most of the flowers still left for examination.

At the Royal Gardens at Kew the scammony is still in bloom. Wormwood, borage, *Lobelia syphilitica*, *Saponaria officinalis*, and *Nicotiana Tabacum*, afford an opportunity of studying the characters of the natural orders to which they belong. The fruit of the dog-rose, buckthorn, hop, fig, squirting cucumber, and many others are now in good condition for forming a practical acquaintance with their structure. The beautiful coral-like fruits of the spindle tree, *Euonymus Europæus*, should not be overlooked, affording as it does an example of the arillus.

The *Euryale ferox* has recently blossomed at Kew. The large leaves, often nearly 3 feet across, purple and spiny beneath, and also furnished with spines on the upper surface, vie with those of the *Victoria regia*, in flower at the same time. The seeds of this plant usually occur in collections of Hindoo and Chinese materia medica, being thought to possess medicinal virtues. In Bengal, however, the seeds after being baked in sand are eaten by the natives.

The *Cassia Tora* is also now in flower in the Economic House. This species bears some resemblance to fenugreek in the leaves and narrow pods, the latter of which are very different in shape from most of the other species of the genus. The leaves have a reputation in India as a cure for ringworm.

An interesting note, by Mr. W. B. Hemsley, appears in the *Gardeners' Chronicle*, in which he gives an account of the opinions held concerning the variety of the wild raspberry named var. *Leesii*. The general consensus of opinion appear to be that it is a hybrid between the strawberry and the raspberry, although this has not been proved as yet by direct experiment.

The subject of the continuity of protoplasm by means of delicate threads through the walls of vegetable cells attracted considerable attention at the meeting of the Biological Section of the British Association, at Southport. Mr. W. Gardiner, who has examined fifty species of plants and found this continuity of protoplasm in all of them, pointed out that this fact places us in a position to obtain a clearer insight into such phenomena as the downward movement of a sensitive leaf upon stimulation, the influence of a germinating embryo upon the endosperm cells, and of the action of a tendril towards its support. Professor Hillhouse suggested that the protoplasmic threads may serve to transmit impulses from one cell to another and thus act somewhat like a nervous system. Dr. Carpenter remarked that there are forms in the animal kingdom in which the cell is never arrived at, but in which there is simply a continuity of protoplasm, so that the lower forms of the animal and vegetable kingdoms are here closely approximated to one another.

Mr. C. A. Macmunn read a paper on the occurrence of chlorophyll in animals. He stated that he had found this green colouring matter in the intestines of invertebrate animals, and had arrived at the conclusion that the chlorophyll found in animals not only has all the characteristic appearances of vegetable chlorophyll, but is synthetically built up by and in the bodies of animals. Professor Lankester confirmed the views of Mr. Macmunn, remarking that the idea held by some, that the chlorophyll found in animals is due to minute parasitic algæ, was opposed by the consideration that chlorophyll has been found in a diffused condition throughout all the tissues, and not merely in the form of little globules which might be considered as independent organisms. The attempt to draw a line of demarcation between the lower forms of the animal and vegetable kingdoms is therefore becoming gradually more difficult.

Some valuable and pertinent remarks occur in the *Gardeners' Chronicle* (p. 208), concerning prizes given for collections of plants and flowers. The editor remarks that any procedure which might lead to the extermination of a rare plant should be discouraged, such as giving weight to the rarity of a plant in the awarding of a prize. He suggests also that prizes might be given for collections of plants from different geological formations, or of maritime plants, etc. "To offer prizes for the largest and best named collection of wild flowers is not to advance botany, *i.e.*, a knowledge of plants . . . It encourages mere collectors, many of whom know nothing of plants beyond their names." This is quite true, and is induced by the nature of the competition. Every spare moment of time is naturally devoted to adding to the number of plants, so as to increase the chances of winning the prize, and the names are naturally obtained in the easiest way possible, often by comparison with illustrations instead of by careful analysis of the flowers. A prize offered for the best dissection and descriptions of a small number of plants, or for a collection of the forms and varieties of a few polymorphous species, would do far more to cultivate a habit of careful observation and systematic work, as well as an accurate knowledge of plants.

The *Gardeners' Chronicle* (p. 237) gives an illustration of a gigantic equisetum (*E. giganteum*) which was seen by M. André growing to a height of 16 feet at the base of the volcano Corazon, near San Florencio, in Equatorial America. The plant grows in marshy ground where the water surges up at every step. Its appearance reminded the celebrated traveller of the immense Lepidodendrons and Calamites, to whose decay we owe our coalfields.

The cultivation of the *Eucalyptus* has of late become extended greatly in the province of Malaga, in order to supply the constant demand for charcoal caused by the excessive use of the fuel for cooking purposes. The tree is also used to form avenues in the neighbourhood of the city. Some low districts which were formerly uninhabitable, owing to malaria, are reported to have been considerably improved in consequence. The extensive cultivation of the plant should lead to the production of the essential oil at a comparatively low price, and to fresh uses being discovered for it.

In some notes in the *Garden* (Sept. 8, p. 212), by Mr. Geo. Nicholson, of Kew, on the genus *Sophora*, it is mentioned that this tree possesses cathartic properties, and that "in the Botanical Garden of Dijon is a well beneath a fine *Sophora Japonica*, which the gardener is obliged to cover over when the leaves or flowers are about to fall," having found by experience that the water acquires laxative properties through the sophora being infused in it. The active principle examined by M. Fleurot, of Dijon, proved to be a non-crystalline substance analogous to the cathartin of senna leaves. Another species, *Sophora angustifolia*, is said to yield the intensely bitter root used in medicine in Japan, under the name of "kus-ham" or "kiusiu," in which M. Petit recently discovered a new alkaloid.

A writer in the *Gardeners' Chronicle* having drawn attention to the danger of honey being rendered poisonous by the visits of bees to the flowers of the aconites so commonly cultivated in gardens, it has since been pointed out that the hive bee does not commonly collect honey from these flowers, presumably because its tongue (proboscis) is too short to reach it, so that humble bees are most frequently seen upon them (*Gardeners' Chronicle*, Sept. 8, p. 289). The golden rod and wild aster have recently been recommended by the Rev. L. L. Langstroth, the inventor of the movable frame-hive, as suitable for planting in waste places near beehives. He states that bees will forsake almost everything else for them (*Gardeners' Chronicle*, Sept. 8, p. 306).

Stings by wasps and bees although generally not very dangerous do sometimes produce alarming symptoms. In a case related in the *Lancet*, Sept. 22 (p. 528), in which great nervous excitement, prodigious swelling and delirium were produced by the sting of a bee, Dr. T. Harrold found the administration of 15 grains of sulphocarbolate of sodium in an ounce of water every four hours rapidly diminished the symptoms after the second dose, caused a profuse perspiration and resulted in the convalescence of the patient. One of the simplest remedies, and one which can quickly be applied in the case of stings of insects, is to press the tube of a key firmly over the place stung; this prevents the immediate absorption of the poison and presses the sting out when it has been left in the flesh.

With respect to the paragraph in the Month (before, p. 62) relating to the use of "crotalus" in scarlet fever, a letter has been received from Dr. Hayward stating that for subcutaneous injection "it is three to five drops of the first centesimal (1 in 1000), not the first decimal attenuation," that is used. Further, it is not the poison bag that is taken, but the "pure venom itself, pressed out by the finger and thumb through the fang into a small bottle, and there immediately mixed with [nine parts of] pure glycerine."

According to Dr. Bonatti (*Glasg. Med. J.*, xx., 239) chloral in infusion of senna acts as a safe, prompt, powerfully drastic, and easily administered aperient in cases of obstinate constipation such as are often met with in the treatment of the insane. He gives it in doses of one, two, or even three grams of chloral hydrate in one hundred grams of infusion, with thirty grams of syrup added.

According to Messrs. Gehe the demand for convallamarin and lily of the valley flowers has considerably abated. This rapid abandonment of a new remedy might find another explanation than the passing away of a nine days' wonder, if *Punch* shadows forth the truth in the following conversation: "*First Country Doctor*: 'Could you come to my place, Brown, to-morrow morning?' *Second C. D.*: 'All right, old man. What is it?' *First C. D.*: 'Well, I've had a case of endocarditis which I've very successfully treated with *Convallaria majalis*, and I want your help with the *post mortem*.'"

Dr. H. P. Powell, of Cleveland, Ohio, has directed attention to the advantages of the administration of chloroform to children during sleep. The little ones are saved from fright and its effects, and from the excitement which the administration frequently causes, and operations can be successively performed during sleep (*Brit. Med. Journ.*, Sept. 15, p. 555).

At a meeting of the New York Medical and Surgical Society (*Practitioner*, September, p. 212), Dr. Flint gave the results of the trial of oil of wintergreen in rheumatism. In thirteen cases tried at the Bellevue Hospital it had yielded rather better results than those ordinarily obtained with salicylic acid. The oil was given in 10-drop doses in linseed tea several times a day. Dr. Kinnicutt also stated that he had used the oil in acute rheumatism with good results, and had found that it was less disagreeable when administered in milk than either salicylic acid or salicylate of sodium.

Some interesting researches upon the probable mode of action of "antiseptics" employed in the dressing of wounds have occupied the attention of M. Gosselin, who has worked with solutions of carbolic acid varying in strength from 1 to 5 per cent., alcohol and dilute alcohol and camphorated spirit, applying the solutions to transparent animal membrane through which the capillary circulation could be observed. He reports (*Comptes Rendus*, xcvii., 541) that upon contact of the antiseptic with the membrane the circulation of the blood in the capillaries is arrested, more or less quickly in direct proportion to the strength of the solution. This arrest he thinks can only be attributed to coagulation of the blood determined by contact with the medicament after it has traversed the very delicate membrane to which it has been applied and the still more delicate walls of the capillary vessels. M. Gosselin points out the analogy of this action to that of caustics and expresses an opinion that as far as it goes it is a true causticizing one. It would appear, therefore, that these medicaments act first as germicides or antiseptics and then as astringents and semi-caustics. In view of the fact that carbolic acid has been reported to have exercised a toxic action when applied to a wound it may be remarked that if coagulation really does follow the application of such solutions in proportion to their strength it is possible that a weak solution would in some cases be more likely to exercise a poisonous action than a strong one.

Freshly dried sphagnum moss has recently been recommended by Dr. Hagedorn, of Magdeburg (*Med. Times and Gaz.*, Sept. 1, p. 246), as a cheap, very absorbent, elastic and conveniently applied dressing for wounds. It is used in conjunction with a weak solution of sublimate.

The use of plastic clay as a convenient material for suppositories in some cases is recommended by Dr. Trippier (*L'Union Pharm.*, xxiv., 398). The ordinary sculptors' modelling clay is used, the medicaments being dissolved in water and then worked into the mass; in this way salts of iron and copper, alum or even vegetable extracts may be incorporated by taking proper precautions. Dr. Trippier appears to contemplate supplying patients with the medicated clay, so that they can break off a portion and mould it between the fingers as required. Although the mass may easily be maintained of a proper consistence in a vessel placed in a plate containing water and covered by a bell-glass, it is liable to harden if exposed in the open air; but this may be prevented by the use of glycerine, which is said to have the additional advantage of giving stability to a potassium iodide mixture. The formula given for such a mass is—clay, 500 grams; water, 50 grams; potassium iodide, 30 grams; glycerine, 100 grams.

The physiological action of cotoin and paracotoin has been the subject of an investigation undertaken by Dr. Albertoni (*Archiv. exp. Path. u. Pharm.*, xvii., 291), with a view of thowing light upon the nature of the effect produced when these substances are administered in cases of diarrhœa. It was found that cotoin exercises no influence upon the process of digestion; neither does it prevent, but simply retards the development of bacteria. Its specific action seems to be to produce an active dilation of the intestinal blood vessels which promotes the nutrition and recuperation of the mucous membrane of the intestines and favours resorption. Paracotoin was found to resemble cotoin in its action, but to be less active. Dr. Albertoni recommends the administration of cotoin in powder enclosed in a wafer, or as an emulsion. He also gives a form for a solution:—cotoin, 0·40; sodium bicarbonate, 1·0; water, 100; glycerine, 20; dissolve with heat. The solution is said to be nearly, but not quite, perfect. According to a statement in Messrs. Gehe's circular, cotoin is coming steadily into demand on the Continent, but United States orders favour paracotoin.

Further experiments undertaken by MM. Cornill and Berlioz with a view to determine the general action on the body of the microbes found in an infusion of jequirity, *Abrus precatorius*, have led them to the conclusion that these bacteria are the sole active principle in producing the medicinal effects of the seeds. The infusion deprived of the bacteria by filtration after M. Gautiers' process produced no pathological effects, while the subcutaneous injection of a solution of the crystallized principle, prepared by M. Chapoteau from the seeds, produced no appreciable effects (*Comptes Rendus*, xcvii., p. 679).

The common southernwood (*Artemisia Abrotanum*) is reported by M. Craveri (*L'Union Pharm.*, xxiv., 410), to yield a crystallizable alkaloid, which he has named "abrotine." The sulphate, hydrochlorate and citrate have been prepared, all of which crystallize well, and the hydrochlorate is very soluble in water. Some preliminary physiological experiments with abrotine have been made by Dr. P. Giacova, who finds it to lower the temperature of the body, and to stop the action of a frog's heart in a few minutes. The alkaloid and its salts appear also to possess the property of preventing the putrefaction of albuminoid matter.

A West African bark, called "doundaké," used by the natives of the Rio Nunez as a febrifuge, has recently been examined by MM. Bochefontaine, B. Féris and Marcas (*Comptes Rendus*, xcvii., p. 272). The bark is of a reddish-orange colour and is formed of superimposed lamellæ, which are easily detached from one another. The taste is strongly bitter. The plant yielding the bark is a shrub, and is supposed to belong to the natural order Rubiaceæ. An active principle of a bitter taste has been obtained from it, soluble in water and alcohol and possessing an alkaline reaction and the same physiological action as the bark itself. This substance the authors regard as an alkaloid, and they have named it "doundakine." The alkaloid possesses poisonous properties, producing in the frog and guinea pig a cataleptic state with gradual failure first of the respiration and then of the heart's action. In dogs the catalepsy is not so evident. A poison obtained from the natives of Rio Nunez and used in chase and in war produced similar effects, and is believed by the authors to contain the same active principle as the doundaké bark.

A new substance, named by Meyer "thiophen" (*Berichte*, xvi., 1465), has been discovered in coal tar benzol. It has the formula C_4H_4S, and is, when pure, a colourless very mobile oil, boiling at 84° C., not miscible with water and having a sp. gr. of 1·062 at 23° C. In commercial coal tar benzol it exists to the extent of perhaps 0·5 per cent. only. The editor of *New Remedies* (p. 268) suggests that this new compound will probably be found in ichthyol, as that substance is known to contain a considerable proportion of combined sulphur. The discovery of thiophen arose from the observation that coal tar benzol when treated with isatin and sulphuric acid yields a magnificent blue colouring matter, which is not the case with benzol prepared from benzoic acid, from toluol or from urine. Benzol treated by sulphuric acid is rendered brown and no longer yields the blue colouring matter (indophenin), and this gave the clue to the process adopted for preparing the thiophen.

In a recent trade report Messrs. Gehe state that they have taken an opportunity while saturating a large quantity of benzoic acid sublimed from resin to isolate the adherent body, upon the presence of which depends the brown colour that is now one of the official characters of benzoic acid in the German Pharmacopœia. It is believed to be "benzophenid," and when treated with alkalies breaks up into benzoic acid and phenol. Some physiological experiments made with the substance by Dr. Robert, in Strassburg, seemed to show, however, that a similar decomposition does not take place in the body when "benzophenid" is administered inwardly; at least no increase of phenol has been detected in the urine; in this behaviour it resembles chloral hydrate, which does not yield chloroform. Rabbits did not appear to be affected by it when administered in doses of 10 grams, and an alcoholic solution injected under the skin of a frog produced no perceptible symptoms of poisoning.

Salicylate of bismuth has been reported to give good results in the treatment of various forms of diarrhœa as well as in typhoid fever. Commercial samples of the salt have, however, been found by M. Jaillet variable in characters and composition, and as a rule to yield to solvents uncombined salicylic acid (*Bull. Com.*, xi., 383), due probably to a defective mode of preparation. M. Jaillet states that there are two salts worth further investigation, an acid salicylate and a basic salicylate of bismuth. The acid salt is prepared by precipitating well crystallized nitrate of bismuth in five hundred times its weight of water, made faintly alkaline with caustic soda and containing salicylate of soda equal to double the weight of nitrate of bismuth employed. After settling, the supernatant liquid is decanted and the precipitate is washed three times with pure water to remove all traces of salicylate of soda and then dried rapidly at 40° C. Acid salicylate of bismuth occurs in white granular crystals that do not become coloured in the light and are only slightly soluble in water. If the washing of the precipitate be continued until the decantation water no longer gives a violet colour with perchloride of iron a yellowish dense amorphous basic compound is obtained, which is thought to be a mixture of two basic salicylates of bismuth. It would therefore appear that the compounds of bismuth with salicylic acid behave in the presence of water similarly to the compounds of that metal with nitric acid.

A nitrochlor-camphor has been prepared by M. Cazeneuve (*Journ. Pharm.*, [5], iv., 231) by heating normal monochlor-camphor with fuming nitric acid, precipitating with water and purifying the pasty mass by treatment successively with strong ammonia solution and 93° alcohol. By suitable treatment it can be obtained in magnificent prisms, melting at 95° C., insoluble in water, moderately soluble in cold alcohol and very soluble in hot alcohol, chloroform, carbon bisulphide and ether. Optically it has the peculiarity of being levogyre, whilst the monochlor-camphor from which it is derived is strongly dextrogyre. In constitution it probably corresponds to the nitrobrom-camphor derived from monobrom-camphor.

Herr Wieland (*Berichte*, xvi., 1989) claims pre-eminence in the list of indicators used in alkalimetry for the nitro-compound known as "ethyl-orange," which he says he has found to excel all other indicators in the delicacy and sharpness of its reaction. It is used in a 0·05 per cent. solution, two drops of which suffice for the coloration of 50 c.c. of liquid, and according to a comparative table given in the paper, the orange colour of 50 c.c. of such a liquid passes to a rose colour upon the addition of 0·3 to 0·5 c.c. of a centinormal acid solution, whilst methyl-orange solution under the same conditions requires the same quantity of acid to change the yellow colour to orange and from 0·8 to 1·0 c.c. to produce the rose colour. Ethyl orange is not affected by carbonic acid; but it should be mentioned that according to Herr Miller (*Berichte*, xvi., 1992) it has the disadvantage of being coloured rose by neutral sulphate of alumina, whilst with methyl-orange the change does not proceed beyond orange.

It is known that certain precipitates, such as sulphur in an emulsion, will pass through a paper filter. In order to overcome this difficulty M. de Boisbaudran (*Comptes Rendus*, xcvii., 625) treats the filter with a substance prepared by boiling filtering paper in aqua regia until the mass liquefies, then addding a large quantity of water and washing by decantation, or otherwise, the white precipitate that is formed. This substance is suspended in water and the mixture is poured into the filter and allowed to drain, when the water passes through and leaves upon the surface of the paper a coating which obstructs the pores.

According to Herr Knapp (*Archiv*, [3], xxi., 598) an establishment for the manufacture of santonin is being erected at Tschimkent, between Taschkent and the city of Turkestan. It is stated that all the material used by manufacturers of santonin grows in the neighbourhood, and a considerable advantage is expected to be realized in the saving of transport, the raw material weighing about fifty times as much as the finished product. The factory is intended to work up ten tons of seed every twenty-four hours.

In a memoir upon the causes of alteration in flour (*Comptes Rendus*, xcvii., 651) M. Balland states that the wheat grain contains a ferment which appears to reside in the neighbourhood of the albumen and the action of which is limited to the gluten. This ferment is insoluble and possesses the properties of the organized ferments; it resists a dry temperature of 100° C., but is destroyed by boiling water. Heat and moisture are indispensable to its development, a moist temperature of 25° C. being particularly favourable. When the grinding is skillfuly conducted most of this ferment remains in the bran, but if the stones be rotated too quickly the greater part of it passes into the flour, entailing the changes that occur in flour technically known as "heated."

In a contribution to the history of putrescence alkaloids Herr Poehl gives the results of some experiments upon the putrefaction of rye meal both free from and under the influence of ergot. (*Berichte*, xvi., 1975). The putrefaction appears to be preceded by the formation of peptone, such as can be set up in pure rye flour by the addition of peptic ferment. Herr Poehl states that from putrefying rye flour, both pure and ergotized, he has obtained, by shaking with ether and evaporating, residues which were sometimes liquid or semi-liquid and sometimes solid, with widely varying odours, sometimes resembling coniine, or with a disagreeable sweet aromatic smell, or recalling the smell of hawthorn, and which gave the usual alkaloidal reactions. It was found that the presence of ergot or the formation of mould in a paste of rye meal and water set up under certain conditions a peptic action upon the albuminoids of the meal and favoured their putrescent decomposition, the rate of decomposition being directly proportional to the peptonization. In the first stages of the change the putrescent decomposition takes place by far the most rapidly and extensively in rye meal to which peptic ferment has been added; next in order comes the meal containing ergot, followed by mouldy meal and then by pure meal. But with the lapse of time these differences are gradually diminished. The most essential conditions upon which the formation of putrescence alkaloids in ergotized rye meal depends appear to be (1) the conversion of starch into glucose; (2) fermentation of the glucose with formation of lactic acid; (3) peptonization of the albuminoids through the peptic action of the mycelium of *Claviceps purpurea* in the presence of lactic acid; (4) transformation of peptone to "ptomopeptone" and decomposition with the formation of putrescence alkaloids.

In a very lengthy communication (*Journ. prakt. Chemie*, xxviii., 82) the changes which take place in starch under the influence of inorganic and organic acids are exhaustively discussed by Herr Salomon. His experiments have led him to the conclusion that the saccharification of starch by dilute sulphuric acid does not consist in the splitting up of the starch molecule into sugar and dextrin, as stated by Musculus, but that the conversion takes place in stages, as affirmed by Payen, the successive products being starch, dextrin, and dextrose. The action of the sulphuric acid appears to resemble that which occurs in the formation of ethers. The acid unites with a definite quantity of starch, effects its hydration, and is then see free to unite with a fresh quantity of starch, the process going on continuously and the rapidity of the conversion being in proportion to the quantity of acid present. The saccharification of starch by organic acids proceeds in exactly the same manner; the action is much less energetic, but the successive products are identical.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 29, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

THE GOVERNMENT CINCHONA PLANTATIONS AT DARJEELING.

THE report of Surgeon-Major KING upon the Government Cinchona Plantations in Bengal, for 1882–83, which has been just received, contains some unusually interesting information respecting the progress of this early and most important experiment in cinchona acclimatization. In the first place the year has been marked by decisive steps taken to utilize the experience of the past in determining the kinds of cinchona which can be most advantageously cultivated at Darjeeling, the total number of plants showing a diminution of about fifty thousand, consequent upon the uprootal of upwards of sixty thousand inferior "hybrids" and "calisayas," which yielded bark that had proved upon analysis to be of poor quality. Following the same policy a hundred and sixty thousand "red bark" trees which had to be uprooted in the ordinary course were replaced by "yellow (Ledgeriana) bark" and superior "hybrids." Further, some new ground has been broken, which is also to be devoted to the best kind of "Ledgeriana" and "hybrids." As to the hybrids, it appears that among them several distinct forms are recognizable, and the results of analyses of bark from four of these were stated in a previous report, and showed a range of crystallized quinine sulphate from 0·97 to 2·87 per cent. The results of the analyses of the barks from four other hybrids are now reported, and these appear to indicate a very high quality, the poorest being nearly equal to the richest of the preceding year, whilst one yielded equal to 6·12 per cent. of quinine sulphate and 2·46 per cent. of cinchonidine, with traces of quinidine and 0·55 per cent. of cinchonine. The total number of plants standing in the plantations at the end of the year was 4,711,168, of which 3,713,200 were "succirubra," 662,998 "Ledgeriana," 304,378 unnamed "hybrids," and 30,592 of "other kinds." "Officinalis" plants are conspicuous by their absence, unless they are included among "other kinds;" but even then the species would seem to have almost disappeared from this part of India. Attempts to cultivate at Darjeeling the species of *Cinchona* and *Remijia* yielding "Carthagena" and "cuprea" barks have also up to the present time been practically a failure. Before leaving this part of the subject a word of commendation is due for the liberal policy of the Government, under which the remainder of the crop of seed from the "Ledgeriana" plants, after reserving what was required for the purposes of the plantation, was distributed gratuitously among private planters applying for a supply.

The crop of bark gathered in the year 1882–83 exceeded that harvested from these plantations in any preceding year, amounting to no less than 396,980 pounds of dry bark, of which 372,610 pounds consisted of "succirubra" bark, and the remainder principally of "calisaya" and "Ledgeriana." The estimated average cost per pound of producing this bark, calculated on the expenditure, is 2 annas 9·88 pies, equal, with the exchange at 1*s.* 8*d.* per rupee, to about 3½*d.* It will be observed that the greater portion of the bark crop consisted of "succirubra," which has hitherto been generally understood to contain as a rule only a small proportion of the most valuable alkaloid and much colouring matter. But the report contains an important statement with respect to "renewed" bark from "succirubra" trees that had had their original bark removed by Mr. MOENS' shaving process, which coupled with the recent report from Ceylon that the bark of the "succirubra" is there found to improve in quality as the plant approaches maturity, would seem to point to a more promising future for one of the most robust species of *Cinchona.* It appears, that although the bark renewed rather slowly, the new product showed a marked improvement in quality, a sample from the Mungpoo plantation yielding upon analysis equal to 3·70 per cent. of quinine sulphate, 4·88 per cent. of cinchonidine sulphate and 1·81 per cent. of cinchonine.

With the exception of a relatively small quantity, the whole of the bark harvested in the year was made over to the Government manufactory for conversion into "cinchona febrifuge." It is said to have included a larger proportion than usual of good bark, to which is mainly attributed the fact that the average quantity of febrifuge extracted from the bark used rose last year 2·73 per cent. The net product of the manufacture for the year is said to have been 10,363 pounds of ordinary, and 300 pounds of crystalline febrifuge, which, by adding the expense of manufacture to the cost price of the bark, as given above, is estimated to have been produced at an expenditure of rupees 8 : 8 (about 14*s.* 2*d.*) per pound. The demand for the febrifuge fell short of that in the previous year, and the stock in hand had increased nearly fifteen hundred pounds and reached nearly three thousand pounds; but this is not considered to be an excessive quantity, representing only about four months' consumption. The quantity of febrifuge supplied to Government during the year is reported as 4180½ pounds, and Dr. KING, somewhat ambitiously comparing it with an equal weight of quinine at 10*s.* per ounce, estimates the saving to the Government by its use at about £27,695. We do not think, however, that the "febrifuge" has yet reached the pitch of perfection at which it can claim to be equal to a similar weight of quinine, and if it be correct that apart from this point the result of the year's work is to show a profit equal to 6½ per cent. upon the capital, there is little necessity for any hypothetical inflation of the figures.

Much attention is reported to have been given during the year by Dr. King and Mr. Gammie to improvement in the process of manufacture of the febrifuge, and some advance is said to have been made. That improvement is desirable may perhaps be assumed from the fact that the falling off in the demand was mainly due to a diminished consumption at the Government Medical Depots of Calcutta and Madras. Dr. King is of opinion that better results might be obtained by a different and more costly process of manufacture, but possibly at an increased cost of the product. On the other hand, the report states that at the desire of the Secretary of State for India, a quantity of upwards of forty thousand pounds of bark ("succirubra" and "Ledger") has been sent to this country, where, it is understood, it will be converted into various kinds of "febrifuge," which will be returned to India for trial by the medical department.

The Inaugural Evening Meeting of the Pharmaceutical Society for the new session will take place on Wednesday next, and will be, as usual, devoted mainly to the reception of reports concerning the doings of old students in the School of Pharmacy and welcoming new ones. The attendance at these pleasant *réunions* is always good, and the fact that the Address to the Students is to be delivered by Professor Michael Foster, F.R.S., will, probably, induce even a larger number to make an effort to be present this year. The occasion will also be rendered additionally interesting by the presentation of the second "Hanbury Medal" to Mr. John Eliot Howard.

* * *

We have received a number of communications upon the subject of the Address delivered last week by Professor Attfield, at Southport, but we have not thought it necessary to publish them, as the opinions expressed are identical with those which have been reiterated again and again in the correspondence columns of this Journal. We have preferred rather to devote a considerable portion of the present number to the reproduction of comments upon the Address that have appeared in the public press, in order that our readers may have an opportunity of estimating the attitude, as thus indicated, that outside public opinion is likely to assume towards any attempt to secure legislation in the direction advocated by Professor Attfield. Several correspondents, also, have expressed a desire that the Address should be widely circulated and have inquired as to the possibility of purchasing copies for distribution. It will be seen from a letter which is printed on another page that Professor Attfield is taking the necessary steps to meet their wishes.

* * *

We regret to see that the editorial columns of the *British Medical Journal* were last week disfigured by one of the class of "leaderettes," so frequently met with now in the public press, in which prejudice and assumption are allowed to do duty for a knowledge of facts. The ignorance of the writer is shown by the statement that in the British Pharmacopœia "it is laid down that spirit of nitrous ether shall contain 2 per cent. by volume of pure nitrous ether." Even if unacquainted with the usually accepted explanation of the indication of the 2 per cent. separation which occurs during the application of the official test, an intelligent perusal of a report of the cases which furnished a text for his diatribe would have preserved him from making so incorrect an assertion. With respect to the tincture of quinine, too, which is alleged to have been found grossly deficient in its active and essential ingredients, it may be remarked that there were two charges in respect of this preparation before the magistrate. In one the correctness of the analysis of the public analyst was disputed, and the sample was referred to the chemists at Somerset House, who, as will be seen on turning to p. 259, have reported that it contained 8 grains of quinine sulphate to the ounce. In the other case, also, the defendant said that he was prepared to swear that in making the tincture he had used the proper quantity of quinine, but having omitted to accept a portion of the sample for independent analysis, and his statement being unsupported, he was convicted. The possibility, however, that the analyst made a mistake in this case as well as in the other is evidently not excluded.

* * *

A deputation from the Chemists and Druggists' Trade Association had an interview, on Tuesday, with the Vice-Chairman of the Board of Inland Revenue (Mr. Adam Young) and Major Keith-Falconer, the object of the visit being to urge on the Board the advisability of issuing an order making it compulsory on excise officers, when purchasing spirit for analysis, to leave with the seller a portion of the article purchased, to enable him, if he so wish, to obtain an independent analysis. It was pointed out that it frequently happens that a considerable time elapses between the date of a purchase and the institution of a prosecution in respect to it, and that meanwhile the spirit might have been in the hands of several persons. The Vice-Chairman at first suggested that the difficulty might be avoided by taking out a licence, which now costs only ten shillings a year; but after some further conversation he said he would recommend the Board to make the order asked for.

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The recent meeting of the British Pharmaceutical Conference in Southport would appear to have been better attended than any previous meeting in any part of the country; the attendance book was signed by 193 persons, whereas the highest previous number of signatures was 170.

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The meeting of the British Association in Southport, which was brought to a close on Wednesday, was also in respect to attendance a most successful one, the number having reached 2714. But it resembled the recent meeting of the American Association for the Advancement of Science in the dull mediocrity of the sectional proceedings, which to those who knew the Association in former days must have justified a regret that the jubilee meeting at York was not made to bring its history to a close.

A little fillip was given on the last day, when a rumour that the "missing link" of the Westminster Aquarium was to occupy the attention of the Department of Anthropology attracted a crowd to the meeting of Section D. The proceedings there, however, will hardly be considered, even by anthropologists, to have contributed much to the "advancement of science," and we think that most people will agree with the *Standard* that "when the British Association takes to expending its energies on the showman's monstrosities there is a distinct 'throw-back' to the time when the 'Transactions' of the Royal Society dealt with the monstrous births of calves with two heads." The next meeting of the Association is to commence in Montreal on Wednesday, the 27th of August, 1884.

* * *

At the sitting of the Academy of Sciences, on the 3rd instant, the President reminded the members that in another three days the Dean of the Academy and of the Institute, M. Chevreul, would enter his ninety-eighth year, not only retaining his physical vigour, but also his mental activity. He added that he looked forward with confidence to the time when the Academy and France would celebrate the centennary of one of the most illustrious scientific men of the age.

* * *

Indeed the office of Dean of the Institute would seem to be closely associated with longevity; for the present ages of the seven distinguished Frenchmen who share this dignity with M. Chevreul are—M. Barthélemy Saint-Hilaire, the youngest, seventy-eight years: M. Charles Lucas, eighty years; M. Boussingault, eighty-one years; M. Dumont, eighty-two years; M. Dumas, eighty-three years; M. Milne-Edwards, eighty-three years; and M. Mignet, eighty-seven years.

* * *

As the Patron of the First International Pharmaceutical Exhibition, His Imperial Highness the Archduke Carl Ludwig invited Herr A. von Waldheim, the President, Dr. Hellmann, the Vice-President, Herr Seipl, the Treasurer, and Dr. Heger, the Secretary to the Executive Committee of that undertaking, to a *dejeuner* on Sunday, the 16th inst. In acknowledging the toast of his health, proposed by Herr von Waldheim, His Imperial Highness said that pharmacists might reckon upon him in the future to do anything that lay in his power to support them in their useful work. It is intended that if possible the formal distribution of prizes shall take place before the end of the present month.

* * *

In Toronto a man named Robertson has been sentenced to pay a fine of five hundred dollars or undergo sixty days' imprisonment for having forged the trade mark of J. C. Ayer and Co. to labels placed on pill boxes. The prisoner appears to have offered a lot of "Ayer's Pills" at two-thirds the market price to a firm which took the precaution before buying to communicate with Messrs. Ayer, so that the fraud was thus discovered. The prisoner said he had sold only one gross of the pills, but admitted that he had prepared about two hundred dollars' worth which he expected would have sold for between one and two thousand dollars. As it was, however, the pills were seized and destroyed, together with boxes, labels and electrotypes that had cost him at least another thousand dollars.

Proceedings of Scientific Societies.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The meeting of the above Association commenced on Wednesday, September 19, at Southport, under the Presidency of Arthur Cayley, M.A., D.C.L., LL.D., F.R.S., Sadlerian Professor of Pure Mathematics in the University of Cambridge.

The President's Address.*

Since our last meeting we have been deprived of three of our most distinguished members. The loss by the death of Professor Henry John Stephen Smith is a very grievous one to those who knew and admired and loved him, to his University, and to mathematical science, which he cultivated with such ardour and success. I need hardly recall that the branch of mathematics to which he had specially devoted himself was that most interesting and difficult one, the Theory of Numbers. The immense range of this subject, connected with and ramifying into so many others, is nowhere so well seen as in the series of reports on the progress thereof, brought up unfortunately only to the year 1865, contributed by him to the Reports of the Association; but it will still better appear when to these are united (as will be done in the collected works in course of publication by the Clarendon Press) his other mathematical writings, many of them containing his own further developments of theories referred to in the reports. There have been recently or are being published many such collected editions — Abel, Cauchy, Clifford, Gauss, Green, Jacobi, Lagrange, Maxwell, Riemann, Steiner. Among these the works of Henry Smith will occupy a worthy position.

More recently, General Sir Edward Sabine, K.C.B., for twenty-one years general secretary of the Association, and a trustee, President of the meeting at Belfast in the year 1852, and for many years treasurer and afterwards President of the Royal Society, has been taken from us, at an age exceeding the ordinary age of man. Born October 1788, he entered the Royal Artillery in 1803, and commanded batteries at the siege of Fort Erie in 1814; made magnetic and other observations in Ross and Parry's North Polar exploration in 1818–19, and in a series of other voyages. He contributed to the Association reports on Magnetic Forces in 1836–7–8, and about forty papers to the 'Philosophical Transactions'; originated the system of Magnetic Observatories, and otherwise signally promoted the science of Terrestrial Magnetism.

There is yet a very great loss: another late President and trustee of the Association, one who has done for it so much, and has so often attended the meetings, whose presence among us at this meeting we might have hoped for—the President of the Royal Society, William Spottiswoode. It is unnecessary to say anything of his various merits: the place of his burial, the crowd of sorrowing friends who were present in the Abbey, bear witness to the esteem in which he was held.

I take the opportunity of mentioning the completion of a work promoted by the Association: the determination by Mr. James Glaisher of the least factors of the missing three out of the first nine million numbers: the volume containing the sixth million is now published.

I wish to speak to you to-night upon Mathematics. I am quite aware of the difficulty arising from the abstract nature of my subject; and if, as I fear, many or some of you, recalling the presidential addresses at former meetings—for instance, the *résumé* and survey which we had at York of the progress, during the half century of the lifetime of the Association, of a whole circle of sciences—biology, palæontology, geology, astronomy, chemistry—so much more familiar to you, and in which there was so

* The report represents the address as delivered, its great length as originally written preventing the insertion of the omitted passages.

much to tell of the fairy-tales of science; or at Southampton, the discourse of my friend who has in such kind terms introduced me to you, on the wondrous practical applications of science to electric lighting, telegraphy, the St. Gothard Tunnel and the Suez Canal, gun-cotton, and a host of other purposes, and with the grand concluding speculation on the conservation of solar energy: if, I say, recalling these or any earlier addresses, you should wish that you were now about to have, from a different president, a discourse on a different subject, I can very well sympathize with you in the feeling.

But be this as it may, I think it is more respectful to you that I should speak to you upon and do my best to interest you in the subject which has occupied me, and in which I am myself most interested. And in another point of view, I think it is right that the address of a president should be on his own subject, and that different subjects should be thus brought in turn before the meetings. So much the worse, it may be, for a particular meeting; but the meeting is the individual, which on evolution principles must be sacrificed for the development of the race.

Mathematics connect themselves on the one side with common life and the physical sciences; on the other side with philosophy, in regard to our notions of space and time, and in the questions which have arisen as to the universality and necessity of the truths of mathematics, and the foundation of our knowledge of them. I would remark here that the connection (if it exists) of arithmetic and algebra with the notion of time is far less obvious than that of geometry with the notion of space.

As to the former side, I am not making before you a defence of mathematics, but if I were I should desire to do it—in such manner as in the 'Republic' Socrates was required to defend justice, quite irrespectively of the worldy advantages which may accompany a life of virtue and justice, and to show that, independently of all these, justice was a thing desirable in itself and for its own sake—*not* by speaking to you of the utility of mathematics in any of the questions of common life or of physical science. Still less would I speak of this utility before, I trust, a friendly audience, interested or willing to appreciate an interest in mathematics in itself and for its own sake. I would, on the contrary, rather consider the obligations of mathematics to these different subjects as the sources of mathematical theories now as remote from them, and in as different a region of thought—for instance, geometry from the measurement of land, or the Theory of Numbers from arithmetic—as a river at its mouth is from its mountain source.

On the other side, the general opinion has been and is that it is indeed by experience that we arrive at the truths of mathematics, but that experience is not their proper foundation: the mind itself contributes something. This is involved in the Platonic theory of reminiscence: looking at two things, trees or stones or anything else, which seem to us more or less equal, we arrive at the idea of equality: but we must have had this idea of equality before the time when first seeing the two things we were led to regard them as coming up more or less perfectly to this idea of equality; and the like as regards our idea of the beautiful, and in other cases.

The same view is expressed in the answer of Leibnitz, the *nisi intellectus ipse*, to the scholastic dictum, *nihil in intellectu quod non prius in sensu*: there is nothing in the intellect which was not first in sensation, except (said Leibnitz) the intellect itself. And so again in the 'Critick of Pure Reason,' Kant's view is that while there is no doubt but that all our cognition begins with experience, we are nevertheless in possession of cognitions *à priori*, independent, not of this or that experience, but absolutely so of all experience, and in particular that the axioms of mathematics furnish an example of such cognitions *à priori*. Kant holds further that space is no empirical conception which has been derived from external experiences, but that in order that sensations may be referred to something external, the representation of space must already lie at the foundation; and that the external experience is itself first only possible by this represention of space. And in like manner time is no empirical conception which can be deduced from an experience, but it is a necessary representation lying at the foundation of all intuitions.

And so in regard to mathematics, Sir W. R. Hamilton, in an Introductory Lecture on Astronomy (1836), observes: "These purely mathematical sciences of algebra and geometry are sciences of the pure reason, deriving no weight and no assistance from experiment, and isolated or at least isolable from all outward and accidental phenomena. The idea of order with its subordinate ideas of number and figure, we must not indeed call innate ideas, if that phrase be defined to imply that all men must possess them with equal clearness and fulness: they are, however, ideas which seem to be so far born with us that the possession of them in any conceivable degree is only the development of our original powers, the unfolding of our proper humanity."

The general question of the ideas of space and time, the axioms and definitions of geometry, the axioms relating to number, and the nature of mathematical reasoning, are fully and ably discussed in Whewell's 'Philosophy of the Inductive Sciences' (1840), which may be regarded as containing an exposition of the whole theory.

But it is maintained by John Stuart Mill that the truths of mathematics, in particular those of geometry, rest on experience; and as regards geometry, the same view is on very different grounds maintained by the mathematician Riemann.

It is not so easy as at first sight it appears to make out how far the views taken by Mill in his 'System of Logic Ratiocinative and Inductive' (9th ed., 1879) are absolutely contradictory to those which have been spoken of; they profess to be so; there are most definite assertions (supported by argument), for instance, p. 263:—"It remains to inquire what is the ground of our belief in axioms, what is the evidence on which they rest. I answer, they are experimental truths, generalizations from experience. The proposition 'Two straight lines cannot enclose a space,' or, in other words, two straight lines which have once met cannot meet again, is an induction from the evidence of our senses." But I cannot help considering a previous argument (p. 259) as very materially modifying this absolute contradiction. After inquiring "Why are mathematics by almost all philosophers . . . considered to be independent of the evidence of experience and observation, and characterized as systems of necessary truth?" Mill proceeds (I quote the whole passage) as follows:—"The answer I conceive to be that this character of necessity ascribed to the truths of mathematics, and even (with some reservations to be hereafter made) the peculiar certainty ascribed to them, is a delusion, in order to sustain which it is necessary to suppose that those truths relate to and express the properties of purely imaginary objects. It is acknowledged that the conclusions of geometry are derived partly at least from the so-called definitions, and that these definitions are assumed to be correct representations, as far as they go, of the objects with which geometry is conversant. Now, we have pointed out that from a definition as such no proposition unless it be one concerning the meaning of a word can ever follow, and that what apparently follows from a definition, follows in reality from an implied assumption that there exists a real thing conformable thereto. This assumption in the case of the definitions of geometry is not strictly true: there exist no real things exactly conformable to the definitions. There exist no real points without magnitude, no lines without breadth, nor perfectly straight, no circles with all their radii exactly equal, nor squares with all their angles perfectly right. It will be said that the assumption does not extend to the actual but only to the possible existence of such things.

I answer that according to every test we have of possibility they are not even possible. Their existence, so far as we can form any judgment, would seem to be inconsistent with the physical constitution of our planet at least, if not of the universal [*sic.*]. To get rid of this difficulty and at the same time to save the credit of the supposed system of necessary truth, it is customary to say that the points, lines, circles and squares which are the subjects of geometry exist in our conceptions merely and are parts of our minds; which minds by working on their own materials construct an *à priori* science, the evidence of which is purely mental and has nothing to do with outward experience. By howsoever high authority this doctrine has been sanctioned, it appears to me psychologically incorrect. The points, lines and squares which anyone has in his mind are (as I apprehend) simply copies of the points, lines and squares which he has known in his experience. Our idea of a point I apprehend to be simply our idea of the *minimum visibile*, the small portion of surface which we can see. We can reason about a line as if it had no breadth, because we have a power which we can exercise over the operations of our minds: the power, when a perception is present to our senses or a conception to our intellects, of *attending* to a part only of that perception or conception instead of the whole. But we cannot *conceive* a line without breadth: we can form no mental picture of such a line; all the lines which we have in our mind are lines possessing breadth. If any one doubt this, we may refer him to his own experience. I much question if anyone who fancies that he can conceive of a mathematical line thinks so from the evidence of his own consciousness. I suspect that it is rather because he supposes that unless such a perception be possible, mathematics could not exist as a science: a supposition which there will be no difficulty in showing to be groundless."

I think it may be at once conceded that the truths of geometry are truths precisely because they relate to and express the properties of what Mill calls "purely imaginary objects;" that these objects do not exist in Mill's sense, that they do not exist in nature, may also be granted; that they are "not even possible," if this means not possible in an existing nature, may also be granted. That we cannot "conceive" them depends on the meaning which we attach to the word conceive. I would myself say that the purely imaginary objects are the only realities, the ὄντως ὄντα, in regard to which the corresponding physical objects are as the shadows in the cave; and it is only by means of them that we are able to deny the existence of a corresponding physical object; if there is no conception of straightness, then it is meaningless to deny the existence of a perfectly straight line.

But at any rate the objects of geometrical truth are the so-called imaginary objects of Mill, and the truths of geometry are only true, and *à fortiori* are only necessarily true, in regard to these so-called imaginary objects; and, these objects, points, lines, circles, etc., in the mathematical sense of the terms, have a likeness to and are represented more or less imperfectly, and from a geometer's point of view no matter how imperfectly, by corresponding physical points, lines, circles, etc. I shall have to return to geometry, and will then speak of Riemann, but I will first refer to another passage of the 'Logic.'

Speaking of the truths of arithmetic Mill says (p. 297) that even here there is one hypothetical element: "In all propositions concerning numbers a condition is implied without which none of them would be true, and that condition is an assumption which may be false. The condition is that $1 = 1$: that all the numbers are numbers of the same or of equal units." Here at least the assumption may be absolutely true; one shilling = one shilling in purchasing power, although they may not be absolutely of the same weight and fineness: but it is hardly necessary; one coin + one coin = two coins, even if the one be a shilling and the other a half-crown. In fact, whatever difficulty be raisable as to geometry, it seems to me that no similar difficulty applies to arithmetic; mathematician or not, we have each of us, in its most abstract form, the idea of a number; we can each of us appreciate the truth of a proposition in regard to numbers; and we cannot but see that a truth in regard to numbers is something different in kind from an experimental truth generalized from experience. Compare, for instance, the proposition that the sun, having already risen so many times, will rise to-morrow, and the next day, and the day after that, and so on; and the proposition that even and odd numbers succeed each other alternately *ad infinitum*: the latter at least seems to have the characters of universality and necessity. Or again, suppose a proposition observed to hold good for a long series of numbers, one thousand numbers, two thousand numbers, as the case may be: this is not only no proof, but it is absolutely no evidence, that the proposition is a true proposition, holding good for all numbers whatever; there are in the Theory of Numbers very remarkable instances of propositions observed to hold good for very long series of numbers and which are nevertheless untrue.

I pass in review certain mathematical theories.

In arithmetic and algebra, or say in analysis, the numbers or magnitudes which we represent by symbols are in the first instance ordinary (that is, positive) numbers or magnitudes. We have also in analysis and in analytical geometry *negative* magnitudes; there has been in regard to these plenty of philosophical discussion, and I might refer to Kant's paper, 'Ueber die negativen Grössen in die Weltweisheit' (1763); but the notion of a negative magnitude has become quite a familiar one, and has extended itself into common phraseology. I may remark that it is used in a very refined manner in bookkeeping by double entry.

But it is far otherwise with the notion which is really the fundamental one (and I cannot too strongly emphasise the assertion) underlying and pervading the whole of modern analysis and geometry, that of imaginary magnitude in analysis and of imaginary space (or space as a *locus in quo* of imaginary points and figures) in geometry: I use in each case the word imaginary as including real. This has not been, so far as I am aware, a subject of philosophical discussion or inquiry. As regards the older metaphysical writers this would be quite accounted for by saying that they knew nothing, and were not bound to know anything, about it; but at present, and, considering the prominent position which the notion occupies—say even that the conclusion were that the notion belongs to mere technical mathematics, or has reference to nonentities in regard to which no science is possible, still it seems to me that (as a subject of philosophical discussion) the notion ought not to be thus ignored; it should at least be shown that there is a right to ignore it.

Although in logical order I should perhaps now speak of the notion just referred to, it will be convenient to speak first of some other quasi-geometrical notions; those of more-than-three-dimensional space, and of non-Euclidian two- and three-dimensional space, and also of the generalized notion of distance. It is in connection with these that Riemann considered that our notion of space is founded on experience, or rather that it is only by experience that we know that our space is Euclidian space.

It is well known that Euclid's twelfth axiom, even in Playfair's form of it, has been considered as needing demonstration; and that Lobatschewsky constructed a perfectly consistent theory, wherein this axiom was assumed not to hold good, or say a system of non-Euclidian plane geometry. There is a like system of non-Euclidian solid geometry. My own view is that Euclid's twelfth axiom in Playfair's form of it does not need demonstration, but is part of our notion of space, of the physical space of our experience—the space, that is, which we become acquainted with by experience, but which is the representation lying at the foundation of all external experience. Riemann's view before referred to may I think be said to be that, having *in intellectu* a more general notion of space (in fact a notion of non-Euclidian space), we learn by experience that space (the physical space of our experience) is, if not exactly, at least to the highest degree of approximation, Euclidian space.

But suppose the physical space of our experience to be thus only approximately Euclidian space, what is the consequence which follows? *Not* that the propositions of geometry are only approximately true, but that they remain absolutely true in regard to that Euclidian space which has been so long regarded as being the physical space of our experience.

It is interesting to consider two different ways in which, without any modification at all of our notion of space, we can arrive at a system of non-Euclidian (plane or two-dimensional) geometry; and the doing so will, I think, throw some light on the whole question.

First, imagine the earth a perfectly smooth sphere; understand by a plane the surface of the earth, and by a line the apparently straight line (in fact an arc of great circle) drawn on the surface; what experience would in the first instance teach would be Euclidian geometry; there would be intersecting lines which produced a few miles or so would seem to go on diverging: and apparently parallel lines which would exhibit no tendency to approach each other; and the inhabitants might very well conceive that they had by experience established the axiom that two straight lines cannot enclose a space, and the axiom as to parallel lines. A more extended experience and more accurate measurements would teach them that the axioms were each of them false; and that any two lines if produced far enough each way, would meet in two points: they would in fact arrive at a spherical geometry, accurately representing the properties of the two-dimensional space of their experience. But their original Euclidian geometry would not the less be a true system: only it would apply to an ideal space, not the space of their experience.

Secondly, consider an ordinary, indefinitely extended plane; and let us modify only the notion of distance. We measure distance, say, by a yard measure or a foot rule, anything which is short enough to make the fractions of it of no consequence (in mathematical language by an infinitesimal element of length); imagine, then, the length of this rule constantly changing (as it might do by an alteration of temperature), but under the condition that its actual length shall depend only on its situation on the plane and on its direction: viz., if for a given situation and direction it has a certain length, then whenever it comes back to the same situation and direction it must have the same length. The distance along a given straight or curved line between any two points could then be measured in the ordinary manner with this rule, and would have a perfectly determinate value: it could be measured over and over again, and would always be the same; but of course it would be the distance, not in the ordinary acceptation of the term, but in quite a different acceptation. Or in a somewhat different way: if the rate of progress from a given point in a given direction be conceived as depending only on the configuration of the ground, and the distance along a given path between any two points thereof be measured by the time required for traversing it, then in this way also the distance would have a perfectly determinate value; but it would be a distance, not in the ordinary acceptation of the term, but in quite a different acceptation. And corresponding to the new notion of distance we should have a new, non-Euclidian system of plane geometry; all theorems involving the notion of distance would be altered.

We may proceed further. Suppose that as the rule moves away from a fixed central point of the plane it becomes shorter and shorter; if this shortening takes place with sufficient rapidity, it may very well be that a distance which in the ordinary sense of the word is finite will in the new sense be infinite; no number of repetitions of the length of the ever-shortening rule will be sufficient to cover it. There will be surrounding the central point a certain finite area such that (in the new acceptation of the term distance) each point of the boundary thereof will be at an infinite distance from the central point; the points outside this area you cannot by any means arrive at with your rule; they will form a *terra incognita* or rather an unknowable land: in mathematical language, an imaginary or impossible space: and the plane space of the theory will be that within the finite area—that is, it will be finite instead of infinite.

We thus with a proper law of shortening arrive at a system of non-Euclidian geometry which is essentially that of Lobatschewsky. But in so obtaining it we put out of sight its relation to spherical geometry: the three geometries (spherical, Euclidian and Lobatschewsky's) should be regarded as members of a system: viz., they are the geometries of a plane (two-dimensional) space of constant positive curvature, zero curvature, and constant negative curvature respectively; or again, they are the plane geometries corresponding to three different notions of distance; in this point of view they are Klein's elliptic, parabolic, and hyperbolic geometries respectively.

Next as regards solid geometry: we can by a modification of the notion of distance (such as has just been explained in regard to Lobatschewsky's system) pass from our present system to a non-Euclidian system; for the other mode of passing to a non-Euclidian system it would be necessary to regard our space as a flat three-dimensional space existing in a space of four dimensions (*i.e.*, as the analogue of a plane existing in ordinary space); and to substitute for such flat three-dimensional space a curved three-dimensional space, say of constant positive or negative curvature. In regarding the physical space of our experience as possibly non-Euclidian, Riemann's idea seems to be that of modifying the notion of distance, not that of treating it as a locus in four-dimensional space.

I have just come to speak of four-dimensional space. What meaning do we attach to it? Or can we attach to it any meaning? It may be at once admitted that we cannot conceive of a fourth dimension of space; that space as we conceive of it, and the physical space of our experience, are alike three-dimensional; but we can, I think, conceive of space as being two- or even one-dimensional; we can imagine rational beings living in a one-dimensional space (a line) or in a two-dimensional space (a surface) and conceiving of space accordingly, and to whom, therefore, a two-dimensional space, or (as the case may be) a three-dimensional space would be as inconceivable as a four-dimensional space is to us. And very curious speculative questions arise. Suppose the one-dimensional space a right line, and that it afterwards becomes a curved line, would there be any indication of the change? Or, if originally a curved line, would there be anything to suggest to them that it was not a right line? Probably not, for a one-dimensional geometry hardly exists. But let the space be two-dimensional, and imagine it originally a plane, and afterwards bent (converted, that is, into some form of developable surface) or converted into a curved surface, or imagine it originally a developable or curved surface. In the former case there should be an indication of the change, for the geometry originally applicable to the space of their experience (our own Euclidian geometry) would cease to be applicable; but the change could not be apprehended by them as a bending or deformation of the plane, for this would imply the notion of a three-dimensional space in which this bending or deformation could take place. In the latter case their geometry would be that appropriate to the developable or curved surface which is their space, viz., this would be their Euclidian geometry, would they ever have arrived at our own more simple system? But take the case where the two-dimensional space is a plane, and imagine the beings of such a space familiar with our own Euclidian plane geometry; if, a third dimension being still inconceivable by them, they were by their geometry or otherwise led to the notion of it, there would be nothing to prevent them from forming a science such as our own science of three-dimensional geometry.

Evidently all the foregoing questions present themselves in regard to ourselves, and to three-dimensional space as we conceive of it, and as the physical space of our experience. And I need hardly say that the first step is the difficulty, and that granting a fourth dimension we may assume as many more dimensions as we please. But whatever answer be given to them, we have, as a branch of mathematics, potentially, if not actually, an analytical geometry of n-dimensional space. I shall have to speak again upon this.

Coming now to the fundamental notion already referred to, that of imaginary magnitude in analysis and imaginary space in geometry, I connect this with two great discoveries in mathematics made in the first half of the seventeeth century, Harriot's representation of an equation in the form $f(x)=0$, and the consequent notion of the roots of an equation as derived from the linear factors of $f(x)$, and Descartes' method of co-ordinates. By these we are led analytically to the notion of imaginary points in geometry; for instance, we arrive at the theorem that a straight line and a circle intersect *always* in two points real or imaginary. The conclusion as to the two points of intersection cannot be contradicted by experience: take a sheet of paper and draw on it the straight line and circle, and try. But you might say, or at least be strongly tempted to say, that it is meaningless. The question of course arises, What is the meaning of an imaginary point? and further, In what manner can the notion be arrived at geometrically?

There is a well-known construction in perspective for drawing lines through the intersection of two lines, which are so nearly parallel as not to meet within the limits of a sheet of paper. You have two given lines which do not meet, and you draw a third line, which, when the lines are all of them produced, is found to pass through the intersection of the given lines. If instead of lines we have two circular arcs not meeting each other, then we can, by means of these arcs construct a line; and if on completing the circles it is found that the circles intersect each other in two real points, then it will be found that the line passes through these two points: if the circles appear not to intersect, then the line will appear not to intersect either of the circles. But the geometrical construction being in each case the same, we say that in the second case also the line passes through the two intersections of the circles.

Of course it may be said in reply that the conclusion is a very natural one, provided we assume the existence of imaginary points; and that, this assumption not being made, then, if the circles do not intersect, it is meaningless to assert that the line passes through their points of intersection. The difficulty is not got over by the analytical method before referred to, for this introduces difficulties of its own: is there in a plane a point the coordinates of which have given imaginary values? As a matter of fact, we do consider in plane geometry imaginary points introduced into the theory analytically or geometrically as above.

The like considerations apply to solid geometry, and we thus arrive at the notion of imaginary space as a *locus in quo* of imaginary points and figures.

I have used the word imaginary rather than complex, and I repeat that the word has been used as including real. But, this once understood, the word becomes in many cases superfluous, and the use of it would even be misleading. Thus, "a problem has so many solutions:" this means, so many imaginary (including real) solutions. But if it were said that the problem had "so many imaginary solutions," the word "imaginary" would here be understood to be used in opposition to real. I give this explanation the better to point out how wide the application of the notion of the imaginary is—viz. (unless expressly or by implication excluded), it is a notion implied and presupposed in all the conclusions of modern analysis and geometry. It is, as I have said, the fundamental notion underlying and pervading the whole of these branches of mathematical science.

I consider the question of the geometrical representation of an imaginary variable. We represent the imaginary variable $x+iy$ by means of a point in a plane, the coordinates of which are (x, y). This idea, due to Gauss, dates from about the year 1831. We thus picture to ourselves the succession of values of the imaginary variable $x+iy$ by means of the motion of the representative point: for instance, the succession of values corresponding to the motion of the point along a closed curve to its original position. The value $X+iY$ of the function can of course be represented by means of a point (taken for greater convenience in a different plane), the coordinates of which are X,Y.

We may consider in general two points, moving each in its own plane, so that the position of one of them determines the position of the other, and consequently the motion of the one determines the motion of the other: for instance, the two points may be the tracing-point and the pencil of a pentagraph. You may with the first point draw any figure you please, there will be a corresponding figure drawn by the second point: for a good pentagraph, a copy on a different scale (it may be); for a badly-adjusted pentagraph, a distorted copy: but the one figure will always be a sort of copy of the first, so that to each point of the one figure there will correspond a point of the other figure.

In the case above referred to, where one point represents the value $x+iy$ of the imaginary variable and the other the value $X+iY$ of some function $\phi(x+iy)$ of that variable, there is a remarkable relation between the two figures: this is the relation of orthomorphic projection, the same which presents itself between a portion of the earth's surface, and the representation thereof by a map on the stereographic projection or on Mercator's projection—viz. any indefinitely small area of the one figure is represented in the other figure by an indefinitely small area of the same shape. There will possibly be for different parts of the figure great variations of scale, but the shape will be unaltered; if for the one area the boundary is a circle, then for the other area the boundary will be a circle; if for one it is an equilateral triangle, then for the other it will be an equilateral triangle.

I have been speaking of an imaginary variable $(x+iy)$, and of a function $\phi(x+iy)=X+iY$ of that variable, but the theory may equally well be stated in regard to a plane curve: in fact, the $x+iy$ and the $X+iY$ are two imaginary variables connected by an equation; say their values are u and v, connected by an equation $F(u, v)=0$; then, regarding u, v as the coordinates of a point *in plano*, this will be a point on the curve represented by the equation. The curve, in the widest sense of the expression, is the whole series of points, real or imaginary, the coordinates of which satisfy the equation, and these are exhibited by the foregoing corresponding figures in two planes; but in the ordinary sense the curve is the series of real points, with coordinates u, v, which satisfy the equation.

In geometry it is the curve, whether defined by means of its equation, or in any other manner, which is the subject for contemplation and study. But we also use the curve as a representation of its equation—that is, of the relation existing between two magnitudes x, y, which are taken out as the coordinates of a point on the curve. Such employment of a curve for all sorts of purposes—the fluctuations of the barometer, the Cambridge boat races, or the Funds—is familiar to most of you. It is in like manner convenient in analysis, for exhibiting the relations between any three magnitudes x, y, z, to regard them as the coordinates of a point in space; and, on the like ground, we should at least wish to regard any four or more magnitudes as the coordinates of a point in space of a corresponding number of dimensions. Starting with the hypothesis of such a space, and of points therein each determined by means of its coordinates, it is found possible to establish a system of n-dimensional geometry analogous in every respect to our two-and three-dimensional geometries, and to a very considerable extent serving to exhibit the relations of the variables. To quote from my memoir 'On Abstract Geometry" (1869): "The science presents itself in two ways: as a legitimate extension of the ordinary two- and three-dimensional geometries, and as a need in these geometries and in analysis generally. In fact, whenever we are concerned with quantities connected in any manner, and which are considered as variable or determinable, then the nature of the connection between the quantities is frequently rendered more intelligible by regarding them (if two or three in number) as the coordinates of a point in a plane or in space. For more than three quantities there is, from the greater complexity of the case, the greater need of such a representation; but this can only be obtained by means of the notion of a space of the proper dimensionality; and to use such representation we require a corresponding geometry. An important instance in plane geometry has already presented itself in the question of the number of curves which satisfy given conditions; the conditions imply relations between the coefficients in the equation of the curve; and for the better understanding of these relations it was expedient to consider the coefficients as the coordinates of a point in a space of the proper dimensionality."

It is to be borne in mind that the space, whatever its dimensionality may be, must always be regarded as an imaginary or complex space such as the two- or three-dimensional space of ordinary geometry; the advantages of the representation would otherwise altogether fail to be obtained.

I omit some further developments in regard to geometry, and all that I have written as to the connection of mathematics with the notion of time.

I said that I would speak to you, not of the utility of mathematics in any of the questions of common life or of physical science, but rather of the obligations of mathematics to these different subjects. The consideration which thus presents itself is in a great measure that of the history of the development of the different branches of mathematical science in connection with the older physical sciences, astronomy and mechanics: the mathematical theory is in the first instance suggested by some question of common life or of physical science, is pursued and studied quite independently thereof, and perhaps after a long interval comes in contact with it, or with quite a different question. Geometry and algebra must, I think, be considered as each of them originating in connection with objects or questions of common life —geometry, notwithstanding its name, hardly in the measurement of land, but rather from the contemplation of such forms as the straight line, the circle, the ball, the top (or sugar-loaf): the Greek geometers appropriated for the geometrical forms corresponding to the last two of these, the words *σφαῖρα* and *κῶνος*, our cone and sphere, and they extended the word cone to mean the complete figure obtained by producing the straight lines of the surface both ways indefinitely. And so algebra would seem to have arisen from the sort of easy puzzles in regard to numbers which may be made, either in the picturesque forms of the Bija-Ganita with its maiden with the beautiful locks, and its swarms of bees amid the fragrant blossoms, and the one queen-bee left humming around the lotus flower; or in the more prosaic form in which a student has presented to him in a modern text-book a problem leading to a simple equation.

The Greek geometry may be regarded as beginning with Plato (B.C. 430–347): the notions of geometrical analysis, loci, and the conic sections are attributed to him, and there are in his Dialogues many very interesting allusions to mathematical questions: in particular the passage in the 'Theætetus,' where he affirms the incommensurability of the sides of certain squares. But the earliest extant writings are those of Euclid (B.C. 285): there is hardly anything in mathematics more beautiful than his wondrous fifth book; and he has also in the seventh, eighth, ninth and tenth books fully and ably developed the first principles of the Theory of Numbers, including the theory of incommensurables. We have next Apollonius (about B.C. 247), and Archimedes (B.C. 287–212), both geometers of the highest merit, and the latter of them the founder of the science of statics (including therein hydrostatics): his dictum about the lever, his 'Εὕρηκα,' and the story of the defence of Syracuse, are well known. Following these we have a worthy series of names, including the astronomers Hipparchus (B.C. 150) and Ptolemy (A.D. 125), and ending, say, with Pappus (A.D. 400), but continued by their Arabian commentators, and the Italian and other European geometers of the sixteenth century and later, who pursued the Greek geometry.

The Greek arithmetic was, from the want of a proper notation, singularly cumbrous and difficult; and it was for astronomical purposes superseded by the sexagesimal arithmetic, attributed to Ptolemy, but probably known before his time. The use of the present so-called Arabic figures became general among Arabian writers on arithmetic and astronomy about the middle of the tenth century, but was not introduced into Europe until about two centuries later. Algebra among the Greeks is represented almost exclusively by the treatise of Diophantus (A.D. 150), in fact a work on the Theory of Numbers containing questions relating to square and cube numbers, and other properties of numbers, with their solutions; this has no historical connection with the later algebra, introduced into Italy from the East by Leonardi Bonacci, of Pisa (A.D. 1202–1208), and successfully cultivated in the fifteenth and sixteenth centuries by Lucas Paciolus, or de Burgo, Tartaglia, Cardan and Ferrari. Later on, we have Vieta (1540–1603), Harriot, already referred to, Wallis and others.

Astronomy is of course intimately connected with geometry; the most simple facts of observation of the heavenly bodies can only be *stated* in geometrical language: for instance, that the stars describe circles about the pole-star, or that the different positions of the sun among the fixed stars in the course of the year form a circle. For astronomical calculations it was found necessary to determine the arc of a circle by means of its chord: the notion is as old as Hipparchus, a work of whom is referred to as consisting of twelve books on the chords of circular arcs; we have (A.D. 125) Ptolemy's 'Almagest,' the first book of which contains a table of arcs and chords with the method of construction; and among other theorems on the subject he gives there the theorem afterwards inserted in Euclid (Book VI., Prop. D) relating to the rectangle contained by the diagonals of a quadrilateral inscribed in a circle. The Arabians made the improvement of using in place of the chord of an arc the sine, or half chord of double the arc; and so brought the theory into the form in which it is used in modern trigonometry: the before-mentioned theorem of Ptolemy, or rather a particular case of it, translated into the notation of sines, gives the expression for the sine of the sum of two arcs in terms of the sines and cosines of the component arcs; and it is thus the fundamental theorem on the subject. We have in the fifteenth and sixteenth centuries a series of mathematicians who with wonderful enthusiasm and perseverance calculated tables of the trigonometrical or circular functions, Purbach, Müller or Regiomontanus, Copernicus, Reinhold, Maurolycus, Vieta, and many others; the tabulations of the functions tangent and secant arc due to Reinhold and Maurolycus respectively.

Logarithms were invented, not exclusively with reference to the calculation of trigonometrical tables, but in order to facilitate numerical calculations generally; the invention is due to John Napier of Merchiston, who died in 1618 at sixty-seven years of age; the notion was based upon refined mathematical reasoning on the comparison of the spaces described by two points, the one moving with a uniform velocity, the other with a velocity varying according to a given law. It is to be observed that Napier's logarithms were nearly but not exactly those which are now called (sometimes Napierian, but more usually) hyperbolic logarithms—those to the base e; and that the change to the base 10 (the great step by which the invention was perfected for the object in view) was indicated by Napier but actually made by Henry Briggs, afterwards Savilian Professor at Oxford (d. 1630). But it is the hyperbolic logarithm which is mathematically important. The direct function e^x or exp. x, which has for its inverse the hyperbolic logarithm, presented itself, but not in a prominent way. Tables were calculated of the logarithms of numbers, and of those of the trigonometrical functions.

The circular functions and the logarithm were thus invented each for a practical purpose, separately and without any proper connection with each other. The functions are connected through the theory of imaginaries and form together a group of the utmost importance throughout mathematics: but this is mathematical theory; the obligation of mathematics is for the discovery of the functions.

Forms of spirals presented themselves in Greek architecture, and the curves were considered mathematically by Archimedes; the Greek geometers invented some other curves, more or less interesting, but recondite enough in their origin. A curve which might have presented itself to anybody, that described by a point in the circumference of a rolling carriage-wheel, was first noticed by Mersenne in 1615, and is the curve afterwards considered by Roberval, Pascal, and others under the name of the Roulette, otherwise the cycloid. Pascal (1623–1662) wrote at the age of seventeen his 'Essais pour les Coniques' in seven short pages, full of new views on these curves, and in which he gives, in a paragraph of eight lines, his theorem of the inscribed hexagon.

Kepler (1571–1630) by his empirical determination of the laws of planetary motion, brought into connection with astronomy one of the forms of conic, the ellipse, and established a foundation for the theory of gravitation. Contemporary with him for most of his life, we have Galileo (1564–1642), the founder of the science of dynamics; and closely following upon Galileo we have Isaac Newton (1643–1727): the 'Philosophiæ naturalis Principia Mathematica' known as the 'Principia' was first published in 1687.

The physical, statical, or dynamical questions which presented themselves before the publication of the 'Principia' were of no particular mathematical difficulty, but it is quite otherwise with the crowd of interesting questions arising out of the theory of gravitation, and which, in becoming the subject of mathematical investigation, have contributed very much to the advance of mathematics. We have the problem of two bodies, or what is the same thing, that of the motion of a particle about a fixed centre of force, for any law of force; we have also the (mathematically very interesting) problem of the motion of a body attracted to two or more fixed centres of force; then, next preceding that of the actual solar system—the problem of three bodies; this has ever been and is far beyond the power of mathematics, and it is in the lunar and planetary theories replaced by what is mathematically a different problem, that of the motion of a body under the action of a principal central force and a disturbing force: or (in one mode of treatment) by the problem of disturbed elliptic motion. I would remark that we have here an instance in which an astronomical fact, the observed slow variation of the orbit of a planet, has directly suggested a mathematical method, applied to other dynamical problems, and which is the basis of very extensive modern investigations in regard to systems of differential equations. Again, immediately arising out of the theory of gravitation, we have the problem of finding the attraction of a solid body of any given form upon a particle, solved by Newton in the case of a homogeneous sphere, but which is far more difficult in the next succeeding cases of the spheroid of revolution (very ably treated by Maclaurin) and of the ellipsoid of three unequal axes: there is perhaps no problem of mathematics which has been treated by as great a variety of methods, or has given rise to so much interesting investigation as this last problem of the attraction of an ellipsoid upon an interior or exterior point. It was a dynamical problem, that of vibrating strings, by which Lagrange was led to the theory of the representation of a function as the sum of a series of multiple sines and cosines; and connected with this we have the expansions in terms of Legendre's functions P_n, suggested to him by the question just referred to of the attraction of an ellipsoid; the subsequent investigations of Laplace on the attractions of bodies differing slightly from the sphere led to the functions of two variables called Laplace's functions. I have been speaking of ellipsoids, but the general theory is that of attractions, which has become a very wide branch of modern mathematics; associated with it we have in particular the names of Gauss, Lejeune-Dirichlet, and Green; and I must not omit to mention that the theory is now one relating to n-dimensional space. Another great problem of celestial mechanics, that of the motion of the earth about its centre of gravity, in the most simple case, that of a body not acted upon by any forces, is a very interesting one in the mathematical point of view.

I may mention a few other instances where a practical or physical question has connected itself with the development of mathematical theory. I have spoken of two map projections—the stereographic, dating from Ptolemy; and Mercator's projection, invented by Edward Wright about the year 1600: each of these, as a particular case of the orthomorphic projection, belongs to the theory of the geometrical representation of an imaginary variable. I have spoken also of perspective, and of the representation of solid figures employed in Monge's descriptive geometry. Monge, it is well known, is the author of the geometrical theory of the curvature of surfaces and of curves of curvature: he was led to this theory by a problem of earthwork; from a given area, covered with earth of uniform thickness, to carry the earth and distribute it over an equal given area, with the least amount of cartage. For the solution of the corresponding problem in solid geometry he had to consider the intersecting normals of a surface, and so arrived at the curves of curvature. (See his 'Mémoire sur les Déblais et les Remblais,' Mem. de l'Acad., 1781). The normals of a surface are, again, a particular case of a doubly infinite system of lines, and are so connected with the modern theories of congruences and complexes.

The undulatory theory of light led to Fresnel's wave-surface, a surface of the fourth order, by far the most interesting one which had then presented itself. A geometrical property of this surface, that of having tangent planes each touching it along a plane curve (in fact, a circle), gave to Sir W. R. Hamilton the theory of conical refraction. The wave-surface is now regarded in geometry as a particular case of Kummer's quartic surface, with sixteen conical points and sixteen singular tangent planes.

My imperfect acquaintance as well with the mathematics as the physics prevents me from speaking of the benefits which the theory of Partial Differential Equations has received from the hydrodynamical theory of vortex motion, and from the great physical theories of heat, electricity, magnetism, and energy.

It is difficult to give an idea of the vast extent of modern mathematics. The word "extent" is not the right one: I mean extent crowded with beautiful detail —not an extent of mere uniformity such as an objectless plain, but of a tract of beautiful country seen at first in the distance, but which will bear to be rambled through and studied in every detail of hillside and valley, stream, rock, wood, and flower. But, as for anything else, so for a mathematical theory—beauty can be perceived, but not explained. As for mere extent, I might illustrate this by speaking of the dates at which some of the great extensions have been made in several branches of mathematical science.

In the address as written I speak at considerable length of the extensions in geometry since the time of Descartes, and in other specified subjects since the commencement of the century. These subjects are the general theory of the function of an imaginary variable; the leading known functions—viz., the elliptic and single theta functions, and the Abelian, and multiple theta functions; the theory of equations, and the theory of numbers. I refer also to some theories outside of ordinary mathematics, the multiple algebra, or linear associative algebra of the late Benjamin Pierce, the theory of Argand Warren and Peacock of imaginaries in plane geometry, Sir W. R. Hamilton's quaternions, Clifford's theory of biquaternions, and the theories developed by Grassmann's 'Ausdehnungslehre,' with recent extensions thereof to non-Euclidian space by Mr. Homersham Cox; also Boole's mathematical logic, and a work connected with logic, but which is primarily mathematical and of the highest importance—Schubert's 'Abzählende Geometrie' (1878); and I remark that all this in regard to theories outside of ordinary mathematics is still on the text of the vast extent of modern mathematics.

In conclusion I would say that mathematics have steadily advanced from the time of the Greek geometers. Nothing is lost or wasted; the achievements of Euclid, Archimedes, and Apollonius are as admirable now as they were in their own days. Descartes' method of coordinates is a possession for ever. But mathematics have never been cultivated more zealously and diligently, or with greater success, than in this century—in the last half of it, or at the present time: the advances made have been enormous, the actual field is boundless, the future full of hope. In regard to pure mathematics we may most confidently say—

"Yet I doubt not through the ages one increasing purpose runs,
And the thoughts of men are widened with the process of the suns."

OPINIONS OF THE PRESS UPON THE SUBJECT OF PROFESSOR ATTFIELD'S ADDRESS.

From the *Lancet*, September 22.

"It would be difficult to over-estimate the importance of the subject chosen by Professor Attfield as the theme of the able Presidential Address delivered at Southport on Tuesday to the members of the British Pharmaceutical Conference. The question of the relations of the State to pharmacy and of the supply of drugs to the public is of vital importance not only to the pharmacist, but to the physician. That matters in the pharmaceutical world are fast approaching a crisis is only too obvious; so little protection is now afforded to chemists and druggists that their very existence is endangered. The Act of 1868 decrees that no person shall practise pharmacy without passing a State examination and having his name enrolled on the Register. The provisions of this Act are unfortunately little better than a dead letter, and for years past they have been systematically evaded. The custom which long existed in country districts of allowing the general shopkeeper to sell a few of the commoner drugs has gradually extended and developed, until now medicinal compounds of all kinds are openly retailed by grocers, hairdressers, chandlers, confectioners, drapers, and a host of other unqualified individuals. Indeed, in many cases completely furnished shops, undistinguishable in appearance from those of registered chemists and druggists, are opened by mere distributors of drugs who have no knowledge of the nature of the dangerous articles they sell, and who have no sense of the responsibility of their position. These sham chemists and druggists keep everything the properly qualified chemist and druggist is allowed to sell, excepting only a few of the more virulent poisons scheduled in the Pharmacy Act. The result is that the public are supplied with untrustworthy medicines, and medical men have no guarantee that their prescriptions are accurately dispensed, or that pure drugs are employed for the purpose. It must be remembered that whereas purchasers of food are more or less protected from the purchase of bad food by their personal power of judging of its quality, purchasers of drugs cannot be protected from the purchase of bad drugs by any personal power of judging of their quality. Even the aid which purchasers of food can invoke from officials under the Acts relating to adulteration cannot be obtained in the case of medicines, for Nature yields drugs which vary much in quality, and analysts are not as a rule sufficiently familiar with the varying standards of the many medicinal articles comprehended under the term 'materia medica' to act in the interests of the public.

"The remedy for this unsatisfactory state of affairs may, according to Professor Attfield, be summed up in one word—'protection.' Where the health of the public is at stake, and where the public cannot protect themselves, an exception to the rule of free trade is not only justifiable, but is imperatively demanded. The law already refuses to permit the unrestricted sale of certain drugs. The only question is where the limit of exception should be fixed. It is contended that the lines should encircle all poisons, and that they should one and and all be excluded from the area of free trade. This involves no new principle; all that is necessary is an extension of the spirit and letter of the Pharmacy Act. At present only about a score of substances are deemed poisonous; but if the list were considerably extended it would afford protection to the public, and would restore to the pharmacist those functions and duties which he is best fitted to perform. . . .

"Eliminate special technical knowledge from pharmacy, and let drugs be sold by any or every shopkeeper, and the public will have no guarantee that they are not supplied with drugs fair in appearance to the untrained eye, but in reality worthless; drugs which once perhaps were of good quality, but which, without altering in appearance, have become spoilt by age; medicines weaker than they should be, medicines stronger than they should be; poisonous fluids for external application not properly distinguished from those for internal administration; indeed, the public will have no guarantee that they are not supplied with the wrong medicine altogether."

From the *Medical Press and Circular*, September 26.

"It is not at all a new conviction that Professor Attfield expressed before the Pharmaceutical Conference at Southport last week, to the effect that protection is the only remedy against indiscriminate drug dealing. For a long time past, not the professions only of medicine and pharmacy have recognized the paramount necessity of some decisive dealing with free trade in poisonous commodities, but common-sense economists and observant individuals of every class interested in preserving life and health have arrived at conclusions which mainly agree with those so ably and eloquently uttered by the President of the Conference above referred to. But while this is undoubtedly true, it must not be too readily assumed that the inferences and arguments advanced by Dr. Attfield are unanswerable reasons in proof of the need for reform, although the prime objection formulated by him, that, namely, public interest and public safety demanded the distribution of dangerous articles of consumption by trained and competent dealers, will find ready and universal acceptance.

"As the head and representative for the time being of the pharmacists and druggists of this country, Professor Attfield has naturally felt it incumbent on him to state the case of his clients in the most forcible manner possible. He had to face the introvertible fact of drug dealing by any and everybody who chooses to enter into the trade relations of chemists and its open indulgence by multitudes of shopkeepers who possess no special knowledge or licence entitling them to so trade, and that this wholesale competition is rapidly destroying the incomes enjoyed by legally qualified and registered pharmaceutists. Rightly enough, too, he argues that the transference of such trading from educated chemists to shopkeepers ignorant of the qualities and appearance of the articles they deal in, is attended with serious danger and inconvenience to the community, the members of which are entirely dependent on the protection the State affords them in respect to the immunity they obtain from being dosed with improper or injurious substances. The fault lies principally, not with the traders themselves, whether ordinary shopkeepers or registered chemists, but with the characteristic inefficiency of the Drugs Act of 1868, which, while forbidding unqualified persons to assume the *title* of chemist and druggist, in no way interferes with their assuming the *functions* they discharge, save and excepting only the sale of a few scheduled poisons. No one, we repeat, will question the existence of the mischief complained of, or fail to agree that amendment of the legislation which permits it is called for; but to the grounds on which Dr. Attfield defends the cause he is called on to plead, exception must in more than one instance be taken.

"The public has long complained of the exorbitant charges made by chemists for the medicines they dispense from prescriptions, and in recent years advantage has readily been taken of opportunities afforded at co-operative stores and elsewhere for getting the dispensing more cheaply performed. It is quite probable that this *has* done much to reduce the incomes made by the chemists, etc. Dr. Attfield, accepting the fact, goes on to insist that it is wrong to expect an educated and registered pharmacist to dispense for the same remuneration as a draper's or a grocer's services can command, the ground taken being that the former are *professional men*. The advice is then given to every chemist to denominate the charge for a bottle of medicine as his *fee*; and herein he is, we venture to think, guilty of an error which, in principle at any rate, pervades his whole reasoning. He contends that, inasmuch as the chemist must precede registration by a definite period of study, and conclude the latter by an examination which tests his fitness to be a dispenser, that therefore he is placed at once on a level with the professors of medicine and law. We do not wish to discuss how far the assumption could be maintained, but we do desire to point out a radical distinction between doctors and chemists, a distinction Dr. Attfield has apparently forgotten. The doctor receives a fee for his opinion and directions (including prescription) to his patient, and—omitting for the moment home prescribers —no transfer of material from practitioner to patient precedes the payment of the former. The chemist, on the contrary, receives payment for the articles he sells, with a percentage for the trouble he is at and the knowledge he displays in arranging them in the particular manner required by his customer. To call his remuneration a *fee* would be at once to deprive the term of all special signification, for as much justice would be in the demand of the hairdresser to be *feed* for cutting one's hair skilfully, or of the grocer for tying up one's tea neatly, or of the tinker for mending one's tea-kettle deftly. Should the proposal made by the President of the Pharmaceutical Conference be really carried out and the chemist insist on being paid a *fee* for his dispensing skill, then must a distinction be drawn between the medicine dispensed and the dispensing process, and each charged *pro ratâ*. Thus we may come yet to see a chemist's account made up of items after this fashion: 'Medicine 3*d*., dispensing ditto 1*s*. 3*d*.,' and so on, an absurdity that could harm none so much as the pharmacists themselves.

"It is of course right and proper for Dr. Attfield to seek to elevate the class of pharmacists as much as possible; but such advice as he gives them in respect to fees can hardly help their aspirations. So long as the chemist is in spirit a mere dealer in toffee, toothbrushes, and brick-dust, who dispenses medicine and sells drugs, he will never occupy a higher place in the public estimation than at present. Professional aspirations are not concordant with the wholesale dealing to which even the West-end chemists referred to by Dr. Attfield are given, and which detracts sadly from the ideal bearing that is sadly needed to raise the tone of chemists. They have not hesitated in the past to seek returns out of all proportion to the work done, and they must not be surprised if the public has seized on means, to its own detriment unfortunately, of obtaining its medicine at a less ruinous expenditure.

"There is also one point particularly on which medical men are fairly entitled to express an opinion adverse to chemists. The term 'prescribing chemist' is now so familiar that it would probably be difficult to name a member of the Pharmaceutical Society who does not deserve to have it applied to him. Dr. Attfield, it is true, attempts a sort of apology for this practice, but his attempt must be, even to himself, very unsatisfactory. He says that the chemist only temporarily treats an applicant for relief, always directing him to a qualified practitioner. We regret to say we have frequently seen this counter-practice in progress, but never have we been fortunate enough to hear such advice given as that Dr. Attfield describes. Only recently an instance showing the gross carelessness and ignorance of chemists came within our knowledge; it was in a large West-end chemist's: a girl came into the shop, and going to the nearest assistant, complained of sore-throat, and asked for 'something to cure it.' Incredible as it seems, this assistant, without examination of any kind, straightway gave the applicant a bottle of mixture—presumably chlorate of potash—with which he told her to gargle the mouth frequently, and swallow the gargle at the end. Surely if ever there was a case for medical treatment this was one; but no hint of the need of further advice was given; nor do we believe it is with anything like the frequency Dr. Attfield suggests.

"We could wish to write at greater length on what is, notwithstanding that we do not agree with its whole conclusions, a most interesting and important address. With its main demand—that for amendment of the Pharmacy Acts—we most cordially sympathize. That the dejected state of pharmacy which it describes really exists we do not for a moment doubt; but we do doubt whether Dr. Attfield has attacked the problem on the side most likely to be breached successfully. He tells chemists to claim the right to call the price of the things they sell *fees*. We tell them to make themselves worthier to be regarded as something better than the mere tradesmen that most of them now are. To this end they can strive without external aid, and the profession of medicine will most willingly co-operate with them in the endeavour. But pharmacists can never be rivals of doctors, even on the score of professional status; they are the complements of physicians, and the interests of the latter no less than of the public that both serve are intimately bound up in the success of the movement so ably advocated by the exponent of the pharmacy of the future."

From the *Medical Times and Gazette*, September 22.

"Dr. Attfield's address contains a large amount of carefully gathered information, and deserves to be thoughtfully read by everyone. In the most part of what he says we entirely agree with him; but unless the public at large can be seriously aroused to a recognition of the evils he points out, it will be to the last degree improbable that the present Government will trouble themselves about the matter."

From the *Daily Chronicle*, September 19.

"Professor Attfield, in his presidential address at the British Pharmaceutical Conference, at Southport, yesterday, took a rather gloomy view of the commercial prospects of the registered dispensers of drugs. As a body, they have no reason to repose implicit confidence in the virtue of Acts of Parliament. The Pharmacy Act of 1868, which everybody expected would create a valuable monopoly for qualified chemists and druggists, has had the very contrary effect. While it has imposed upon them the necessity of affording satisfactory proof of their fitness to distribute the 'perilous stuff' in which they deal, it has given them no protection against the competition of unqualified men who, 'bold in the practice of mistaken rules,' dispense, prescribe, 'and call their masters fools.' The Act merely provided that the title of 'chemist and druggist' could not be legally assumed by unexamined or unregistered men. There is nothing, however, to prevent such persons trading as chemists and druggists under some other title. Hence, many a man who has never troubled an official examiner in pharmacy thrives by 'pounding his poisoned poisons behind his crimson lights.' In addition to the sham chemists the duly registered members of the Pharmaceutical Society have to compete with grocers, oilmen, storesmen, and Jacks of all trades, who sell drugs of every description, with the exception of a few prohibited poisons. As Professor Attfield points out, however, nearly all drugs are poisons, more or or less, and there is as much difference in the quality of the commonest kind as there is in the quality of any other marketable commodities. It is an easy matter for the dealer in bad drugs to undersell the vendor of those of a genuine potency, and the worst of it is the public are quite unable to judge of the goodness or badness of the specifics included in the category of the British Pharmacopœia. To be able to do this requires the professional knowledge of which the properly qualified chemist and druggist has given proof. Dr. Attfield contends that the sale of all poisons should be exclusively entrusted to registered pharmaceutists. As the Pharmacy Act was passed for the protection of the public against the dangers arising from careless dispensing and the sale of worthless drugs by ignorant vendors, and as the Act has failed to ensure this protection, an amendment of it in the direction indicated by the President of the Pharmaceutical Conference is evidently needed."

From the *Morning Advertiser*, September 21.

"With many points of Professor Attfield's address we are able to agree, but there are many other points which have to be criticized from a much broader standpoint than that upon which they were dealt with by the speaker. . . . The main proposition Professor Attfield laid down is sound enough, namely, that the chemist and druggist, having taken the pains to qualify himself for the sale of drugs by obtaining a certificate of competency, is entitled to charge for the articles in which he deals not only such a price as will carry with it a fair profit upon the cost, but as will remunerate him for the knowledge and experience he brings to bear upon his business. . . . By all means let us have any measures which may be deemed necessary in order to secure the public against fraud in what, after all, is the most important article of commerce after food. This security is afforded by the existence of qualified chemists, and those people who wish to make sure that the prescriptions of their physicians are accurately dispensed will doubtless avail themselves of the knowledge and skill of the qualified persons who hold certificates of competency. But there are many drugs in common sale which can do no harm to anybody, and to suggest that Parliament should place them in the hands of a small class of vendors is to attempt the reinstitution of protection in a manner directly contrary to the public interests. Why preparations of well-known specifics, such as cod liver oil, quinine, rhubarb, aloes, and ginger, should not be sold in the open market we utterly fail to see. Chemists and druggists are sufficiently protected in the matter of the more dangerous drugs, such as poisons, narcotics, opiates, and so forth, and by their monopoly of the dispensing of prescriptions. No one in his senses who requires a dangerous drug, or an accurately-compounded prescription, would ever dream of going to anybody but a properly qualified chemist, whereas there is no need of the skilled retailer for the sale of Cockle's pills. That is the distinction we draw between the two cases. There are drugs which any man may sell without any possibility of danger to the public, and there are other drugs which can only be sold by persons familiar with their nature: and in the ordinary course of things the latter class of drugs are those for which people would naturally go to a qualified chemist."

From the *Morning Post*, September 20.

"The introductory address delivered at the twentieth annual meeting of the British Pharmaceutical Conference at Southport on Tuesday by the President, Professor Attfield, established the fact that a serious breach has occurred in the relationship of the State to Pharmacy, and that unless legislation be speedily undertaken the professional practice of pharmacy is in danger of complete extinction in many rural districts. . . . The doctrine of free trade in drugs, which some persons advocate, runs on curiously parallel lines with the general principles of so-called free trade by which the commercial affairs of this country are regulated, and its operation presents equally anomalous results. The British producer is compelled to fight his foreign competitors, even in British markets, with his hands tied; and in like manner the registered pharmacist, after being required to undergo a special training and pass a State examination, is exposed to the competition of traders who are allowed to practise his profession without having incurred the trouble and expense of qualifying for it. Drugs of all kinds, simple and compound, are being indiscriminately stored and sold by persons who, in many instances, are totally ignorant of their qualities and effects. In its bearing upon the position of the qualified chemist and druggist this, of itself, would constitute a grave evil calling for public attention, inasmuch as its inevitable result must be the extinction of his legitimate business in the smaller towns and remote country districts. But the matter has a wider importance as affecting the interests of the public at large. The purchaser of food is more or less adequately protected by his personal powers of judging of the quality of the article which he buys, but the rule does not hold good in regard to drugs. As Professor Attfield pointed out in his inaugural address, the maxim '*Caveat emptor*' cannot apply in this case, inasmuch as the purchaser does not possess the requisite knowledge to enable him to beware. It is to be feared that if the worthless or partially spoilt drugs that are frequently exposed for sale in the large wholesale markets could be traced to their ultimate destinations the truth of this remark would be fully established. Parliament has decreed that in a matter of so much importance to the public health as the supply of pure and reliable medicines the public shall be protected by requiring the dealer to give satisfactory proof of his knowledge of their properties and uses. That that protection should have been rendered valueless by a flaw in the enactment needs only to be demonstrated to insure the early attention of the Legislature. Whether the remedy recommended to the Pharmaceutical Conference—viz., to render illegal the retail sale of the simple and compound drugs of the British Pharmacopœia by any but registered chemists and druggists or medical practitioners—is not too drastic in so far as it affects the vending of patent medicines may be open to doubt, but it has at all events the double merit of simplicity and thorough efficiency."

From the *Globe, September* 19.

"Professor Attfield's address at the opening of the Pharmaceutical Conference draws attention to a subject whose importance can hardly be over-estimated. Have the public any guarantee, when they take a prescription to the chemist to be made up, or when they purchase drugs on their own account, that the practitioner at the counter understands his business? Practically, says Dr. Attfield, none at all. The Act of 1868 provides that no man shall call himself a chemist and druggist unless he has passed an examination and been duly registered. But, unfortunately, it is the name only that is forbidden, and not the calling. Any man is at liberty to hang a red lamp before his door, and to fill his window with those magnificent coloured bottles which have been the sign of the apothecary's trade from time out of mind. Not one person in ten who resorts, thus attracted, to the shop, thinks of asking to see the proprietor's qualification, and as a matter of fact prescriptions are made up and the most dangerous drugs dispensed, except only some few poisons which are scheduled in the Pharmacy Act, by barbers, booksellers, chandlers, confectioners, oilmen, publicans, stationers, tobacconists, and wine merchants. One consequence of this is that the qualified dispenser, who has incurred considerable expense in obtaining his professional knowledge and skill, is exposed to unfair competition, and is in danger of being driven out of the field altogether. It seems, indeed, that the number of registered pharmacists is actually on the decline. The interest of the public in finding a remedy for this state of things is not, however, less than that of the pharmaceutical profession itself. If the practice of pharmacy by qualified men becomes generally unremunerative, it will fall entirely into the hands of ignorant shopkeepers and their assistants. What is required is, obviously, to alter the Act of 1868 so that it may fulfil the intention with which it was passed. The unregistered tradesman must not only be forbidden to assume the title of a druggist, but he must be effectually restrained from selling drugs."

From the *Bedfordshire Times and Independent*, Sept. 22.

"There is some ground for the Professor's protest; but we question if he will speedily obtain a parliamentary recognition of his principle 'that the method which ought to have been adopted was that of rendering illegal the retail sale of the simple and compound drugs of the Pharmacopoia (with certain exceptions) by any but registered chemists and druggists, with the saving of all rights to medical practitioners.' The simple and compound drugs of the Pharmacopœia make up a long list, and many of them are substances in common use. It is self-evident that no unqualified person ought to be allowed to dispense medical prescriptions. It is also undisputed that the sale of virulent poisons ought to be carefully controlled. So far as pharmacy is a 'profession'—whatever may be the exact meaning of that very elastic term—it ought to be restricted to specially educated practitioners. But the Professor himself admits that the sale of an ounce of rhubarb is a commercial transaction; and we cannot see that the incapacity of either vendor or vendee to judge of the purity of the rhubarb is a reason why the substance should be withdrawn from open trade. Must the cook go to the 'chemist and druggist' for many of the simple substances she now gets, without any trouble, of her grocer? The truth is the 'chemist and druggist' has been endeavouring to raise his business into a profession; and has discovered that one important part of his income comes—or rather came—from that class of transactions which are purely commercial, and in which the unlicensed shopkeeper and the co-operative storekeeper can compete with him. The Act of 1868 undoubtedly needs amending; but the public will not tolerate the 'raising a legal fence'—to use Professor Attfield's words—round the sale of the simple and compound drugs of the Pharmacopœia, except on condition that the Professor's 'certain exceptions' are very numerous. The list of prohibited poisons may well be increased; and the penalties for adulteration may also be made heavier and be more rigorously enforced. But it is not necessary to make a man spend years of preparatory study before he is qualified to sell an ounce of rhubarb or a dose of Epsom salts."

From the *Birmingham Daily Post*, September 20.

"Although Professor Attfield's strictures upon the Pharmacy Act of 1868, at the opening of the Pharmaceutical Conference, were naturally formulated from the point of view of the dispensing chemist, and directed primarily to the better protection of the trade interests of the body he was addressing, there was much in them to appeal to the sympathies of the general public.. Up to a certain point it may be conceded that the interests of chemists and the public are identical; and if it be true, as asserted, that the existing Act tolerates the sale of the most potent drugs in the Pharmacopœia by unqualified persons, we can cordially co-operate with the chemists in procuring its amendment. The Act provides, it seems, that no man shall call himself a chemist and druggist unless he has passed an examination and been duly registered; but, unfortunately, it is the name only that is protected, the business calling itself is practically open to anyone. In point of fact it is largely exercised, we are assured, by numbers of persons—such as barbers, booksellers, chandlers, confectioners, publicans, oilmen, and others, who have no qualifications whatever for the delicate and hazardous office they undertake, and hence, no doubt, the number of accidental poisonings and deaths through inadvertence, which annually swell the bills of mortality. Anybody, it seems, may hang a red lamp over his door, and decorate his window with globular bottles of coloured water with impunity, and providing only that he does not call himself a chemist and druggist, he may dispense over his counter all the poisons in his shop, and compete successfully against qualified druggists, who are handicapped by a long and expensive special training. The unfairness of this practice to the qualified chemist is a matter which he may be safely left to deal with, but the danger to the public involved is one which everybody must feel and resent. Unfortunately the evil is more obvious than the remedy. We cannot, as the chemists would probably wish, prohibit the dispensing of drugs of any kind by unlicensed or unqualified persons, for it is not easy to define what do and what do not possess medicinal virtues, and merely to prohibit the making-up of medical prescriptions by unqualified persons would still leave a large and dangerous field open to the enterprise of the unlicensed dispensers. Herbalists and oil and colour men daily dispose of numbers of botanical and chemical preparations possessing potent medicinal virtues, and it would be impossible to interfere with their business because they are not licensed dispensers. The only practicable remedy, we are afraid, is the slow one of public enlightenment, which might be a good deal assisted, perhaps, by the display of chemists' diplomas in some conspicuous part of the dispensary. If this were made a rule of the trade, the public would soon understand that the absence of the diploma meant the absence of the qualification, and would learn to carry their prescriptions elsewhere."

From the *Bradford Observer*, September 20.

"The drug trade, it appears, is in a bad way, so far at least as the professional dealers are concerned; and one of the chief reasons for this unpleasant phenomenon is said to be the extensive appropriation of the trade by those who had never undergone proper training. These unqualified dealers, we are told, sell inferior and adulterated drugs, to the injury of the public. The remedy proposed is to forbid sale of drugs by any but duly-examined and qualified pharmacists. Outsiders might be inclined to doubt whether this would afford absolute security against adulteration. Furthermore, it would be extremely difficult to define drugs in an Act of Parliament, and unreasonable to provide that in country districts no shopkeeper should be allowed to vend castor oil or senna or other simple medicines. Again, if only druggists are to sell medicines, the doctors might fairly demand in their turn that druggists who prescribe—as many of them do for poor customers—should be punishable. If the Legislature provides penalties for adulteration, and forbids the sale by unqualified persons of the more dangerous drugs, it goes as far as the pharmacists can reasonably expect."

From the *Liverpool Courier*, *September* 19.

"Everybody knows that the pharmaceutical chemist is not above extending his trade by storing his shop with articles not strictly within the requirements of the healing art. He trenches on many of the trades enumerated by the Professor, even dispensing the cordials which the publican believes belong to his domain. Then again the druggists have lent their countenance to the patent medicines, which certainly require no special skill to sell. This distribution of 'packed or packeted goods' is one of the means by which the druggists have parted with their business. These are the goods which are now sold in the great drapery and other stores at such low prices that the druggist cannot compete with them and live. It is clear that in this the public derive advantage. It may be assumed, as the skilled pharmaceutist is willing to sell patent medicines, proprietary preparations, and coated pills, that he considers them harmless, if not actually beneficial, and very strong argument will be needed to convince the public that they will benefit by paying the druggist a high price for the identical 'packed or packeted goods' which they can purchase from another tradesman for very much less. The case of drugs which are not packed is very different, and here the public, as well as the druggist, is in need of protection which the existing law does not afford. It must be recollected that, as Professor Attfield points out, 'nearly all drugs are poisonous more or less,' and it follows that nearly all drugs should be dispensed and sold by persons conversant with their properties, and not admitted within that area of free trade which has tended to injure the druggist while jeopardizing the health and lives of the people. . . . We are afraid that the pharmaceutist must not look to the Legislature for much protection against the free-trade spirit of the age. Unless the 'packed and packeted' drugs can be abolished, they must be prepared to see a large share of their trade in the hands of other people; but the public have a right to be protected against the unregistered dealers who vend poisonous drugs without knowing the dangerous qualities of what they dispense."

From the *Liverpool Daily Post*, September 20.

"Druggists are in a bad way. So, at least, says Professor Attfield, the President of the British Pharmaceutical Conference, which was lately held at Southport, and he has taken some pains to ascertain the fact. This is partly the result of causes against which neither druggist nor anyone else can grumble: the improvement in the public health, the diminished use of stimulants, the lessened confidence in drugs, the disposition to trust to fresh air and clean water, and to let Nature have her own way. But there is something more than this, and that something closely concerns the public. An Act of Parliament passed in 1868 provided that no one should after the end of that year take the title of chemist and druggist and practise under it without being duly examined by a board appointed for the purpose, and having his name entered on the roll of qualified persons. But what was to prevent unqualified persons who do not call themselves chemists and druggists from selling drugs? The Act does indeed schedule certain poisons as to be sold only by the qualified; but these constitute only a small part of the trade, and almost its whole extent lies open to the inroad of the uneducated shopkeeper. Anybody can sell patent medicines; which, duly authenticated by wrapper and stamp, are as safely bought at the draper's as at the druggist's. There are other preparations—not patented—prescriptions, in short, ready made up—which are practically in the same category. The wholesale druggist sells his goods as willingly to one shopkeeper as to another, if only the money is forthcoming. In a word, the Act of 1868 has failed in its purpose. It was intended to secure that the sale of drugs should be in the hands of competently educated persons. As a fact the public buys much of its physic anywhere, and has no guarantee of its quality.

"That druggists should, like other tradespeople, be exposed to sharp competition, with the inevitable result of lowering prices, is not of itself a grievance with which the public will greatly sympathize. But this is a matter in which genuineness of quality is of much more consequence than lowering of price. Few parents can have reared a family of children through the necessary sicknesses of early life, without some instructive, perhaps painful, experience of this kind. Some medicine has been prescribed which has conspicuously failed to produce its proper effect, till at last the discovery is made—well if it be not too late—that an incompetent druggist has either left out some important constituent in the prescription, or that the drug supplied has been of so inferior a quality as to be quite inefficacious. Physicians have many a tale to tell of the difficulty of having prescriptions which contain rare or costly ingredients properly made up, even in large towns, while in the country they are usually driven to compound them themselves. This state of things is, no doubt, aggravated by the facts which Professor Attfield adduces. Still, it is difficult to see what direction future legislation should take. It would be impossible to give a certain class of men a monopoly of the sale of simple drugs. Even if it were not, it is conceivable that qualified druggists might sell inferior drugs—inferior, perhaps, in original quality, inferior from long haunting of the shelves. You may make druggists in this way the guardians of the public health so far as physic is concerned, but who is to guard the guardians? After all, the public must look out for themselves in this matter. If they are so stupid as not to recognize the advantage of scientific training in their purveyors of medicine, and prefer to buy physic at their draper, it is difficult to say them nay. At the same time, with sensible people the best druggist will always have the best practice; and we do not know that excellence in any profession can have, or ought to want, any better guarantee than this."

From the *Manchester Courier*, September 20.

"The address delivered by Professor Attfield at the Pharmaceutical Conference ought to receive attention. It discloses a serious danger to which the public are exposed, and to remove which legislation has taken place. That the law affords, nevertheless, no real protection was abundantly demonstrated, and it is clearly of importance that something should be done for the purpose of remedying its defects. The Act provides that no person shall adopt the title of 'chemist and druggist' and practise under it unless he has been shown by examination to be properly qualified, and his name has been duly entered upon the Register. The law in that respect is said to be systematically evaded. Numbers of persons who possess no knowledge whatever of the nature of drugs are engaged in their sale to the public, the evasion of the law in their case being simply the omission of the title of 'chemist and druggist.' Their shop windows contain all the usual indications that the business of a chemist and druggist is carried on, but the announcement is not made in words, so that, technically, there is no punishable breach of the law. Professor Attfield states that drugs of nearly all kinds, simple and compound, are indiscriminately sold by unqualified persons, amongst them being barbers, booksellers, chandlers, confectioners, drapers, general dealers, grocers, herbalists, ironmongers, marine store dealers, oilmen, tailors, tobacconists, and others. The Professor did not mention in what form these several tradespeople supplied the public with drugs, and the probability is that they are in the form of patent medicines, or other concoctions with the composition or preparation of which the vendor, whether he be a barber or a chemist and druggist, has nothing to do. The fact that a grocer or other tradesman disposes of preparations of that kind may be injurious to the professional chemist and druggist, but his doing so makes him no more a chemist and druggist than the sale of tinned meat would constitute him a butcher. It may be, however, that something more than patented specifics are disposed of by the tradesmen named, and that the public are really exposed to serious danger owing to the want of that knowledge, on the dealer's part, of which the possession of the right to use the words 'chemist and druggist' is a guarantee. Professor Attfield says that drugs are sometimes sold, by persons who are not chemists and druggists, at cost price, or very nearly cost price, 'as mere baits to catch customers,' and he contends that the sale of all drugs should be excluded from the area of free trade and confined to those who possess special knowledge in reference to them. It may be taken for granted, we suppose, that patent medicines are not examined by chemists and druggists before they sell them, and that, therefore, the public risk is as great when they are bought from a registered dealer as from a general tradesman; and if general tradesmen are to be prohibited by law from selling such 'drugs,' they may complain of the chemist and druggist being permitted to interfere with their particular line of business by the sale of cigars, sponges, soap, and other common commodities."

From the *Manchester Examiner and Times*, September 19.

"A good deal that Dr. Attfield said in regard to the public interest in this matter is undoubtedly true, and that admission may be made without involving an acceptance of the whole of his conclusion that the Pharmacy Act should be extended in its spirit and letter to the case of tradesmen other than qualified chemists dealing in drugs. No doubt, as he says the public have no guarantee that they are not supplied with drugs 'fair in appearance to the untrained eye, but worthless to the trained eye of the druggist, drugs which once perhaps were of good quality, but which, without altering in appearance, have become spoilt by age.' It is not easy to see, nor does the address explain, how in such a case State machinery can supply a substitute for the salutary caution which the public is required to exercise for its own protection. It is well, however, that we should be made acquainted with the views of the Pharmaceutical Conference on this point. If they do not compel immediate agreement, they deserve to be considered. And the proposal of the President is that the list of medicinal substances treated as poisons under the Pharmacy Act should be considerably extended (with due regard to the rights of persons who would otherwise be prejudiced), so as to prevent the free vending of poisonous compounds by any other than men who have satisfied the examiners of their competency to deal in dangerous medicines."

Parliamentary and Law Proceedings.

THE ALLEGED SALE OF DEFECTIVE TINCTURE OF QUININE.

At the Marylebone Police Court, on Wednesday, Mrs. Jane Allchin, carrying on business as a chemist at 1A, Elizabeth Terrace, Hampstead, appeared in answer to an adjourned summons taken out by order of the Hampstead Vestry for selling 3 ounces of tincture of quinine not containing the proper quantity of sulphate of quinine, viz., 8 grains to the ounce.

Mr. Ricketts, solicitor, appeared to prosecute on behalf of the Vestry; Mr. Glaisyer, solicitor, appeared to defend on behalf of the Chemists and Druggists' Trade Association of Great Britain. The case was before the Court a fortnight ago, when Mr. Heisch, the analyst to the Vestry, certified that the sample of quinine which had been submitted to him contained 6·2 grains of sulphate of quinine per ounce. Professor Attfield, for the defence, gave evidence showing that by the process of analysis adopted by him he found 7½ grains per ounce of sulphate of quinine. In consequence of the conflict in the chemical evidence the magistrate, on the application of the defendant's solicitor, decided to send a sample to Somerset House to be reported on by the Government analysts.

On the resumption of the case, the certificate of the Somerset House authorities was read. It stated that the sample contained not less than 8 grains of sulphate of quinine.

Mr. Mansfield dismissed the summons.

Mr. Glaisyer asked for special costs, which Mr. Ricketts opposed.

Mr. Mansfield pointed out that the results of the three analysts all differed, and it was very difficult to know who was right. He should make no order as to costs.

Obituary.

We regret to have so soon to publish the death of another "Bell Scholar," in the person of Mr. George Frederick Gutheridge, Surgeon of the Royal Mail Steam-ship 'Severn,' who died of fever in the West Indies on the 6th of July, at the age of 27 years. Mr. Gutheridge held the Scholarship during the session of 1876–77.

Notice has also been received of the death of the following:—

On the 31st of August, Mr. David Imrie, Chemist and Druggist, Consett, Durham. Aged 74 years.

On the 2nd of September, Mr. John Cunliffe, Blackburn Street, Bolton. Aged 53 years.

On the 7th of September, Mr. Charles Joseph Hartley, Chemist and Druggist, New Malton, Yorkshire. Aged 69 years.

On the 7th of September, Mrs. Mary Stokes, Chemist and Druggist, Watery Lane, Birmingham. Aged 74 years.

On the 9th of September, Mr. William Kemsey Bourne, Chemist and Druggist, High Street, Lavenham. Aged 38 years.

On the 10th of September, Mr. Horace Watson, jun., Chemist and Druggist, Laceby, Grimsby. Aged 35 years. Mr. Watson had been an Associate of the Pharmaceutical Society since 1870.

On the 16th of September, Mr. William Augustine Pridmore Ellsum, Chemist and Druggist, High Street, Newcastle, Staffordshire. Aged 27 years.

On the 17th of September, Mr. Charles Row, Pharmaceutical Chemist, Fore Street, Devonport. Aged 79 years. Mr. Row was one of the oldest magistrates of Devonport, having been placed permanently on the Commission of Peace shortly after filling the office of Mayor in 1863. He had been a Member of the Pharmaceutical Society since 1853.

Correspondence.

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

Copies of the Conference Address.

Sir,—Several requests have been sent to me, by post and through other channels, for copies of the Conference Address, as a pamphlet, to be distributed by chemists and druggists to their friends or customers, and inquiries have been made as to cost. Now, the address is already in type for the 'Year-Book,' and it makes a twenty-eight page pamphlet; or, if some press notices be appended, a thirty-two page pamphlet. If my colleagues on the Executive permit a production at cost price, and I feel sure they will, a parcel of 50 could be sent from the printers, post paid, for about 4*s*. 6*d*.; 100, for about 7*s*., or larger numbers, carriage free, for about £3 per 1000. If intending distributors will let me know by or before next Wednesday morning's post, at 17, Bloomsbury Square, how many copies they desire to have, the action of the Committee will be much facilitated.

No doubt this is one method of making that appeal to "the great mass of the community" insisted upon as so desirable, by Mr. Schacht, at the Southport meeting. How far it will be adopted remains to be ascertained.

The Conference desired, I think, to present a covered copy of my two addresses to each member of the Houses of Parliament—and I possess a sufficient number of copies of last year's address for such a distribution to be effected.

But correspondents ask me, in addition, to promote the transmission of a copy of this year's address, with added extracts from the press notices, to every registered chemist and druggist; drawing his attention to what the Pharmaceutical Society has done and is doing in the direction of legislation, asking him to endeavour to enlist editors of local newspapers on our side on the general subject of "the future supply of drugs to the public," and requesting him to do what he can in this and other ways to obtain the support of local public opinion and to secure the favourable influence of his Parliamentary representatives. I only know of one difficulty in the way of this being done—cost. I did present a copy of last year's address to every non-member of the Conference on the Register of Chemists and Druggists, hoping I should thus pave the way to that invitation to membership which I knew would be issued by the Conference later on; hoping, also, that I should do good in other ways. The twelve thousand copies, including wrapping, addressing and postage, cost me over £60, and I am well satisfied with the results. But I did not myself contemplate doing anything of the kind this year.

Remembering the very considerable amount of support which pharmaceutical policy (on all fours with the public welfare) is now receiving from the press, if that half of the druggists of Great Britain who are outside all pharmaceutical organizations, and who, doing nothing for themselves, so frequently complain that those inside do nothing for them, will now effectively put their shoulder to the wheel, and if those inside, with generous earnestness, will do the same, the gods of the Legislature will probably only too gladly aid us, with the result that pharmacy will again advance and the health and welfare of the whole country be thereby promoted.

John Attfield.

Sophisticated (?) Oil of Cloves.

Sir,—In the issue of the 8th inst., you publish a note on the above subject, by Mr. Spencer, in which he infers that the oil of cloves examined by him was a "mixture of genuine oil of cloves with a compound of the creasol class, as the latter gives the same coloration with Fe_2Cl_6."

Allow me to call his attention to the statement made by Hanbury and Flückiger, that "eugenol is by far the prevailing constituent" of oil of cloves, and that "it (eugenol) belongs to the phenol class;" hence it is not surprising that he should have discovered a similar "sophistication" to that of Herr Bechurt's. Had his series of experiments included the oil of pimenta (likewise consisting largely of eugenol) exactly the same results would have been obtained with ferric chloride. Or had the expedient been adopted of distilling a small quantity of oil of cloves for comparison, a more vivid and more persistent green coloration would have been obtained by the treatment of an alcoholic solution of this oil than could be produced by the ordinary commercial samples.

At present it is to be feared that adulteration, if any, must be looked for in some other direction than that of one of the natural constituents of the oil.

W. H. P.

"*Jumbo*."—Dec. aloes comp.

"*Inquirer*" (Ilfracombe).—(1) See Disp. Memo. 626, *Pharm. Journ.*, [3], xii., p. 719, and answer on p. 806. (2) One preparation ordered is not official. Such a change would occur and your explanation is probably the correct one. (3) The acid. gallic. should be finely powdered and will then be partially suspended by the solution of gum. A "shake the bottle" label should be used. The mixture becomes brown in keeping but should not be of that colour when dispensed. (4) We cannot furnish this information.

W. C.—The gallic acid should be rubbed to a very fine powder and suspended in the fluid. Use a "shake the bottle" label.

T. F. T.—On the addition of the acid. phos. dil. the mixture becomes cloudy and a precipitate falls, consisting for the most part probably of iron. Ferri cit. c. strychnia is not official and samples differ.

S. Carsian.—Rub the morphia hydrochlorate with a little mucilage; it will be suspended, not dissolved. Use a "shake the bottle" label.

"*Inquirer*."—The subject has been referred to several times. See note on "Explosive Mixture" (*Pharm. Journ.*, [3], vii., 1054) and reply.

G. S.—*Echium vulgare.*

J. A. H.—(1) Probably *Crepis virens*. (2) *Hieracium boreale*. (3) Probably *Thrincia hirta*. (4) *Hypochœris radicata*. (5) Probably *Leontodon autumnale*. (6) *Barbarea vulgaris*. If cotton wool be used it should be tied round the base of the stem. The plants could be named more easily if they were first carefully pressed in a book, and the flowers, fruit and radical and stem leaves sent.

"*Minor*."—(1) *Eupatorium cannabinum*. (2) *Astragalus glycyphyllos*. (3) *Lythrum Salicaria*. (4) *Cichorium Intybus*. (5) *Polygonum Convolvulus*. (6) *Knautia arvensis*.

J. C. Hyslop.—Probably laburnum (*Cytisus Laburnum*). The odour resembles that of liquorice and is frequent in leguminous plants.

W. Smith.—We are unacquainted with such a work.

"*Alpha*" is referred to text-books on the subject, and the rule relating to anonymous communications.

R. H. R.—(1) The Bill as it at present stands would require the engagement of a qualified assistant at each branch business. (2) We cannot recommend particular makers. (3) Labels are now printed at so low a rate that we do not think you would be able to print them yourself more cheaply.

E. B. M.—*Torilis anthriscus.*

H. O.—It is not "porous" in the sense in which the word is usually used.

Communications, Letters, etc., have been received from Dunstan, Umney, Wells, Stearns and Co., Brown, Hickman, Leay, Stevens, Foster, Quinlan, Dodd, Wilkinson, City, W. G. B.

INTRODUCTORY SESSIONAL ADDRESS

DELIVERED AT THE COMMENCEMENT OF THE FORTY-SECOND SESSION OF THE SCHOOL OF PHARMACY,

October 6, 1883.

BY MICHAEL FOSTER, M.A., M.D., LL.D., F.R.S.

Mr. PRESIDENT, when you asked me to say a few words on this occasion, I at once said, "Yes." My experience is that when you ask anybody anything they always do say "yes;" but having said "yes," I next began to wonder why you had asked me, and I came to the conclusion that it must be because you wished to have an address from an outsider. But, sir, I am not altogether an outsider as regards pharmacy, for in times past I have rolled pills, I have folded powders, and I have written in a legible, if not in a bold, hand the directions how they were to be taken. Besides that, I have the honour to be, not a real member, but an honorary member of your Society. Still I fancy I am so far outside you that my external character will give an adventitious value to anything which I may have to say.

Now, having said "yes," my next duty was to find out what I was to talk about, and knowing there would be a distribution of prizes, my mind kept running on examinations, and I fear the few words which I shall have to speak to you to-night will deal a good deal with examinations. I fear that I may appear in this respect like a ghost at a banquet; but I may appeal to those who have received your prizes this evening, that they may be gratified that I am taking them as the topic of my discourse, and I may also appeal to those who have been unsuccessful, that they may possibly find some consolation in what I have to say.

Now we use examinations, as far as I can understand, for two purposes. In the first place, we use examinations that we may take the result of those examinations as a stamp, as a mark, as a certificate. But a stamp, a certificate, a mark of what? I wish to look at the matter somewhat carefully, and I think, perhaps, I have some little right to speak on this subject, because as a young man, although examinations were not, if I may use the phrase, so "rife" in those days as they are now, I was a good deal examined. Indeed I look back to certain years of my life as being a kind of hurdle race in examinations. It seemed to me that I had no sooner cleared one examination than there was another ahead of me. Then when I grew a little older, for as we know Time brings about a whirligig, I got as it were my revenge, and instead of being an examin*ee* I became an examin*er*, and there was a time, from which I have happily escaped, when my friends told me that I was the most examining man in England. So that I think I have some right to speak on this point, and yet I feel compelled to say—and in this I recognize on this occasion my ghostly character—that the real thing of which the result of the examinations is the stamp and the certificate, is ability and skill in passing an examination. I do not think we can go surely farther than that.

Nevertheless, we may use the examination safely in an indirect way. The stupid man and the idle man will never acquire skill and ability in passing an examination; the industrious and the clever will easily show skill in passing an examination; and we may use an examination indirectly very safely as a pass examination to separate the industrious and the clever from the idle and the stupid. But we may even then make mistakes, and those mistakes become much more probable when we use the examination as a means of sorting out people from each other; when we pass from the pass examination to the competitive examination. We have no doubt that A. is cleverer in passing an examination than B., and in all probability A. will in future life be a better man, and prove a more real man than B. But that is not always the case; the examinations often fail us in that respect. Again and again I have known men whom I have been obliged to speak of as good examination men, who did not prove of great value in after life; again and again I have known men who have not done well in the examination room, who have been of enormous value in after years. And then modern refinements have increased our difficulties.

I do not know, sir, whether you are acquainted with the poems of that vigorous old dissenter, the illustrious author of 'Robinson Crusoe,' Daniel Defoe; but he begins one of them with these remarkable lines—

> "Wherever God erects a house of prayer,
> The Devil always builds a chapel there,
> And 'twill be found upon examination
> The latter has the larger congregation."

Now, sir, whenever an examination is instituted in order to select the fit persons for this or that there always arise a certain number of people who undertake to put a lad through that examination whether he be fit or not. There are certain names given to these persons; they are sometimes called "coaches," they are sometimes called "crammers," but the name of "coach" seems to me very significant We have an idea that the prize in an examination is given because in the race the lad arrives at the goal by the exercise of his own limbs, and that his speedy arrival at the goal is a test of the soundness of his mind and the strength of his limbs. But a "coach" takes him on his back, and lands him there; it is at his expense he is carried there, and his arrival there is a token not so much of the lad's ability, but of the "coach's" skill. I speak this advisedly, because I have had some experience of "coaches." I quite admit there are some "coaches" who gain their end by real teaching; but they have deserted their clan, they are no longer "coaches," but teachers. But all are not so, and in my experience as an examiner, I have been brought to the conclusion that coaching has now-a-days achieved the position of a fine art, that it is an occupation of life into which a great deal of energy is directed. As far as I understand, the "coach" when he takes to coaching pupils does not consider in the first place the nature of the study, but what he is pleased to call "the examiner's mind." He makes a study first of all of the examiners. He knows their whims; he knows their fancies; he learns what answers will, if I may say so in the presence of others who are like myself examiners, tickle them most, and he directs his efforts accordingly. Indeed, sir, I understand that some of these "coaches" who have a large number of pupils take on them the functions of a general. They marshal their forces, and I know very well that in one examination where the *vivâ voce* is of some importance, a "coach" has been in the habit of sending his weak, hopeless pupils in first to know what the style of the questions was in order that the hopeful pupils might benefit by the knowledge. This is an additional, and a very serious and important additional difficulty, in taking the results of an examination as really a stamp of the merit of the candidates who have passed the examination.

But happily there is another use of examinations, a more noble one, a use which I believe to be on the whole a greater one, and that is this, that whether there be "coaches" or not the lad who goes in for an examination in any subject must in some way or another learn something of the subject. The examination compels knowledge, and there are many of us who know that but for an examination into which perhaps we entered for some partly vainglorious purpose, for the mere reason of getting a certificate or winning a medal, we might never have got an introduction to a science or a knowledge which soon fascinated us, and to which we have become attached ever since. And I believe it is probable that a great deal of the work of science is first made attractive to men who are introduced into a branch which they are afterwards destined to adorn by an examination of which when they took it in hand they had no idea either of the value or of the bearing. They have gone to it frequently for purely business ends, like Saul the son of Kish, who for business matters went to seek his father's asses and found a crown. Very often they have gone in for a medal or a certificate, and in the end have found that which was better than either medal or certificate; they have found knowledge.

Now, you will gather from what I have said, that I regard examinations as like many other things in this world, mixed in nature, partly good and partly evil, and it seems to me that one great need of the present time is to take such steps as should minimize the evil and increase the good. Now, I will venture to propose to you a paradox. I believe that the evils of examinations may be diminished, and the good may be increased, by simply multiplying them. I think the evil of examinations lies a great deal in their formal character; in their being frequently one supreme effort which is made and is left. I am inclined to regard that examination as the worst where a lad after two or three years' study on a variety of subjects, is examined in all of them in the shortest space of time. For instance, in a certain university, the subjects are so many that, as a poor, disappointed, despairing student said to me, preparing for this examination is like driving a lot of pigs. You have no sooner got hold of one subject than the others are all abroad. The worst examination seems to me to be that in which a lad brings up a number of subjects, after a somewhat lengthy preparation, before a group of strange men, of whom he knows nothing, and who know nothing of him, and before whom, to the best of his ability, he there disgorges, if I may use the phrase, his knowledge in a few hours. I do not believe that that examination is one just either to the student, or, if I may say so, to the examiner. The best examination seems to me that kind of one which is carried out in a partial manner in the School of Science at South Kensington, and which, if fully developed, takes on somewhat of this form, that a lad having to study two, three, or four subjects does not attempt to drive them, so to speak, all abreast, but takes one, or at most two, and devotes his whole attention to that one or at most two. Then as he attends the lecture, and especially as he carries out the practical work belonging to the lecture, a note is now and again taken by the teacher of the progress which he makes, and any doubt which the teacher may have is remedied by frequent informal examinations. At the end of the course there is a formal examination undertaken by the teacher, or if you please, by the teacher with the help of an assessor, in order that things may be straight and square and above-board. But I am one of those who think that no one can judge of a lad's progress like the man who has actually taught him, the more formal examination becoming, as it were, the crown of the three or four or six months' work, and the position which he gains in that subject should go as so much to his credit for his final degree or certificate. Then he would turn with a full heart and free mind to another subject, and treat that in the same thorough, honest, straightforward way. That I believe would be a kind of examination against which a coach of the utmost ability would have no power whatever. But, you will say, it would assume the form of compulsory lectures. Now, in politics, and in the general conduct of life, I am opposed to compulsion. I am one of those who believe that the art of government consists in developing the free tendencies of the people, and not in manufacturing unnecessary restrictions; that the progress of government consists in the diminution rather than the increase of laws, and that the ideal government is that which in the end finds nothing to do. I am opposed to compulsion; but I venture to think that this course which I have sketched out to you would not be a series of compulsory lectures.

For I am as opposed as possible to mere compulsory lectures. I cannot, and never could see the good of making a lad sit in the back benches and read a novel, or carve his name on the desk, while the lecturer is doing his best to open up to him grand views of the science which he is teaching. These would not be compulsory lectures; but such a course would involve compulsory study, and that compulsion I think is necessary for the good of the individual as well as the good of the public, of which he is a part. I am opposed to compulsion, but I do not think such compulsion unjust, nor do I think that legislation meddlesome or unnecessarily restrictive which gives the public security concerning the sale of things which are becoming in their nature alarmingly dangerous, and more and more alarmingly dangerous every day; which are alarmingly dangerous utterly out of proportion to the knowledge of the people who have to use them. I believe that when all people are educated there need be no restriction on the sale of drugs or poisons; but opposed to all compulsion, on principle, I still must admit that this is a case where compulsion should intervene, and if that compulsion is to intervene, I think the compulsion should be complete. If security is to be offered, I think that security should be a real one, and not a fantastic one; and I am inclined to think that that security is not to be found in a rapid examination, however conscientiously and however ably conducted; but that such a security must be found in some such course of study as I have ventured to sketch out.

But I feel that I am trespassing now on somewhat dangerous ground. A young gentleman has of recent years acquired some notoriety by his—as it seems to me—somewhat crude handling of an old topic, "Is life worth living?" And I daresay it occurs to many to put the question: "Is the pharmacist's life so much worth having that you are ready to undergo all these examinations, and to sink the money which is involved in them?" I fancy I hear someone say, that if you attempt legislation of this kind, in your rude endeavours to increase public security you will simply overreach yourselves; that in attempting to make the gate of entrance straiter and more strait, you will simply swell the number of those who climb over the wall. I can imagine people saying, "We have spent so much money and so much time in acquiring the right to sell strychnia with our sovereign's approval. We wait for customers but they do not come, and in the end we find a faithless public buying it clandestinely and cheaply round the corner." This I admit is a grave and anxious matter, and one on which an outsider perhaps ought not to say much. But I would venture to remind you that this is a difficulty not confined to yourselves. My brethren, the doctors, have the same complaint. They say that if the stringency of medical examinations is to be increased in the future as it has been in the past the young gentlemen who have thus been made to sound all the depths of biological knowledge, and to equip themselves with the whole panoply of the healing art, will never stoop to the drudgery of village practice and that our country poor will be left to the mercies of unlicensed quacks. The same cry comes also from other departments of life. The engineers have the same cry. I hear of it, too, even in the army, and it has reached the farmers. Everywhere we hear this complaint, that this science, which has turned the world upside down, has come hither also. Now is it not because science is becoming an increasingly potent factor in the struggle for human life, and is making the struggle a closer and a bitterer one? The work of science is to enable the skilled few to do the work which is done, or which used to be done, by the unskilled many. It lengthens the arm of each man, but within an area it diminishes the number of those who can live within that area. It is tightening up the whole world. Everywhere science is making itself felt, and in many respects, maybe, the whole of life is becoming one brilliant examination in science, and, moreover, the standard is raised year by year.

Now it is no good striving against the inevitable. As the story of human life unfolds each passing stage has its charms, has its good and its ill; but you cannot hope to keep the good and let go the ill of each passing phase. There was a certain pleasure in the old savage life. It was very good to pitch one's tent where one liked without the dread of leases, of contracts, and builders' bills; but then there was hunger and thirst, and there was bloodshed ever at hand. And I dare say many of my brothers, the doctors, think it must have been pleasant in the old times when anyone who liked, without reference to the central body, could set himself up to cure or to kill any of his neighbours who pleased to entrust their bodies to him. And I dare say it seems to you it would be a pleasant time when any of you, having found a corner house vacant and being possessed of three large bottles of coloured fluid, could at once proceed to deal out poisons to your neighbours quite regardless of Major and Minor. But I take it that my brethren, the doctors, would be very loth, with all the charms of the past, to go back eighty years, and I take it that you, too, would be unwilling to wipe out the Pharmaceutical Society and all it means, and to go back forty years. But if you do not go back, neither can you stand still. Many of you, looking back forty years, might think it was a purely voluntary act, the undertaking to institute the Pharmaceutical Society and all it meant. But, in reality, your ancestors were carried on by the spirit of revolving things, and that same spirit must carry you on to do still further things, and it is far better for you to put yourselves in harmony with the necessary course of events—much better to put your shoulder to than against the wheel of fate.

Now let me in conclusion offer one word of consolation to those who, recognizing that impending changes are inevitable, still regard them with dread. For myself I do not from a pecuniary point of view fear that either our doctors or our pharmacists will become so superlatively educated that our country districts will be left without men to prescribe or men to dispense. I feel sure that the struggle for existence is getting far too sharp to leave any place of that kind vacant for any length of time. But some of you will say, "Yes, the places will be filled up, but they will be filled up by men far too good for them, men who will remain disappointed, and in this attempt to develop your profession you are only making efforts to increase the sum of human discontent." But these persons forget that in the first place discontent arises largely from comparisons, and as I said just now you are no worse off than other people.

All ranks are feeling the same pressure; everywhere the same place is being occupied by a better man. You will find that better men, like yourselves, are now occupying these country places in which I once rejoiced, Mr. President, but which I find are always spoken of in the terms which I have used this evening. Moreover, there is one other consolation, viz., that which you accuse of breeding this discontent goes far to take it away, for it is one of the happy features of the work of science in human life that while it is making closer and more bitter the struggle, sharpening the fight between man and man, it is at the same time opening out new capacities for enjoyment. You look back to the man who without any trouble could set up his shop where he pleased without any previous education, without any previous training; but you must remember that the life of such a man was in the vast majority of cases limited to his dinner and the tittle-tattle of the village. I feel sure that every one of you who has passed through these portals feels that there are new pleasures of life opened up to you, of which you knew nothing before you entered these doors, and I feel sure that you will leave them with the conclusion that though pounds, shillings and pence, are and must always be the framework of happiness, still that the pleasures of an instructed mind are the best and most lasting habiliments of that framework. The former are the dry bones and the skeleton of happiness, but it is the latter which breathe into them the breath of life and make life a reality, Depend upon it that the money which you spend on your examination in procuring your licence is not simply returned to you in that licence, is not simply returned to you in the more lucrative trade to which that may lead, but it comes back to you every day in the greater light and the greater pleasure which you have in knowing things. That is an element which you must fairly consider when you come to ask the question whether in the face of so many examinations, so much increasing study, and so much diminishing return, a pharmacist's life is worth having.

OPINIONS OF THE PRESS UPON THE SUBJECT OF PROFESSOR ATTFIELD'S ADDRESS.

From the *British Medical Journal*, September 29.

"Professor Attfield has made out a strong case in favour of an immediate amendment of the Pharmacy Act of 1868. In his opening address as President of the Pharmaceutical Conference, at Southport, he has clearly shown that the aim of the Act in question, namely, the proper supply to the public of trustworthy drugs by duly qualified persons, has not been generally accomplished. Although Dr. Attfield's cogent criticism of the Pharmacy Act was naturally formulated from the standpoint of the pharmaceutical chemist, and directed primarily towards the support of the authority of the Pharmaceutical Society and the protection of the trade interests of his auditors, his observations cannot fail to quicken the interest of the medical profession in the reforms he advocates, and to demonstrate to the general public the pressing need for more stringent regulation of the conditions under which they purchase their medicines. A general impression has hitherto prevailed that the Pharmacy Act prevented the sale of powerful drugs, or the dispensing of prescriptions, by any but properly educated and publicly authorized persons. Dr. Attfield authoritatively informs us that the public have really no reliable guarantee that the shopkeeper who sells drugs or undertakes the compounding of prescriptions is qualified for his responsible and hazardous work. The Pharmacy Act provides, it seems, that no man shall call himself a chemist and druggist unless he has passed certain examinations, and been duly registered. But, unfortunately, it is the name only that is protected, not the exercise of the calling; the business itself is left open to anyone, without let or hindrance, and the Pharmacy Act is practically a dead letter. Anybody, as the law at present stands, is at liberty to hang a red lamp over his door, and to fill his window with the orthodox bottles of coloured water; and providing only he does not incur penalty by calling himself a chemist and druggist, to sell drugs and poisons without restriction, and to "make up" prescriptions with impunity. This practice is grossly unfair to the honestly educated and duly certificated chemist, and it constitutes a grave and widespread public peril, which cannot be suffered to continue. Dr. Attfield assures us that drugs of nearly all kinds, simple and compound, are now being indiscriminately sold by unqualified persons; that it is a notorious fact that prescriptions are dispensed, and the most dangerous drugs supplied, except only some few poisons which are scheduled in the Pharmacy Act, by barbers, booksellers, chandlers, confectioners, drapers, general dealers, grocers, hairdressers, herbalists, ironmongers, marine-store dealers, oilmen, printers, publicans, stationers, storekeepers, tailors, tobacconists, toy-dealers and wine-merchants. The public can, more or less, judge of the quality of the food or raiment they purchase, but they cannot safely be left to protect themselves in the case of drugs. The failure of the Act has arisen from the adoption of a wrong method of protecting the public. A legal fence has been raised around a mere name. Experience has shown that the method that ought to have been adopted was that of rendering illegal the retail sale of the simple and compound drugs of the Pharmacopœia, with certain well-recognized exceptions, by any but registered chemists and druggists, with the saving of all rights to medical practitioners. As a remedy for the evils he described, Professor Attfield advocated an extension of the principle and letter of the Pharmacy Act. It is obviously necessary, both for public safety and for the protection of the qualified chemist, to amend the Act of 1868, so that it may really accomplish the purpose for which it was ostensibly passed. It is not sufficient that an unqualified and unregistered tradesman shall be prevented from assuming the name of chemist and druggist; he must also be effectually restrained from selling drugs and compounding medical prescriptions."

The Pharmaceutical Journal.

SATURDAY, OCTOBER 6, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

THE COMMENCEMENT OF A NEW SESSION.

THE past week has been a busy one in the medical and pharmaceutical schools of the metropolis. Lecture-halls and class-rooms, after a couple of months of comparative silence, have once more been enlivened by the footsteps of gathering students and have echoed to the sound of "Introductories," full of kindly words of encouragement and sage advice. Young men putting on, for the first time, the harness for work, will for a considerable time feel the stimulus of the prizes and laudations bestowed upon those who have been the most successful labourers in a past session; others who are resuming interrupted studies, and who are not so sanguine, perhaps, as in a previous session, as to the distinctions they may gain in their respective schools, but who are sobered and fitted for a steady and sustained effort by previous contact with the work and a clearer appreciation of the nature of the task that remains to be completed, will feel the impulse in a modified form. Considering what as a rule will be the ultimate object of the commencement or resumption of study in the schools it is safe to predicate that in the minds, if not upon the lips, of professors and pupils, one word will be perhaps unduly present, and that is "examination," for even the greatest purists among them, who would decry most vigorously the idea that examination should in the least degree lead the school, will recognize that examination is an ordeal that has to be passed. Notwithstanding this, if we may judge from the published reports, the word is markedly absent from the "introductory" addresses except in one instance, in which, however, it formed the text of a remarkably able discourse. We refer to the address delivered by Professor MICHAEL FOSTER, on Wednesday evening last, to an audience which thronged the lecture theatre in Bloomsbury Square.

The address is printed on another page, and will doubtless be read with pleasure by all interested in the subject. It is the outcome of the ripe experience of one who, as he quaintly puts it, was, as a young man, "a good deal examined," and who, when he grew a little older got as it were his revenge, and instead of remaining an examinee became an examiner. Therefore, it is of interest to notice that upon the evening of the day upon which the Council of the Pharmaceutical Society had mad another step towards securing the enforcement of a curriculum as a preliminary condition essential to passing the examination as to qualification for registration as a chemist and druggist, Professor FOSTER expressed to his audience of pharmacists *in esse* and *in posse* his deliberate opinion that "the real "thing of which the result of the examinations is "the stamp and the certificate is ability and skill in "passing an examaination," which might be used indirectly to separate the industrious and clever from the idle and stupid, but could not be trusted implicitly to do even that. The weak points of the examination system, and some of the evils that it entails, were graphically described and are generally recognized. As to the paradoxical remedy suggested by the speaker,—the multiplication of examinations as a means of minimizing the evils and increasing the good attendant upon them,—it is in accord, we believe, with the practice which has for some time past obtained in the school in Bloomsbury Square, where the Professors habitually test the progress made by the pupils and accustom them by *vivâ voce* examinations at frequent intervals to formulate the knowledge they have attained. But it seems evident that Professor FOSTER would go further than this and entrust the teacher with important functions in the pass-examinations of his own pupils. We presume that here he was speaking generally of the subject, and that he had in his mind merely the examinations upon which might be based a general certificate that the student had made good use of certain opportunities. We do not gather that he contemplated the introduction of such an innovation into the mode of conducting the examinations provided for in the Pharmacy Act, and indeed we may remark that the acceptance of certificates based upon examinations so conducted to the extent that the holder had gone satisfactorily through a prescribed curriculum has in the United States been found to be occasionally attended by inconveniences. But there can be no doubt as to the truth of the statement that no one can judge of a pupil's progress like the man who has taught him, and it would therefore seem desirable, if possible, to turn this capability to some account.

During the last three weeks pharmacists have perhaps to a greater degree than usual been made sensible of the wrongs that they endure—or at any rate fancy they endure—from unlicensed competitors, and they have enjoyed the luxury of an unusual amount of sympathy from the public press on the subject of their grievances. The experience has been probably to some extent enervating, if not demoralizing, and symptoms of this influence are to be seen in the tendency in some quarters to assume that the sole—or even the chief—recompense for the money and time sunk in the scientific training of a pharmacist is to be found in a limited protection from competition in the business of supplying medicines to the public.

Far be it from us to attempt to minimize in the slightest degree the claims which the pharmacist who has complied with the requirements of the law has upon the Legislature that the spirit of the law passed by it shall not be allowed to be evaded by unqualified pretenders. But there is nothing gained by indulging in Utopian dreams which are never likely to be realized, and it is necessary to recognize the conditions of life by which we are surrounded in order to obtain a clear perception of the good that is attainable. If there are any who feel that consideration of their wrongs during the last few weeks may have led to an undue relaxation we recommend them to read the straightforward manly words of Professor FOSTER in the latter part of his address, which should produce upon them an effect as bracing as a cold douche. As pointed out by the speaker, the time has passed when the influence of science was confined to what were termed the learned professions, and the education upon which the pharmacist is apt to base a claim for special consideration has become a necessity if he wishes to keep abreast of many of his customers in some of his special subjects.

The interest which was unflaggingly manifested during Professor FOSTER's address was sustained during the succeeding short but interesting ceremony of presenting the "Hanbury Medal" to Mr. JOHN ELIOT HOWARD. No words are necessary here to explain the nature of the services which Mr. HOWARD whilst indulging his love for scientific investigation has been enabled to render to mankind. Probably as long as cinchona bark remains an article of the materia medica the name of HOWARD will be associated with it. But it is especially interesting to learn that the labours of Mr. HOWARD in this direction were influenced to so large an extent by the lamented pharmacologist in memory of whom the medal was instituted.

THE AMERICAN PHARMACEUTICAL ASSOCIATION.

JUST a week previous to the meeting of the British Pharmaceutical Conference in Southport, —namely, on the 11th of September,—the thirty-first meeting of the American Pharmaceutical Association was commenced in a lecture hall connected with the Smithsonian Institution in the city of Washington. In respect to numbers the meeting would appear to have been a very successful one, no less than two hundred and fifty members having signed their names as being in attendance. The business proceedings extended over four days; but, as indicated in a notice which appeared in this Journal a few weeks since, they were by no means so incessant as to exclude festivities during that period. Indeed there was a manifest disposition on the part of the more industrious visitors to resent as excessive the demands made upon their time by the Entertainment Committee for feasting and visiting. It is known that some of the features of the meetings of this Association, such as the presentation of reports by permanent committees on legislation, the drug market, etc., are absent from those of the British Pharmaceutical Conference, and in some respects the scope of its operations is wider. But it must be admitted that apparently there is also a marked difference in the disposition to discuss at inordinate length and at unexpected moments matters of detail which in this country are left in the hands of the Executive to deal with. One result is that the proceedings in the American Association sometimes seem to lack the regular continuity to which the members of the Conference have become accustomed. It may be partly from this cause too, that the reading of practical and scientific papers, which in this country constitutes the chief occupation of the Conference, appears in the United States to be somewhat dependent upon circumstances; at any rate, notwithstanding the longer duration of the meeting, the number of papers read there is not usually so great.

From the report of the Committee on Legislation it appears that a law regulating the practice of pharmacy in the city of San Francisco has been repealed on the pretext that the constitution of California does not allow of the enactment of local laws, but the real motive is attributed to the disinclination on the part of some of the San Francisco druggists to pay an annual registration fee of one dollar. On the other hand a new Pharmacy Act has been passed in the State of Delaware, reserving to registered persons the right to conduct a pharmacy or store, or to sell, compound, or dispense medicines or poisons within the corporate limits of any town of five hundred inhabitants or more. An amended Act has also been passed in West Virginia. In addition, a Bill has been drafted, to be brought before the next Congress, under which, if it passed into law, the apothecaries in the United States army and navy would become commissioned officers, with the rank and pay respectively of second lieutenants of infantry in the army, and of ensigns in the navy. A resolution requesting the Committee to assist in securing legislation in this direction was subsequently passed by the Association. The yearly accession to the legislation affecting pharmacy, of one or more Acts that in hardly any case are identical in substance with those previously in existence, evidently furnishes material for considerable perplexity as to the exact position which pharmacists occupy in particular States, and the President of the Association expressed a strong opinion as to the desirability that Congress should pass a national Pharmacy Act to make a more uniform code of law for all the States. Another subject which was brought forward in the President's address was the sale by the United States Government of drugs and medicines that have been condemned by the drug examiners, and a resolution protesting against the reprehensible practice was afterwards passed. There were about fifteen papers read, and we hope to publish some of them in an early number.

In connection with the meeting of the Pharmaceutical Association, and immediately preceding it, a meeting was held which resulted in the organization of a National Retail Druggists' Association for the purpose of dealing with all questions of commercial importance to the trade. But, probably, the special *raison d'être* of this Association is the competition that exists in the United States, as in this country, in the selling of proprietary articles. A Committee was appointed to make an arrangement to secure the establishment of the "rebate plan," under which manufacturers of proprietary articles would sell their goods to those "jobbers" only who will agree not to supply them to retail dealers at a rebate price except upon receiving a written agreement that they shall not be sold below the marked retail prices.

The School of Pharmacy advertisement on another page will be found to contain information as to some important changes in connection with the Chemistry and Pharmacy Class that will come into operation in the session which has just commenced. The Class in Practical Dispensing, which under the management of Mr. Dimmock has proved such a success as to demand more teaching power, will have the advantage of the services of another accomplished pharmacist in Mr. Joseph Ince, who will henceforth be associated with Mr. Dimmock in conducting it. In addition, Mr. Wyndham R. Dunstan, who has for some time past assisted Dr. Redwood in the lecture room, has now been formally appointed Assistant Lecturer on Chemistry and Physics, and according to a statement made on Wednesday evening he will deliver some supplementary afternoon lectures.

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At the meeting of Council on Wednesday last, upon the recommendation of the Benevolent Fund Committee, it was decided that there should be an election of Six Annuitants in December next, and a list of ten approved candidates was adopted.

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As will be seen from a report which appears on p. 280, at a meeting of the executive committee of the British Pharmaceutical Conference, held on Wednesday last, it was resolved that it was desirable that the two Presidential Adresses delivered by Professor Attfield at Southampton and Southport should be brought under the notice of the members of both Houses of Parliament. The plan suggested is that, as far as possible, this should be done by persons residing in different parts of the country, who may be able to bring some personal influence to bear at the time of presenting the pamphlet, and communications upon the subject from those who are willing to undertake the duty are invited. It only remains to add that the arrangements foreshadowed by Professor Attfield in his letter on p. 260 last week have now been made, and that chemists and druggists wishing for copies of the Southport address for distribution may now obtain them at a price representing the cost of their production.

We understand that the papers on existing legislation relating to the sale of poisons, to which we referred on a recent occasion as likely to be brought before the National Association for the Promotion of Social Science, during its meeting at Huddersfield, will be read in the "Repression of Crime Section," on Monday morning next, the 8th inst.

* * *

At the recent meeting of the German Pharmaceutical Society, the question was broached as to the advisability of a more frequent issue of the official journal, the *Archiv der Pharmacie*. It was stated by the President that the subject had already been under the consideration of the Council, which had decided that the *Archiv* shall be issued twice instead of once a month, after the commencement of next year, if upon inquiry it be found that the consequent increase in the expenses would not be too great.

* * *

As the *Archiv der Pharmacie* resembles this Journal in that a copy is supplied free of cost to every member of the Association to which it belongs, it may be interesting to quote some figures as to that Journal from the published report. During the past year the number of copies printed monthly was 3150; of these 2802 were sent to members, the remainder representing the sales, stock, exchanges, etc. The gross cost of production was 18,066 marks, while on the other hand the receipts for sales and advertisements had amounted to 2578 marks; the net cost of suppling 2802 copies of the journal monthly to the members of the Association was therefore 15,488 marks.

* * *

At the recent half-yearly meeting of the Council of the Ontario College of Pharmacy it was decided to make an important change in respect to the *Canadian Pharmaceutical Journal*, which is the official organ of, and has hitherto been published by the College. The property in the Journal, together with all advantages accruing from its publication, has been made over to the Editor, Mr. E. B. Shuttleworth, for a term of five years, on the condition that for a minimum annual sum of seven hundred dollars he shall mail a free copy monthly to every member up to the number of seven hundred. Should this number be exceeded an extra sum of one dollar per annum is to be paid for each member in excess and similar payment is to be made for copies supplied to students and assistants connected with the College. The first number published under the new arrangement is printed on a page of larger size, and gives evidence on the part of the Editor of his intention to substantiate its claims to be "the organ of the Canadian drug trade."

* * *

A new work on Systematic Botany is now being published in Japan under the auspices of the Japanese Government. It is of folio size, and gives illustrations of the plants, apparently both wild and cultivated, growing in Japan. The first part contains illustrations of *Pæonia Moutan*, *Chimonanthus fragrans*, *Illicium anisatum*, var. *religiosum*, and several species of magnolia.

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The first meeting of the Chemists' Assistants' Association in the new session will be held in University Chambers, 53, Conduit Street, on Wednesday evening, October 10, at 8.30 p.m., when the President will deliver his inaugural address.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, October 3, 1883.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Messrs. Borland, Bottle, Butt, Churchill, Gostling, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Squire, Symes, Williams, Woolley and Young.

The minutes of the August meeting were read and confirmed.

The Pharmaceutical Conference.

The Vice-President, as one of the delegates appointed by the Council to attend the recent meeting of the Pharmaceutical Conference at Southport, wished to have the fact recorded that the meeting was in every respect a great success, whether regarded in its scientific or its social aspect, the number present being larger than on any previous occasion. Without going into the merits of the presidential address, the papers, or the discussions, of which members could judge for themselves by the report, he desired to express most strongly his personal appreciation of the manner in which every possible wish of the visitors to Southport was anticipated and provided for, and he regretted that there was no closing meeting at which expression could be formally made of what he was sure was the universal feeling amongst those who attended the Conference.

Mr. Savage said he thoroughly acquiesced in everything the Vice-President had said.

The President said it was very satisfactory to know that the meeting had been so successful. From what he had heard it seemed as if one result of the late Conference meeting would be to leave a good deal of work for this Council or some other body to do.

The Patents Act and the Medical Bill.

Vote of Thanks to Local Secretaries.

The President said it might perhaps be well to state briefly what had taken place with regard to certain legislative matters since the last meeting. In the case of the Patents Act, which originally contained a clause relative to the use of the royal arms in trade which had caused some alarm, the result of an interview he had had with Sir Thomas Farrer, was that an amended clause was suggested which the Council approved. This clause was moved by Sir John Lubbock, and ultimately became part of the Act. It might be satisfactory to the members and the trade to know that the law officer of the Crown, in reply to a question in the House, had stated that in its amended form the Bill would not interfere with the use of the royal arms in any way in which chemists and druggists would desire to use it. With regard to the Medical Acts Amendment Bill, it was stated by the Prime Minister, positively, up to almost the last moment that this Bill would be proceeded with, and it therefore became necessary to take action with reference to the amendment of the clauses relating to the revision of the British Pharmacopœia. As was now matter of history, the Bill was opposed by some sections of the medical profession and, ultimately, on August 22, it was withdrawn. It was some satisfaction, however, to know that the efforts of the Council and others would not be wasted, for he had every reason to believe that when the Bill again came before Parliament, some such clause as was desired, recognizing the claims of pharmacists to be associated with medical men in the revision of the Pharmacopœia, would be inserted.

The Vice-President remarked that the President had sacrificed a considerable portion of his holiday by remaining in town to watch over the interests of the Society, whilst Parliament remained in session.

Mr. Young thought the Society was much indebted to Mr. Symes for bringing forward the question of the royal arms, the original clause having caused great consternation in Scotland.

The President said it was a great satisfaction to him to find that the Council had been successful in its effort to get the clause amended, especially as the Society of Arts had previously moved in the same direction, but without effect.

Mr. Symes said he had been informed by one printer, not in a very large way of business, that the expense he would have been put to had the original clause stood would have been about £500; and this statement, which somewhat astonished him, was fully borne out by two other printers whom he consulted.

Mr. Hampson wished to add, with reference to the Medical Bill and the Pharmacopœia question, that he had learned from various sources that the influence exercised by members of the trade on their representatives in Parliament had been very great, and that they had received a very general acquiescence in the views they had presented. This would encourage them in their efforts in the future, and he believed that when the matter again came before a Government department there would be little difficulty in obtaining all that was required. He would move a vote of thanks to the Local Secretaries and others who had so greatly assisted the Council in the matter.

Mr. Borland corroborated what Mr. Hampson had said. He had had some correspondence with his own member, and received from him a most kind letter saying that he would support the prayer of the petition sent him when the occasion arose.

Mr. Bottle, Mr. Schacht and Mr. Symes also spoke in similar terms as to the kind manner in which their reports had been received by members of Parliament.

The Vice-President said he had been much struck with the assent which medical men had given to the idea that pharmacists should have a voice in the preparation of the Pharmacopœia when it was put before them.

Mr. Squire seconded the motion as to the vote of thanks proposed by Mr. Hampson, which was put and carried unanimously.

Elections.

MEMBERS.

Pharmaceutical Chemist.

William Lloyd Williams, of Buckley, having passed the Major examination and tendered his subscription for the current year, was elected a "Member" of the Society.

ASSOCIATES IN BUSINESS.

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

Cochrane, James ....Wishaw.
Jenner, Harry Albion ....St. Leonard's-on-Sea.
Macintyre, John ....North Berwick.
Parkes, Harry Charles............Weston-super-Mare.
Paterson, Alexander C. ....Douglas, Isle of Man.
Schofield, John William ....Rothbury.

ASSOCIATES.

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

Atkinson, Richard ....Penrith.
Harston, Charles Edward ......Lincoln.
Keeling, Arthur Gadsby.........Walthamstow.
Layng, Henry ....Brandon.
Shepard, William...................Newport (I.W.).
Whiston, Edmund ....Wolverhampton.

APPRENTICES OR STUDENTS.

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

Baker, Alfred Henry Sanzen ...Gateshead.
Bowes, John William ....Pocklington.
Cowin, William Stephen.........Union Mills.
Greensit, John William ....Masham.
Hughes, John ....Aberystwith.
Johnson, Charles Ernest.........London.
Kirkup, George John ....Newcastle-on-Tyne.
Loeffler, George Berthold ......London.
McAllister, Robert D. S..........Helensburgh.
McKenzie, James...................Cullen.
Marshallsay, Richard Jeanes ...Wareham.
Roberts, Roderick ....Crickhowell.
Scarr, John ....Todmorden.
Stothert, Robert ....Blackburn.

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

ADDITIONS TO THE REGISTER.

The Registrar reported that:—

Thomas Campbell McCormack, 19, St. Saviourgate, York;

Benjamin Death, 147, Charles Street, Stepney, London, E.; and

William Thomas Upfill, 74, Rodney Road, Walworth, London, S.E.,

having made statutory declarations that they were in business before the passing of the Pharmacy Act, 1868, and these declarations having been supported by duly qualified medical practitioners, their names had been placed on the Register.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee included the recommendation for the payment of various accounts, and also recommended that in the case of a pharmaceutical chemist, a fine of 10*s.* 6*d.* in commutation of arrears of subscription be received from him on re-admission to membership of the Society.

The motion for the adoption of the report having been moved and seconded, the Council went into committee to discuss the subject of payment of arrears, which occupied a considerable time.

Ultimately the VICE-PRESIDENT moved an amendment to the effect that the report of the Finance Committee be adopted, except that portion referring to the payment of arrears by a pharmaceutical chemist, and that the question of payment of fines for restorations be referred to the Library, Museum, Laboratory and House Committee.

Mr. SCHACHT said this was a very important addition to the amendment, and he thought an unfortunate one.

The PRESIDENT said the instructions were that the office was to use its discretion up to a certain point, and that all other cases were to be referred to the Finance Committee. That was the reason why this case had been submitted to the Committee.

Mr. SCHACHT said the Finance Committee had simply fulfilled its instructions in taking this case into consideration, and it had come to a conclusion upon it. If the Council refused to accept that conclusion it was of course open to it to do so, but it ought to be distinctly understood, and then if it were desired that the Finance Committee should have further instructions for its guidance in the future, a fresh motion should be made on the subject. As a member of the Finance Committee, it seemed to him a distinct affront to that Committee to reject its decision in this way.

The PRESIDENT remarked that the Vice-President had in the first place suggested that the matter should be sent back to the Finance Committee to be re-considered; but it was thought better that it should be referred, if at all, to the Library Committee.

After some further discussion, the amendment, leaving out the latter portion again referring the general principle to a Committee, was put and lost, and the original resolution was put, and carried by 10 votes to 7.

The VICE-PRESIDENT then moved that the general question of fines for restoration to membership be referred to the Library, Museum, Laboratory and House Committee for consideration, which was agreed to.

BENEVOLENT FUND.

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

£10 to a former pharmaceutical chemist member, aged 70, who has had three previous grants.

£5 to a former pharmaceutical chemist member for forty years, aged 81. Applicant had a considerable grant in February last.

£5 to the widow of a pharmaceutical chemist and member, who has had two previous grants.

£10 to a pharmaceutical chemist and former member, aged 80.

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

£5 to a registered chemist and druggist, out of employment and suffering from illness.

£10 to a registered chemist and druggist, aged 69, who has had two previous grants.

£10 to the widow of a registered chemist and druggist, aged 66.

£5 to the widow of a registered chemist and druggist and annuitant. Applicant has had two previous grants.

Two other applications had been deferred for further inquiries, and one had been rejected.

A suggestion for the apprenticing of one of the Isherwood orphans had been considered, and it was recommended that £10 for the payment of premium be placed in the hands of the Secretary, who should endeavour to obtain more favourable terms than those offered. It was recommended also that £10 be granted towards the support of these orphans.

The Secretary had reported that six annuitants had died during the year, leaving thirty-six on the list.

The Committee recommended that six annuitants be elected in December next, and had drawn up a list of ten approved candidates.

The Committee also recommended the sale of some gas shares standing in the name of the trustees, and the re-investment of the money in 5 per cent. debentures.

The report and recommendations were carried unanimously.

GENERAL PURPOSES.

The report of this Committee, which as usual was read in committee, included the usual letter from the Solicitor, stating the progress which had been made with cases placed in his hands. From this it appeared that Charles Campbell, 555, Rochdale Road, Manchester, had paid a penalty of £5 and costs, and J. C. Copley, 51, Robin Hood Street, Nottingham, under stress of a county court order for committal in default, had also paid £8 8*s.* 3*d.* as penalty and costs.

Several cases of alleged infringement of the Pharmacy Act had been considered, and proceedings were recommended to be taken.

The Council having resumed, the report and recommendations were unanimously adopted.

PHARMACEUTICAL EXHIBITION.

Mr. SYMES moved the following resolution of which he has given notice:—

"That an Exhibition of Pharmaceutical and Chemical

Apparatus and other objects of special interest to pharmacists be held in the Society's Rooms in May next, and that the Library, Museum and Laboratory Committee be requested to consider and report on the best means of carrying it out efficiently."

He need not say much in support of this motion, inasmuch as two exhibitions had already been held, and on the last occasion on which he brought the subject before the Council with a view of ascertaining whether it was the opinion of the majority that such an exhibition should be held every year, an amendment was passed to the effect that exhibitions should not be held more frequently than once in three years. Of course that did not bind the Council to hold one every three years, but seeing that two years had elapsed and the third would arrive in May next, he thought most gentlemen would agree with him that if such an exhibition was to be held in the Society's rooms it should be made successful, and to render it successful it was necessary that there should be longer notice of the intention than had hitherto been given. The last exhibition held there was an international one. Though he did not wish to deprive the Vienna people of the credit of having instituted the first International Exhibition he must say that the views in this country concerning an exhibition were so cosmopolitan that there was no idea of anything but an international exhibition; and there had been on the previous occasion exhibits from France, Germany, America and elsewhere. To get exhibits of the desired character, and to allow persons sufficient time to consider and prepare their exhibits, some months' notice should be given, in order that there might be ample time to communicate with persons abroad. As yet there had been no exhibits from Austria, although, as had been seen recently, Austrians were capable of producing things which were not familiar in England. The recent exhibition at Vienna might be adduced as a reason for not holding one there, but he thought, on the contrary, that some of the articles there shown might very likely be sent over here. He looked on this as an educational question—not as educating students but as helping men engaged in pharmacy to discuss the merits of various appliances and products which were shown. The day was gone by when preparations were made by secret apparatus, but the day would never pass when a large amount of skill would hold its own. What was wanted was that those men that possessed skill should have greater experience in the means by which that skill could be made available. He hoped the motion would be carried, as he believed it would be very acceptable to the trade.

Mr. Radley, in seconding the motion, said he thought the country members generally were very much interested in such exhibitions, and that the time named was one when there would be a large assemblage of country members in London.

Mr. Schacht in the abstract approved of the proposal because it tended to the cultivation of the art of pharmacy, and in a certain degree to open all eyes to what was going on. Now he should like very much, inasmuch as the matter would probably be referred to a Committee of the Council, chiefly composed of London members, to know whether the members of that Committee felt that it would be in their power so to manage this affair that it should be of sufficient interest generally, and on the other hand not exposed to the abuse of advertisement. Of course neither Mr. Symes nor Mr. Radley wished to encourage that, but they must know that that was a direction in which the exhibition might be abused. He could not remember with perfect gratification the last exhibition, because his impression was that a large portion of it consisted of articles which the Society ought not to be called upon to advertise. He, therefore, wished to gather the opinion of the Committee whether that class of exhibits could be eliminated, and if not he thought it would be wise not to hold an exhibition.

Mr. Hampson said he took it for granted that the members of the Committee would be anxious to answer the question, but on the other hand he thought the Council might trust half a dozen intelligent gentlemen to so conduct the affairs of this exhibition, that it would not be open to the reproach just referred to. He quite sympathized with Mr. Schacht's view, but at the same time the danger was not confined to pharmaceutical exhibitions. The remarks of Mr. Schacht would strengthen the hands of the Committee and give the key note to its action, and he was quite sure, from past experience, it would be able to carry out the work with satisfaction. Another point was, had the time arrived when an exhibition could be held with advantage to the Society, and was it likely that it would be supported by a sufficient number of novelties?

Mr. Butt said he was a member of the Committee conducting the last exhibition. Several hundred circulars were sent out, and the replies were very few, and up to within a few days of the opening there was every appearance that the scheme would prove abortive. It was only by extending the limits and admitting objectionable things which had a certain interest to some people that the Committee succeeded in getting a sufficient number of articles to make an exhibition. There were a large number of things which he individually, and he believed the other members of the Committee, objected to, and which would not have been admitted if there had been a sufficient number of applications to make anything approaching an exhibition without them. As far as his experience went a second attempt would be equally abortive if the managers took the trouble to exclude everything in the nature of an advertisement. Several things were then excluded, and the Committee was hauled over the coals for having done so. For himself he must say that if it were decided to hold another exhibition he must decline to act on the Committee, first because he was not satisfied with the result of the Committee's labours last time, and, secondly, because he had not sufficient leisure.

Mr. Williams said it was a very troublesome and expensive thing to get up specimens worthy of such an occasion, and when an exhibition was only opened for one or two days it became a serious question with manufacturers, and they would only go to this expense and trouble when they saw that it would pay them to do so. He did not object to the principle of the thing; on the contrary he thought the first exhibition was a very great success, but the second was not so good, because there a certain set of people came forward who discovered that this was a good means of pushing certain articles. If it were decided to hold another exhibition he should be sorry to oppose it, but if a committee were appointed it ought to be perfectly impartial, and it would have a very disagreeable task before it; such a committee ought to be thoroughly and loyally supported by the Council in its decisions.

Mr. Robbins, as one of the Committee of the last exhibition, agreed with Mr. Williams that it had a very disagreeable and difficult task to perform. On the last occasion the Committee went into the matter most zealously, and everything possible was done to make the holding of an exhibition known beforehand; but when it came to almost the last moment it was found that there was very little sent in that was worthy of being exhibited, and consequently the Committee was driven to take what was sent or to have no exhibition at all. An attempt was made to discriminate, and some things were excluded, and then umbrage was taken outside at the decision. If the same thing were repeated he certainly thought the Council should be very careful not to encourage any such discontent by giving ear to it. He was sure that any committee appointed would act conscientiously, and after doing so it would not like to be charged with acting unfairly. He did not think there was any probability of there being a sufficient number of persons interested in pharmacy present in May next to make it worth while to try the experiment.

Mr. RICHARDSON said he had hitherto been a strong advocate of exhibitions of pharmaceutical apparatus and other interesting articles at the annual meetings, but after the discussion that morning, he thought very few would have the temerity or enterprise to send many articles to such an exhibition. It was impossible to hold a successful exhibition within those walls, if it were to be one worthy of the pharmacy of Great Britain. To that end contributions ought to be solicited from all the other countries, France, Germany, Austria, and America; but there was not room in that building for such a collection, and if there were room the advantages offered were not, as Mr. Williams suggested, commensurate with the trouble and expense which exhibitors would be put to. He was anxious to give country members every inducement to come up to London to an annual meeting, but if they were brought up to London ostensibly to see an exhibition worthy of the rising generation of pharmacists and then presented with one which had been taken from town to town, as was sometimes the case, the result would not be satisfactory. There were persons who would have the enterprise to fill the rooms with articles which might be of interest to some people; but the question was whether it would be wise for the Society as an educational body to encourage that sort of thing. If an exhibition were held, let it be one of practical pharmacy, of interesting apparatus, such as Mr. Schacht suggested some years ago, a kind of museum, but after what had been said he should ask Mr. Symes to consider whether it would be advantageous to hold one next year. He begged to say he should vote for the motion if it was put.

Mr. GREENISH said he should oppose the proposition for the holding of an exhibition of pharmaceutical apparatus and so forth in the Society's rooms. His experience was that there were not sufficient novelties to render it interesting, unless those things were introduced which were the negation of true pharmacy. He should say, have the exhibition elsewhere, and let those who exhibited advertise as much as they liked. If medical men took the advertisement portion of the Journal as their pharmacopœia, which some of them seemed to do, it might be useful to them to see such specialities exhibited; but if the exhibition was to be confined to pharmaceutical preparations and apparatus he was sure there was not sufficient of novelty to make it interesting. Contributions of apparatus from abroad had been referred to, but it would be very wrong to invite gentlemen on the Continent to send articles to an exhibition lasting only a couple of days without clearly explaining all the circumstances. On the last occasion great fault was found with the Committee because it rejected certain things not in accordance with the printed rules, and he hoped if the experiment were again tried some clear instructions would be laid down for the guidance of the Committee, and that its decisions would be supported by the Council.

Mr. WOOLLEY should not like it to go out to the world that Mr. Greenish was of opinion that there was nothing new under the pharmaceutical sun.

Mr. GREENISH remarked that what he said was that there was not sufficient novelty to make an exhibition interesting, unless objectionable things were allowed.

Mr. WOOLLEY said one great advantage of this motion was that it came before the Council in good time, so that the Committee would be able to form an opinion whether there would be a sufficient number of articles of interest forthcoming. That the Committee would ever get an exhibition of that highly respectable superæsthetical nature, free from advertisement, which some people seemed to wish for, he very much doubted. He and other gentlemen present had exhibited, and he should like to ask them whether they exhibited on purely moral principles and whether they had not some idea of advertisement in the matter. He would strongly support the proposition.

Mr. GREENISH said every year since he had attended the annual meeting of the North and South German Association there had been an exhibition in connection with the meeting; but it had been found as he had stated that there were not sufficient novelties, and on the last occasion an application was signed and presented to the Association asking that the exhibition should not be held every year, but, at the discretion of the President, every three or four years.

The PRESIDENT said it was perfectly well known in London that there was only one way of getting up an exhibition. It was not worth the while of anyone to exhibit in any exhibition unless he received some *quid pro quo*; either you must pay the maker to exhibit, or you must give him an opportunity of advertising his wares. The question was, which of these two courses was the better one to adopt. If it was desired to have a high class exhibition, a thing really novel and interesting, people must be paid to bring their things; if they wanted an exhibition of ordinary commonplace things, the proprietors of those things which they had already advertised, and were advertising, would no doubt be glad to come and advertise themselves again. Personally he did not object to either one or the other very seriously, but it was a little difficult, constituted as that Society was, to impose on a small committee the very awkward task of rejecting exhibits of some of their fellow members on the ground that they were not suitable. What took place last time must take place again. The Committee must apply to pushing men engaged in pharmacy to come, and must give them what they call "facilities." He would ask Mr. Symes if he had considered the very small number of people who came to such an exhibition. Had he compared it with what was called the Sanitary Exhibition, lately held at Knightsbridge, which some people who obtained medals there might think was a success, but in point of the numbers who visited it, and financially, was a complete failure. It was quite in harmony with the position of the Society to encourage country members to come to London at the Annual Meeting, and the Council endeavoured to do that by the liberal way in which it dealt with the Conversazione; but when the relatively small number which constituted the meeting was considered, it was not worth the while, commercially, of any firm to exhibit, unless it either had its expenses paid or something in the shape of an advertisement, which was looked upon as a *quid pro quo*.

The VICE-PRESIDENT said the remarks of the President, though very useful, had left him very much where he was, and his position was one of great hesitation in the matter. Reference had been made to the country friends and provincial members, and there was great force in the remark that two days was a very short time for an exhibition, to which he would add that one of those days was practically absorbed in the Annual Meeting. The other class of people, experimental pharmacists of a high class, would not care to come to an exhibition unless it contained novelties; it would be no pleasure to them to see things they already knew, and few men would care to go to the expense of sending new apparatus or new products for two days.

Mr. HILLS suggested that the permanent Museum should represent an exhibition worthy of the Society, and that such a one as now proposed belonged rather to commercial enterprise.

Mr. YOUNG said he had not the pleasure of seeing the last exhibition, but he observed that the motion referred to an exhibition of apparatus; it seemed to him it would be a pity to run the risk of damaging the premises, which had recently been redecorated, by setting up soda-water and other apparatus. He agreed with Mr. Hills that the Museum should be constantly attended to, and everything of a new and interesting character should be sent there, but it would only lead to confusion to introduce cartloads of apparatus.

Mr. Bottle thought a very good suggestion might be gathered from the remarks of the President. The last exhibition did not impress him very much, and he agreed with Mr. Woolley that it was impossible to get an exhibition which did not include the advertisement element. He thought it was worth consideration whether the Conversazione should not be held within the Society's own walls, and made on the next occasion an exhibition, paying for the introduction of what were really novelties or objects of interest which would be valuable from an educational point of view to the members of the Society.

Mr. Symes said the idea originated in his mind partly from the recollection of the old Conversazione in that building, where improvements and novelties in pharmacy were exhibited, and attracted such large numbers that the building was not found large enough to accommodate them, and partly from the scheme which Mr. Schacht brought forward some time ago for having a permanent exhibition of modern apparatus. The Conversazione had been moved to South Kensington, and Mr. Schacht's proposal was negatived from want of accommodation, and consequently there was no opportunity for showing those improvements which were constantly taking place in pharmaceutical apparatus and the preparations made by them. All were aware that exhibitions were one of the modern means of imparting knowledge. A great deal had been said about the last exhibition, but nothing about the first, which he was perfectly satisfied was a thorough success. Nothing good could be obtained without having an evil, and the evil must be put up with for the sake of the good. The chief object of any person in sending apparatus or preparations was to make them known. If it were objectionable to countenance any kind of advertisement, why were advertisements inserted in the Journal? The first time he suggested such an exhibition he was told there would never be six persons in the room at one time, and at another that there were no such things as pharmaceutical apparatus existing; yet there had been apparatus exhibited, and it was known that the rooms were crowded during the greater part of three days. He quite agreed that persons should not be invited to send contributions from abroad without being fully aware of the limits of the exhibition. The argument that the Germans were not going to hold an exhibition next year seemed to him in favour of holding one there. It seemed, however, to be the opinion of the majority that such an exhibition was not desirable, and he, therefore, hesitated somewhat to press the motion; but he felt that it would be losing a great opportunity, and if the Council would go earnestly into the subject there was no fear of the result.

Mr. Schacht suggested that the scheme would be more likely to elicit general approval if the exhibition were limited to apparatus: educationally, it would answer the whole purpose, and it would be likely to eliminate that element which was considered by some open to objection. The Museum contained almost all the preparations likely to be seen, but very little in the shape of pharmaceutical apparatus.

Mr. Symes thought it would narrow the exhibition too much to confine it to apparatus, and he should prefer the motion being put in its original form. Of course the Committee would have the power of selection.

On being put to the vote the motion was lost by 10 votes to 8.

For—Hampson, Radley, Richardson, Savage, Schacht, Symes, Williams and Woolley.

Against—Atkins, Bottle, Borland, Butt, Gostling, Greenish, Hills, Robbins, Squire and Young.

The President and Mr. Churchill did not vote.

The Proposed Curriculum.

Mr. Schacht then moved the following resolution:—

"That a Committee be appointed to frame, with the assistance of the Solicitor, such modifications of the bye-laws as will give effect as far as possible to the resolutions in respect of the future training of candidates for examination under the Pharmacy Act which were adopted by the Council on March 7, 1883."

It appeared to him that this was the next proper step for the Council to take after having come to the resolution at which it arrived in March last; from that time to the present action had been a little bit trammelled by the possibility of an amended Act of Parliament being passed, but the hopes in that direction had been disappointed, and it was just as well, in view of another session being equally unfruitful in that respect, to see whether the powers the Society already possessed would not allow of making the modifications which had been generally approved. Looking as carefully as a layman's eyes could look at the legal documents, he found nothing in what was proposed antagonistic to a single line of the Charter as far as he understood it. It would be noticed that very early in the declaration of the Charter it said, "For the purpose of advancing chemistry and pharmacy and promoting an uniform system of education of those who should practise the same," and if the charter were followed carefully it would be found that in order to carry out those fundamental ideas certain powers were given to the Council which was to regulate all matters and have power absolutely to formulate and alter the bye-laws subject only to the approval of the Privy Council. In the Act of 1852 this was repeated in almost identically the same language. There was nothing whatever to limit the power of the Council to modify from time to time the bye-laws, which it itself had created, beyond the one provision that every such modification must receive the sanction of the Privy Council. With regard especially to the examinations, it said in one Act of Parliament, "And such other subjects as may from time to time be determined by any bye-law." He did not wish to say that the Council had or had not this or that power, but bringing ordinary common sense to bear upon the subject, he thought with the assistance of the legal adviser the Council would be able to accomplish what was desired under the existing Act of Parliament.

Mr. Symes seconded the motion. He said the Council had decided that it was desirable to carry out certain modifications of the bye-laws, and there was no reason why that record should remain on the books without some action being taken to carry it into effect. The first thing which occurred to his mind was that it might weaken their claim to get an Act of Parliament passed next session, but on the other hand there was no guarantee that an Act of Parliament would be obtained next session, nor was there any certainty that in that Act some of the things which the Council might consider desirable would not be eliminated, therefore, if the Council had power to carry out these resolutions irrespective of a new Act of Parliament—he was not a sufficient lawyer to know whether it had that power or not—it was desirable to do so. Of course any alterations in the bye-laws would have to go before a special meeting of the Society and the Privy Council, but if they had the support of a special meeting it might have a beneficial influence on the future Pharmacy Act, as it might reduce the number of points for which it was necessary to go to Parliament.

Mr. Borland said he had frequently expressed his opinion as to the illegality of the position which some members of the Council took up, and after again looking at the two Acts he still adhered to the same view. The proposition to enforce a curriculum was the point which seemed to him altogether illegal. The Acts of 1852 and 1868 distinctly stated that the examiners were to examine all persons who presented themselves, irrespective of any curriculum or mode or extent of education.

The President remarked that if the discussion were going to take the line which Mr. Borland seemed to indicate, he must ask him to read the whole of the paragraphs he had referred to. It was provided that the examinations should be conducted under such regulations as the Council should lay down

Mr. Borland said that referred to the mode of conducting the examinations. It gave the Council no power in his opinion to impose a curriculum. He was quite agreed that better education should be demanded of the candidates, but in face of these two Acts of Parliament, and the very explicit language to be found there and in the Charter, he did not see how a curriculum could be imposed. It was especially provided that the bye-laws should not be repugnant "to these presents, or to the laws of this our realm." The laws of 1852 and 1868 distinctly stated that any person might present himself to the Board of Examiners. The Council had no power to limit the numbers of candidates by a curriculum. It would be wise, therefore, first to obtain a legal opinion before appointing a Committee to frame new bye-laws, and he would move as an amendment, that the Solicitor of the Society be consulted as to the legal applicability of the resolution respecting the future training of candidates of pharmacy, which was adopted by the Council on the 7th of March.

Mr. Williams thought such an amendment was almost involved in the motion, since it proposed that the Committee should act with the Solicitor, who would not allow them to go far wrong. He was glad to find that Mr. Schacht had seen the wisdom of consulting the Solicitor. He thought with Mr. Borland that the Acts of Parliament did not give power to carry out the resolution which the Council agreed to on a former occasion. Originally he objected to the principle of an enforced curriculum, not that he wished to limit the amount of education required for pharmacists, but because he thought the expense of such a course was more than could be fairly called for from a man who, in after life, was only destined to receive in so many cases so small a remuneration. He had, however, since then seen a great many pharmacists all over the country, and found that his idea was not borne out by what they thought of the matter. The general opinion undoubtedly was that a curriculum was a good thing, and that it would not be to the disadvantage of pharmacists generally that education should be pushed forward. He heard this opinion freely expressed lately at Southport, and last year at Southampton, from which it appeared that the trade was not quite so bad as some people would like to make out, because it seemed the opinion of the leading men in pharmacy that it was not only not a bad thing, but a good thing to increase the cost of pharmaceutical education in this way. He was glad to find that this was the view of the majority of the trade, and hoped experience would not prove that they were wrong. On this ground he should have the greatest pleasure in supporting Mr. Schacht's motion, now that it was combined with a reference to the legal adviser, because that seemed to him quite necessary. He should be very sorry for a committee to draw up bye-laws which, when they came to be enforced were found to be illegal.

Mr. Borland said he would withdraw his amendment, as he found Mr. Hampson was about to move one which would cover the same ground, and which he would be happy to second.

Mr. Hampson then moved as an amendment—

"That increased statutory powers be obtained before giving effect to the resolutions in respect of the future training of candidates for pharmacy adopted by the Council on March 7, 1883."

He did not wish to re-open a discussion on the question itself, but accepted the vote of the Council, but still he thought he might ask the question, Why this unnecessary haste? what was the object of pressing on this matter, in his view, so unwisely? The two Government assessors did not agree with the proposals—one of them at any rate distinctly did not—and if the proposed new bye-laws were submitted to the Privy Council, the opinion of those gentlemen would no doubt be taken as to the desirability of sanctioning them. He remembered, years ago, when he first entered the Council, several bye-laws were proposed, which ultimately received the sanction of the Society, which he opposed, because he did not like to interfere unduly with the educational arrangements of any person who wished to enter the trade. At that time he remembered very distinctly the Solicitor stating that the Society had not the power to make bye-laws or regulations of this kind; yet Mr. Schacht wished a committee to be appointed to propose the most radical changes in the mode of education, and to call in the Solicitor to help frame these regulations; he did not say to ask his opinion whether they were legal. The Solicitor would frame the bye-laws, no doubt, and they would be presented, and if Mr. Schacht manifested his usual eloquence and persuasive power, no doubt they would be accepted. For his part, he did not want to break the law, and he believed the Act of Parliament was already strained to the utmost. Was it wise when the Council was going to Parliament for a new Pharmacy Bill to give the Government the impression that it was not worthy of trust? He believed this would be the result if the Council endeavoured to override the Act of Parliament. How was it that Mr. Schacht and others when labouring in the Parliamentary Committee on the new Pharmacy Bill thought it necessary to include full provisions for carrying out the important educational change they so much desired if they already had power under the present Act? He certainly thought a curriculum was desirable, but who had asked for the organic change? The Government assessors had not asked for anything of the kind, they did not say the examinations were insufficient—they said just the contrary; the public had not demanded it, the Privy Council had not demanded it, nor had the candidates; there was no necessity to urge the matter unduly forward, and he was quite sure that by doing so the Council would weaken its influence when it went to Parliament for a new Bill.

Mr. Williams did not see how the Solicitor could be consulted until he knew what he was to be consulted about.

Mr. Greenish said he recollected on one occasion the Solicitor stating most distinctly that the Society could not make these changes under the present Act of Parliament. He believed he had attended every Committee meeting since, and he had no recollection of the Solicitor having expressed any different view.

The President said the solicitor said they could not be carried out without certain provisoes.

Mr. Greenish said the remark of the Solicitor was, "If you wish it, gentlemen, here I am to obey your instructions." But nothing could be more emphatic than his opinion that under the present Act of Parliament the Society could not make these changes.

The Vice-President said the motion was exceedingly simple, and it was quite obvious the Society could only do that which was legal, and he hoped they only wished to do so. They would know what was legal by consulting their legal adviser. He should not think of taking the responsibility of saying what was legal, but should, as he always did, throw the responsibility on a man who understood the subject. An amended Act of Parliament might be very remote, and this matter being so important why should it be referred to the ides of March, seeing it had received the sanction of the Council almost unanimously, and, as Mr. Williams had said, had received the approval of the whole country?

Mr. Williams said he should hold the Solicitor responsible. His duty would not be to act as the clerk of the Committee, but to advise it how far it could go.

Mr. Young said when this subject was discussed in March he voted for the resolution; but on the point of legality or illegality he did not feel able to give an opinion, and hoped the Council would be advised whether the proposed change was legal or not. If the motion were slightly altered it appeared to him it would be unobjectionable, and the Council certainly should not consent to anything as to the legality of which there was any doubt. The first thing would be to consult with the Solicitor; not to go to him and say we have appointed a Committee to meet you and frame these bye-laws, but to take his advice and report. Mr. Schacht seemed to assume that there was power to do this, whilst other gentlemen had considerable doubts on that point.

Mr. Bottle said that some few years ago the question might fairly have been raised whether there was power to make such modifications in the bye-laws as to give effect to the resolution of March last, but all doubt had been removed from his mind by the fact that the Society had already made bye-laws on similar lines affecting the examinations; for instance, it had provided that no person should be admitted to the Major or Minor examination who had not attained the full age of twenty-one years. It might be said that it had no right under the Act of Parliament to define that a man should be twenty-one years old, and again, "unless he shall satisfy the examiner that for three years he had been registered or employed as an apprentice or student." Therefore, having travelled in that direction, and having obtained the concurrence of the Privy Council to such a wide interpretation of the Act of Parliament, he took it the Council was quite at liberty to go further and impose a curriculum. He was, therefore, quite prepared to support Mr. Schacht's motion, and would even go further and suggest that there were other alterations in the bye-laws which might be made at the same time.

Mr. Schacht, in reply, said Mr. Borland seemed to rely on the provision in the Act of 1852, that the Board of Examiners was compelled to examine every candidate who presented himself without any sort of limitation; but it did not run so in the Act itself. In the 8th section, it said that the Examiners "shall respectively have full power and authority and are hereby authorized and empowered to examine all persons who shall present themselves for examination under the provisions of this Act." That gave full power to the Council to make its bye-laws which should constitute the provisions of the examination. Therefore, it had ample power to do what it pleased. Referring again to the Charter, it said; "And we do further will and declare, that it shall be lawful for the said Council, to the best of their judgment and discretion, to make and establish such bye-laws as they shall deem proper and necessary for regulating the affairs of the said Society; and also the number and decriptions of its officers; and also the times, place and manner of examining candidates for admission." The time, place and manner, were all made matters of bye-law, and that brought the proposed modification thoroughly within the scope of its powers. There was, therefore, full power to provide that a candidate should not come up until he was twenty-one, and that he should not come until he had spent three years in a pharmacy, and in his opinion the same clause gave power to say he should not come up until he had passed a curriculum.

Mr. Greenish remarked that in the opinion of the Solicitor some of the bye-laws really over-rode the Act.

The amendment being put was lost by 13 votes to 4, viz.:—

For—Borland, Churchill, Greenish, Hampson.

Against—Atkins, Bottle, Butt, Carteighe, Gostling, Hills, Radley, Robbins, Savage, Schacht, Squire, Symes, Woolley.

Mr. Williams did not vote.

The motion was then put and carried.

The following gentlemen were appointed the Committee:—The President and Vice-President, with Messrs. Bottle, Butt, Hills, Schacht, Symes, Woolley and Young.

Mr. Hampson was nominated but declined to serve.

Assistant Lecturer on Chemistry.

It was unanimously resolved that Mr. Dunstan be appointed Assistant Lecturer on Chemistry and Physics for the ensuing year at a salary of £50.

The late Mr. Atherton.

The President reminded the Council that Mr. Atherton died at Tunbridge Wells on September 13 last. Mr. Atherton had not only been a member of the Council, but Local Secretary of the British Pharmaceutical Conference at its meeting at Nottingham, probably one of the most successful meetings the Conference had ever had, and his sympathy and activity on that occasion earned for him the gratitude of every pharmacist present. It was only becoming, therefore, that the Council should record its sense of the loss which the Society had sustained by the death of Mr. Atherton, and with the sanction of his colleagues he would write a letter of sympathy to the widow.

A resolution to this effect was carried unanimously.

A letter was read from the Secretary of the Chemists and Druggists' Trade Association, soliciting that an opportunity should be afforded to the Committee of that body of conferring with the Council of the Society on the subject of the proposed Pharmacy Acts Amendment Bill. The President and Secretary were instructed to arrange a convenient time for such a meeting.

EVENING MEETING.

Wednesday, October 3, 1883.

The first Evening Meeting of the Session 1883-4 was held on Wednesday, October 3, at half-past eight o'clock. The chair was taken by the President, Mr. Michael Carteighe, and the room was crowded to its utmost capacity.

After a few words from the President as to the business of the evening, he called for the—

Report on the Chemistry and Pharmacy Class.

Professor Redwood said that with regard to the past session he was fully justified in saying that good work had been done, and that there had been no falling off, but rather an improvement in the condition of the School. Speaking specially of his own class he could say conscientiously that he had never had a more orderly and attentive set of students than those of the last session. That they had been industrious and fairly successful in their studies would appear from the list of prizes and certificates; but before reading the names of the successful competitors, he must say a word as to the future. This was an age of rapid progress; the old slow system of travelling had been superseded by one of a more expeditious character, and the change thus effected seemed to have influenced other operations besides those of locomotion. Nowadays they had to go over the ground more rapidly than formerly, and thus the course of instruction which used to occupy ten months was now compressed into five. This, of course, made the work much harder, but owing to the principle of division of labour, it was capable of accomplishment, and even of doing more work than was formerly done; practical dispensing being now included in the programme. A class for teaching this subject had been organized under the management of Mr. Dimmock, and during the ensuing session he was glad to say that Mr. Joseph Ince would be associated with him. Again, with reference to his own lectures on physics and chemistry, he had hitherto had the assistance of Mr. Dunstan, and it was proposed that for the future Mr. Dunstan should take a more prominent part in the teaching. That day Mr. Dunstan had been appointed by the Council Assistant Lecturer on Physics and Chemistry, and would co-operate with him in the lectures and demonstrations, not only at the lecture table in that hall, but also in supplementary lectures which it was proposed to give in the afternoons. It would be seen, therefore, that they were endeavouring to make arrangements for increasing and extending the teaching power of the institution. Professor Redwood concluded by reading the names of the successful students.

The following is a list of the awards of medals and certificates to students in this class:—

FIVE MONTHS' COURSES.

FIRST COURSE.

Bronze Medal	David Rees.
Certificates of Merit	Edward Baily. Charles Ranken. Sidney Phillips. Francis Ransom. Thos. Southall Dymond. William Edward Crow. James Haddock. David Low. Edward Ernest Sewell. Arthur Pumphrey.

SECOND COURSE.

Bronze Medal	Lewis Walter Hawkins.
Certificates of Merit	John Chinery Wiggin. Ernest James Reynolds. John Rodman Mowatt.

SESSION. TEN MONTHS.

Silver Medal	David Rees.
Certificates of Honour	Francis Ransom. Edward Baily. David Low.
Certificates of Merit	Charles Ranken. William Edward Crow. Thos. Southall Dymond.

The following are the questions that were set for these examinations:—

FIRST COURSE.

BRONZE MEDAL AND CERTIFICATES.

Hours—Ten till Two.

1. What physical force does the weight of a body represent?
2. What are the points in the construction of a balance for estimating weight upon which the accuracy of the estimation chiefly depends?
3. What is the meaning of the term "*mechanical equivalent of heat*," and what is the mechanical equivalent of heat as expressed in "*foot pounds*," according to either the Fahrenheit or Centigrade scale?
4. What is the latent heat of the vapour of water respectively at 112°, 212°, and 312° Fahr.?
5. Briefly explain the undulatory theory of light.
6. In a galvanic battery composed of zinc and copper plates excited by an acid, which is the positive and which the negative terminal plate within and also without the acid?
7. Name the non-metallic chemical elements.
8. Describe the Pharmacopœia process for the preparation of "*Acidum phosphoricum dilutum*," giving full details of the mode of operating, the objects contemplated, and the means by which they are accomplished.
9. Name the oxygen acids of phosphorus, and show how they are produced from the oxides.
10. Describe the production of calomel and corrosive sublimate, and briefly explain processes which were formerly and those which are now adopted for the preparation of calomel.
11. Name some of the principal hydrocarbons of the fatty group, giving their typical formulæ.
12. Give the composition of cyanogen, and describe its mode of production and its characters and tests.

SECOND COURSE.

BRONZE MEDAL AND CERTIFICATES.

Hours—10 *till* 2.

1. What are the values respectively of the gram and kilogram, expressed in grains? What are the relations existing between the gram, decagram and centigram?
2. Describe and explain the method of taking the specific gravity of paraffin.
3. What is the weight of a fluid ounce of sulphuric acid, B.P.?
4. Describe the construction and explain the principle of action of the siphon.
5. Explain what is meant by the transmission of heat. Name a solid that possesses the property of transmitting heat in a high degree, and another that possesses the property in a low degree.
6. What is the composition and the assumed constitution of borax? What are its sources, and how is the borax of commerce usually prepared? Describe some of the properties of borax.
7. Describe the process by which zinc is obtained from its ores, the properties of the metal, and the different methods by which the oxide may be prepared.
8. Describe the transformations which may be effected between the members of the ligneous, saccharine, and amylaceous group of bodies, and the properties of the products.

SESSION.

SILVER MEDAL PRIZE AND CERTIFICATES.

Time allowed, three hours.

1. Define the meaning of the terms "inertia" and "force" as used by physicists.
2. State in general terms the methods adopted for determining the specific heats of bodies, and explain the relation of the specific heats of bodies to their atomic or molecular weight.
3. Explain the principles upon which the process of spectrum analysis is founded, and the general nature of the results obtained by this process.
4. What is meant by the statement that certain substances, mostly liquids, deviate or turn the plane of vibration of a ray of polarized light from its normal direction? Describe a simple arrangement and construction of apparatus for showing this result, and explain the action of each part of such apparatus.

Time allowed, three hours.

5. Describe the ammonia process for the production of carbonate of soda. State what the impediments were to its general adoption when first introduced, and what circumstances have since tended to favour its success.
6. Describe the production of lead from its ore; the method of eliminating silver from lead by Pattinson's process, and also by cupellation; the properties of the metal and also of its oxides, pointing out the distinction between litharge and massicot.
7. Explain the circumstances under which water may become contaminated with lead by remaining in contact with the metal, and the conditions under which such contamination may be prevented.
8. Describe the process for the artificial production of urea. State the compositions respectively of urea, cyanuric acid, and cyanic acid, and explain the manner in which these may be produced one from another by successive transformations.

REPORT ON THE BOTANY AND MATERIA MEDICA CLASS.

Professor BENTLEY was next called upon to report upon the Materia Medica and Botany Class. He said it was unnecessary for him to do otherwise than do so very briefly, because he could only repeat that which he had said on so many occasions previously. All he would say was that in diligence, intelligence, behaviour, and everything which was the model of a student his students of last year were types. He was also glad to say that in point of numbers the class was the best he had had for many years. He would not go into the honours question further than to say that those gentlemen whose names appeared on the list of prizes awarded by the Council on his recommendation were thoroughly entitled to the distinctions awarded to them. No certificate of merit, honour, or medal, or any kind of award was given in that institution without a high standard of excellence being attained. Having read the list of names he concluded by saying he was extremely gratified with his class of last year, which was of a high average merit, and he was quite sure that those who had received distinctions would take an honourable place in the ranks of pharmacy of the future.

The following is a list of the awards of medals and certificates to Students in this class:—

FIVE MONTHS' COURSES.

FIRST COURSE.

Bronze Medal	William Edward Crow.
Certificates of Merit	Edward Baily. David Low. William Lloyd Williams. Sidney Phillips.

SECOND COURSE.

Bronze Medal	John Chinery Wiggin.
Certificate of Merit	Ernest James Reynolds.

SESSION. TEN MONTHS.

Silver Medal	Edward Baily.
Certificates of Honour	Francis Ransom. William Edward Crow. William Lloyd Williams. Equal { Charles Ranken. Equal { David Low. Edward Ernest Sewell.
Certificates of Merit	Thos. Southall Dymond. Arthur Pumphrey. John Chinery Wiggin.

The following are the questions that were set at these examinations:—

FIRST COURSE.

BRONZE MEDAL AND CERTIFICATES OF MERIT.

Hours from 10.30 *till* 2.

1. What is Chlorophyll, where is it found, and what is its action in the plant?
2. Describe the internal structure of an Acotyledonous stem.
3. Distinguish between Epiphytes, Parasites and Saprophytes. What are the distinctive characters of roots and stems?
4. Define the following:—Thalamus, Receptacle, Loculicidal, Septicidal, Gymnospermous, Germinal Vesicle, Foramen, Arillus, Caruncule and Albumen.
5. Describe the botanical and geographical sources of Ammoniacum. What are its general and chemical characters, and enumerate its official preparations?
6. Enumerate the official plants of the order Rutaceæ. What are the botanical and geographical sources of Buchu leaves? Describe their botanical, general, and chemical characters.
7. How is Balsam of Tolu obtained. What are its botanical and geographical sources, its general and chemical characters, and its official preparations? Explain what you mean by a Balsam.

SECOND COURSE.

BRONZE MEDAL AND CERTIFICATES OF MERIT.

Hours from 10 *till* 1.30.

1. Describe sclerenchymatous cells, hyphal tissue, and sieve tubes.
2. Describe the structure of epidermal tissue.
3. Define the following terms:—(*a*) pinnate pinnatifid, conduplicate, as applied to leaves; (*b*) panicle, umbel, cyme, as applied to the inflorescence; (*c*) and exserted, didynamous, gynandrous, and syngenesious, as applied to the stamens.
4. Describe the structure of the embryo, and explain the process of germination.
5. What are the botanical sources of bitter and sweet almonds? Describe their general and chemical characters. Enumerate the official plants of the Rosaceæ.
6. What are the botanical and geographical sources of Liquid Storax? How is it obtained, and what are its general and chemical characters? What is a Balsam?
7. What official drugs are derived from the Gentianaceæ? Enumerate their official preparations. Describe the physical and chemical characters of Gentian Root.

SESSION.

SILVER MEDAL AND CERTIFICATES.

Hours from 10 *till* 1.

BOTANY.

1. What are aleurone grains, crystalloids, and globoids, and where are they commonly to be found?
2. Describe the internal structure of aerial and submerged leaves.
3. Define the terms acropetal, centripetal, and centrifugal, as applied to the inflorescence, and describe the following kinds of inflorescence: — Raceme, corymb, spadix, capitulum, scorpioid cyme, and verticillaster.
4. Describe the following kinds of fruits:—Legume, achenium, etærio, drupe, capsule, pyxis, cremocarp, and siliqua. What is a pseudocarp?
5. Distinguish between the Rosaceæ and Ranunculaceæ, Compositæ and Dipsacaceæ, Labiatæ and Scrophulariaceæ, Iridaceæ and Amaryllidaceæ.
6. Give the essential characters of the following natural orders, and enumerate their official plants:—Papaveraceæ, Rutaceæ, Umbelliferæ, Oleaceæ, Polygonaceæ, and Liliaceæ.

SILVER MEDAL AND CERTIFICATES.

Hours from 2 *till* 5.

MATERIA MEDICA.

1. Describe the method of obtaining Opium. State the characters of good Opium, and enumerate its official preparations.
2. What are the botanical and geographical sources of Peruvian and Savanilla Rhatany? Show how they may be distinguished from each other; and mention the active constituents, medicinal properties, and official preparations of Rhatany.
3. What are the botanical sources of annulated, striated, and undulated Ipecacuanhas? Describe their general characters, and enumerate the official preparations in which Ipecacuanha is contained.
4. What are the botanical and geographical sources of the official Santonica, and describe its general and chemical characters? Enumerate the official plants of the Compositæ.
5. What are the botanical sources of the official Jalap and Tampico Jalap, and how would you distinguish the official Jalap resin from the resins of Tampico Jalap, Scammony, and Guaiacum?
6. Enumerate the official plants of the Euphorbiaceæ, and mention the parts or products of each which are directed to be employed in the British Pharmacopœia. Describe the general and chemical characters of Cascarilla Bark, and state its official preparations.

Report on the Practical Chemistry Class.

Professor Attfield said he had already presented two reports to the Council, one on the School, and one on the results of the examination; he would merely state as briefly as possible the leading points of those reports. First as regards the numbers they had had a better session than for several years past, and secondly the average period for which the pupils had studied had been longer than for twenty years past. No less than twenty-eight of the pupils studied for the whole session of ten months. The number was no doubt small, but it must be satisfactory to all who were interested in carrying on the work of pharmacy that the number of men who had taken advantage of the instruction offered by the Society was now increasing every year, and that the period of study was also increasing. As to the whole class, he had to report as usual, that the attendance was good, the diligence unexceptionable, and the progress satisfactory, while the conduct of the students had been without a flaw in any one case. One feature of the session had been that the students had increased their period of study, another was that they had never held a better all-round average of ability. On the one hand they had no third-class men, but he was bound to say on the other hand they had not had men of exceptional brilliance; which perhaps might explain how it was that no pupil of the School had succeeded this year in taking the Pereira Medal. After reading the names he said he regretted that Mr. Crow was not present to receive the silver medal, but his absence was very satisfactorily accounted for by the fact that he had been selected by the Secretary of State for the Foreign Department to occupy an honourable position in pharmacy in Hong Kong and had already left England.

The following is a list of the awards of medals and certificates to students in this class:—

Session. Ten Months.

Silver Medal	William Edward Crow.
Bronze Medals	Thos. Southall Dymond. David Rees.
Certificates of Honour	Charles Ranken. John Chinery Wiggin. William Lloyd Williams. Bernard Keene.
Certificates of Merit	Edward Baily. Francis Ransom. David Low. Edward Marsh. James Burden Barnes.

The following are the questions that were set in this examination:

July 13th and 14th, 1883.

(*Books and Memoranda permitted.*)

Standard number of Marks, 100.

FIRST DAY.

Hours 10 *to* 5.

1. Make a qualitative analysis of the accompanying "Mineral Water," and give the names of the salts you detect.

2. Report on the sample of "Syrup."

SECOND DAY.

Hours 10 *to* 3.

3. Is there any tin in the "Soup" supplied to you?

4. What substances are present in the "Teething Powder?"

Note.—*Manipulation as well as results will be scrutinized.*

The President then distributed the prizes to the successful students.

The Herbarium Prize.

Professor Bentley next made his report as to the Herbarium Competition, in which a medal and certificate were awarded as follows:—

Bronze Medal	Thomas Stephenson.
Certificate of Merit	Frederick Miller.

The Council Examination Prizes.

The President then explained the nature of the Council Prizes, and Pereira Medal, and called upon Mr. Sidney Plowman to report with regard to them.

Mr. Plowman said thirteen candidates had presented themselves for examination, but he regretted to say that after a long and anxious consultation with his colleague Mr. Southall they had been unable to recommend that the Pereira Medal should be given. But two gentlemen had achieved sufficient distinction to entitle them to the Council Prizes; their names were W. L. Williams, to whom the Silver Medal was awarded, and Edward Baily, who was to receive the Bronze Medal. He desired to say that those two gentlemen displayed great merit, but not quite such as would entitle them to the Pereira medal, which was the highest prize of the pharmaceutical year.

These prizes were therefore awarded as follows:—

Pharmaceutical Society's Medal (*Silver*); *and Books value £3, presented by Mr. T. H. Hills.*

William Lloyd Williams.

Pharmaceutical Society's Medal (*Bronze*); *and Books value £2, presented by Mr. T. H. Hills.*

Edward Baily.

The following are the questions that were set for this examination:—

BOTANY AND MATERIA MEDICA.

Time: 10 *a.m. to* 1 *p.m.*

In framing Answers, Candidates should not enlarge upon the Questions, but should confine themselves to giving, as briefly and clearly as they can, the information required.

BOTANY.

1. Give instances of irritability in the organs of plants, and describe any of the motile mechanisms connected therewith.

2. What is meant by suppression, augmentation or deduplication of the parts of a flower? Give instances.

3. What is callus? Explain its formation.

4. Describe the inflorescence and flowers of the Scotch Fir, and explain how fertilization is effected. Mention the peculiarity of the embryo.

5. Give the morphology of the sporangia of ferns.

MATERIA MEDICA.

1. What is the Botanical origin of Scammony, and how is it collected? What are the adulterations, and how may they be detected? How may it be distinguished from resin of Scammony?

2. What is the Botanical source of Duboisin, and what is its physiological effect?

3. In what part of "India" is Cinchona Bark cultivated? What species and varieties, and what modes of cultivation are best adapted for the production of Quinine yielding barks? Also what species are desirable for pharmaceutical use?

4. What is Resorcin, and what can you mention as to its uses and properties?

CHEMISTRY.

Time: 2 *to* 5 *p.m.*

1. What is the weight of 150 c.c. of the vapour of chloroform at 80° C. and 720 mm. pressure?

2. Give the formulæ and briefly describe the properties and methods of preparation of the following:—Phenol, Croton Chloral (so-called), Picric Acid, Salicylic Acid, Thymol, Ethyl Bromide, Apomorphia.

3. What is fermentation? Describe any varieties with which you may be acquainted.

4. Describe the action of an aqueous solution of hydrofluoric acid upon glass. Describe and illustrate, with equations, a process for obtaining pure silica from flint.

5. Describe briefly processes for the isolation of the following metals:—Aluminium, Magnesium, Silver, Lead, Potassium, Mercury and Calcium. Mention any evidence which can be brought forward to prove the existence of Ammonium.

6. What is the meaning of the following terms:—Homologous series, Isomerism, Allotropy, Isomorphism, Dimorphism, Actinism, Atomicity? Illustrate your meaning by examples.

The Jacob Bell Memorial Scholarships.

Mr. Taylor, being next called upon to report upon the competition for the Bell Scholarships, said that four years ago when this duty first devolved upon him he had expressed some regret that only 11 candidates competed. The following year the numbers rose considerably; in 1881 there were 18; in 1882 there were 20; and this year he was glad to say there were 25. He believed this satisfactory increase was due to the very pertinent remarks made last year by his colleague, Mr. Plowman, himself an old Bell scholar. He need not enlarge on the value of the scholarships, and he trusted that the number of competitors would be at least maintained in coming years. The examination had been conducted by Mr. Ekin and himself, and though they had no difficulty in selecting the two best men, he must say a word of encouragement to the two who came next, whose mottoes were "Aude sapere" and "Spero," who had done so well that he hoped they were young enough to try again.

The names of the successful candidates are—

Fraser McDiarmid
and
Robert Wynn Charles Pierce.

The questions that were set for this examination were as follows:—

Time allowed: *Two hours* (4 *to* 6).

CHEMISTRY AND PHARMACY.

1. Show by an equation what the result is of the action of diluted Nitric Acid on Copper.

2. What are the characteristics in common of the group of elements known as the Halogens, and whence the term Halogen?

3. How are White Precipitate and Red Precipitate prepared?

4. In what state does the Iron exist in freshly prepared Mist. Ferri Co., and what change, if any, occurs on keeping?

5. How much Oxygen and Hydrogen by weight and measure are required to form water, and what is the measure of the resulting vapour?

BOTANY.

1. Give the characteristics of any Natural Order with which you are well acquainted.

2. In what does a Dicotyledonous vary from a Monocotyledonous stem?

Time allowed: *Three hours* (12 *to* 3).
In awarding marks the neatness and legibility of the writing will be taken into account.

LATIN.

1. Translate in English:—

"Hoc erat, alma parens, quòd me per tela, per ignes,
Eripis? ut mediis hostem in penetralibus, utque
Ascaniumque, patremque meum, juxtàque Creüsam,
Alterum in alterius mactatos sanguine cernam?
Arma, viri, ferte arma: vocat lux ultima victos.
Reddite me Danais; sinite instaurata revisam
Prœlia. Nunquam omnes hodie moriemur inulti."

2. Parse *eripis, mactatos, reddite, sinite.*

3. Give the present infinite and supine of *emico, excutio, repeto, requiro.*

4. Translate into Latin:—

"Water being added it crumbles to powder."

ENGLISH.

1. Write a short essay on London, or any City of importance.

2. Parse the following lines:—

"He who fights and runs away
Will live to fight another day."

3. Give examples of Transitive and Intransitive verbs.

ARITHMETIC.

[The working of these examples, as well as the answers, must be written out in full.]

1. What are the standards of weight and capacity in England, and how are they fixed?

2. Explain the "metrical system" of weights and measures.

3. Reduce 2 weeks, 5 days, 7 hours, 27 minutes to the fraction of a day; and $2\frac{1}{2}$ cwt. to the fraction of 2 tons, 12 lbs.

4. Add $5\frac{1}{2}$ cwt. to 3·125 qrs.; and reduce the sum to the decimal of a ton.

FRENCH OR GERMAN.

The candidate is at liberty to choose either French or German, and is not required to show a knowledge of both. Marks will only be awarded for one.

FRENCH.

Translate into English:—

"Si je garde quelque empire sur ma destinée, je ne serai jamais à Paris qu'un oiseau de passage. Cette vie tumultueuse, cette distraction sans trêve, ces gens toujours debout, toujours en l'air, toujours gais, toujours fous, me font entendre aux oreilles un bruit de grelots qui m'étourdit et me gêne. Je cherche mon pauvre moi et je ne le trouve plus. Quand je suis arrivée, j'ai cru tomber dans un carnaval dont j'attendais toujours la fin, mais inutilement, car il ne finit point, et c'est ici le fonds même de sa vie. Tous ces gens vont, viennent, s'agitent, s'empressent, se moquent et meurent tout à coup. La mort à Paris m'étonne toujours; elle ne m'y parait pas naturelle. Tout est si factice à l'entour que ce détail y choque comme un accident dans une fête. C'est la seule loi réelle de la vie qu'on n'y puisse oublier, parce qu'elle s'impose. Il me semble qu'on y méconnaît toutes les autres. L'accessoire, le luxe, l'ornement, la broderie, sont le principal et le tout. On vit de gâteaux, et point de pain." (Octave Feuillet.)

GERMAN.

Translate into English:—

"Verona die alte weltverühmte Stadt, gelegen auf beiden Seiten der Etsch, war immer gleichsam die erste Station für die germanischen Wandervölker, die ihre kalte nordische Wälder verlieszen, und über die Alpen stiegen, um sich im goldnen Sonnenschein des lieblichen Italiens zu erlustigen. Einige zogen weiter hinab, Anderen gefiel es schon gut genug am Orte selbst, und sie machten es sich heimatlich bequem und zogen seidne Hausgewänder an, und ergingen sich friedlich unter Blumen und Cypressen, bis neue Ankömmlinge, die noch ihre frischen Eisenkleider anhatten, aus dem Norden kamen und sie verdrängten,—eine Geschichte die sich oft wiederholte, und von den Historikern die Völkerwanderung genannt wird. Wandelt man jezt durch das Weichbild Verona's so findet man überall die abenteuerlichen Spuren jen' Tage, so wie auch die Spuren der älteren und späteren Zeiten." (Heine.)

The Inaugural Sessional Address.

The President having distributed these prizes, an Address was delivered by Michael Foster, M.A., M.D., LL.D., F.R.S., Professor of Physiology in the University of Cambridge. The Address is printed at the commencement of the present number. At its conclusion,

Sir Frederick Abel, in proposing a vote of thanks to Professor Foster, said there could be no one in the assembly who had listened with greater interest or pleasure to the words of wisdom which he had uttered. Although he (Sir F. Abel) had not that vast experience as an examiner which Professor Foster might claim, he had had a large experience years ago as an examiner. The unfortunate victims who came before him were of a different class altogether from those he now addressed, or to whom Professor Foster had referred. It had been his painful duty to examine youths on entering the military schools, to examine them while passing through the schools, on leaving, again when as officers they re-entered the schools, and when they again passed out, and again to submit them to the same process when passing to a higher grade in the service; and from his experience he could re-echo all that had been said as to examinations and as to many of the evils which attended them. One point struck him very forcibly, viz., that the teacher was the best possible judge of the powers and capacities of those studying under him. Nevertheless, in the wisdom which guided one large branch of the service it was held desirable not to appeal to the men who should best know the qualifications of those who had been educated there, and it was considered better to submit those men to the torture of unbiassed examiners, as they were called, who were accustomed by long practice to put the questions which men should answer in the form in which they were least likely to answer them. Consequently, in many cases the unready man, whom the teacher would put forward as the best man of his class, came out at the bottom. It was true that much of this evil was guarded against by the zealous efforts of the teachers themselves. He believed in examinations, and when years ago he was a teacher, he used to endeavour to follow in the steps of one of his great masters, Faraday, whom he had the honour of succeeding at Woolwich, and who used so to interlard his lectures with questions that the lecture might almost be considered an examination. And he did it in such a pleasant manner as never to discourage even the most backward. He remembered his asking on one occasion, "Mr. So-and-So, what will happen when I plunge this taper into this bottle of oxygen?" The youth scratched his head and said, "It will go out, sir." "*Not precisely,*" said Faraday, as if the answer was almost correct. The characteristic of a true teacher was that he not merely demonstrated a fact, but continually sounded his pupils to see what knowledge they had acquired.

Professor H. A. Armstrong, F.R.S., seconded the motion, and desired to thank Professor Foster for the important essay on examinations which he had given them. As a teacher and an examiner, although with but short experience as yet, he could vouch for the truth of what had been said. With reference to the course of study carried on in that institution and elsewhere he should like to remark that what was required in his opinion in all such schools was not so much that a man should gain a more or less superficial knowledge—as it must be from the time they could devote to the work—of several subjects, but that a few subjects should be so well studied that the power of carrying on study afterwards might be acquired. All who had been a few years out of their student's course knew that what they had learned since was very great indeed, as compared with what they learned during their student's career. It was the habit of work which was the most valuable thing learned.

The resolution was carried with acclamation, and briefly acknowledged by Professor Foster.

Presentation of the Hanbury Medal.

The President said the next part of the programme was of a different character from the first, which had been more or less connected with the work of students and examinations. He now had to perform, in conformity with a trust which devolved on the Council of the Pharmaceutical Society, another duty of a very agreeable character, that of handing over one of the greatest honours which could possibly be offered in the domain of the particular branch of science included in the trust to a gentleman who was selected *without examination.* Before, however, handing over the Hanbury Medal, it would be necessary to state the circumstances under which it was founded. Mr. Daniel Hanbury, a distinguished member of the Society, and at the time of his death in 1875 probably one of the greatest, if not the greatest pharmacologist in the world, died at a comparatively early age, far too early for the work he might have accomplished. He had done so much work for the advancement of pure science, especially that of pharmacology, that it was thought only fit and proper that some memorial of him should be established in connection with pharmacy. Accordingly, a limited subscription was suggested and immediately responded to; the result was, that shortly after his death, a fund was raised, and the influential Committee that had charge of it, decided that the best way of perpetuating Daniel Hanbury's memory would be to award a gold medal biennially for high excellence in the prosecution of original research in the chemical and natural history of drugs. There was no limit as to country or place. It was a medal open to all the world. A trust-deed was drawn to meet the resolutions of the Committee and the Pharmaceutical Society was made the trustee. It was also decided that the adjudicators of the Medal should be the Presidents for the time being of the Linnean, Chemical and Pharmaceutical Societies, the President of the British Pharmaceutical Conference, and one pharmaceutical chemist, who should, prior to each award, be appointed by the Presidents of the Pharmaceutical Society and Conference. The first award was made to a distinguished German, who was Daniel Hanbury's coadjutor and friend, being the joint author with him of one of the works by which he was best known, the 'Pharmacographia,' viz., Professor Flückiger. This year the judges, having taken the matter into consideration and considered the claims of American, European, British and Irish competitors for the Medal, came to the conclusion that the person of all others deserving the award on this occasion was an Englishman,

MR. JOHN ELIOT HOWARD.

He held in his hand the official award, which he need not read, signed by Sir John Lubbock, Dr. Perkin, Dr. Attfield, Henry B. Brady and himself. He regretted that owing in the one case to domestic affliction, and in the others to accidental circumstances, Sir John Lubbock, Dr. Perkin and Mr. Brady were not able to be present, but they desired him to express to Mr. Howard their extreme regret at not being able to assist at this award. It would ill become him to attempt to enumerate Mr. Howard's qualifications, but he might just say that his scientific work had been very largely, almost exclusively, in the chemistry and natural history of one single bark, the cinchona bark, the importance of which everyone present thoroughly recognized. He had before him three volumes with which Mr. Howard was more or less identified, and in one of them there were illustrations and a description of no less than forty-two species of cinchona. These, with many others, had been studied by Mr. Howard for many years at an enormous expense, for the benefit not only of those who were interested in pharmacology, but all mankind. For having regard to the value of the barks themselves, and the alkaloid quinine, it would have been impossible for the Government of India, and private growers of bark in Ceylon, to have carried on their operations with satisfaction and certainty if they had not been assisted from first to last by Mr. Howard, and the skill he had brought to bear upon the whole subject. Without saying more he would ask Mr. Howard to receive this medal and offer him most cordially not only his own respectful congratulations, but those of every pharmacologist in the world.

Mr. J. E. Howard said words would fail him to express the deep gratification which he experienced in receiving this proof of the appreciation of those for whose judgment he had so great respect. With regard to whatever he might have done in the way of scientific labour, he must say he considered himself still a student, and though he was happy to say he had not been subjected to an examination, he was a member of that Society. He was particularly gratified at receiving this medal, because it reminded him of the great assistance and sympathy he had received from the illustrious man in whose honour it was founded. His own love for science had sprung up spontaneously, and he followed it, not with any expectation of reward, but simply from the pleasure it afforded him. But he was induced and helped forward to publish the results of his observations more by Mr. Hanbury than any one else, and it was therefore to him very specially and exclusively that in looking back he might say he owed whatever advantage might have accrued to himself or others—from the publication of his researches. At that late hour he ought not to detain the meeting longer, though he should have liked to say a few words for the encouragement of his fellow students. He trusted they would all find the same interest that he had found in the study of the works of the Great Creator, and that they would all feel that which he would particularly seek to impress upon them, that there was no real contradiction between Christianity and Science. For himself he considered it the highest honour to be a Christian.

W. Johnstone.—(1) *Rhamnus catharticus*. (2) *Clematis Vitalba*. (3) *Artemesia vulgaris*. (4) *Odontites rubra*.

Biberon.—*Viburnum Lantana*.

R. S. P.—Section xv. of the Pharmacy Act, 1868, enacts that "any person who shall take, use, or exhibit the name or title 'pharmaceutical chemist,' 'pharmaceutist,' or pharmacist,' shall be liable to pay a penalty of £5.

E. V. Z.—In all English colonies where Pharmacy Acts are in force, we believe without exception, the Minor qualification is accepted as entitling to registration without further examination. In the United States this is not generally the case.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, on Wednesday, October 3.

Present—Mr. J. Williams, President, in the chair; Professor Attfield, Messrs. S. R. Atkins, Borland, Hills, Naylor, Radley, Schacht, Taylor and Young; Mr. Ekin (Treasurer), and Mr. Plowman (Hon. Secretary).

The minutes of the previous meeting was read and confirmed.

Letters of apology for non-attendance were read from Messrs. Benger, Payne and Stephenson.

With regard to the distribution of the presidential addresses, delivered by Professor Attfield at the Southampton and Southport meetings, it was moved by Mr Schacht, seconded by Mr. W. Hills, and carried:—"That in accordance with the generally expressed wish of the general meeting of the Conference at Southport, it is desirable that the two addresses delivered by the late President, Professor Attfield, F.R.S., be distributed to members of both Houses of Parliament."

Professor Attfield presented the Conference with a sufficient number of copies of his first address for this resolution to be carried out. It was further resolved that the cost of printing, enclosing the two addresses in a cover, and adding any press notices, etc., be defrayed by the Conference. Professor Attfield was requested to distribute the copies either direct or, as far as possible, through gentlemen personally acquainted with members of Parliament.*

A Sub-Committee, consisting of the President, Professor Attfield and the Honorary Secretaries was appointed to arrange details.

Professor Attfield announced that he had already received applications from thirty individual chemists and druggists and two local associations for parcels of the Southport address, with added press notices. Twenty of these requests were for parcels of fifty, eight for packages of one hundred, one for two hundred copies, one for two hundred and fifty, one for five hundred, and one request for one thousand copies. The Committee agreed that the type of the 'Year-Book' should be used for such reprints, allowed the extension of the pamphlet from twenty-eight to thirty-two pages for the addition of press notices, and authorized the printers, Messrs. Butler and Tanner, Frome, Somerset, to supply the parcels requested and any others for which they might receive applications from chemists and druggists at the following rates, carriage paid:—Fifty for 4*s.* 6*d.*; one hundred for 7*s.* 6*d.*; five hundred for 32*s.*; one thousand for £3. Applications to be made to Messrs. Butler and Tanner as soon as possible.

The following gentlemen having signified their willingness to act as Honorary Colonial Secretaries for the undermentioned districts were unanimously appointed:—

Mr. H. Shillinglaw, Melbourne, for Victoria; Mr. L. B. Bush, Bathurst, for New South Wales; Mr. T. M. Wilkinson, Dunedin, for New Zealand; Mr. A. Walsh Port Elizabeth, for the Cape; Mr. H. S. Evans, F.C.S., Montreal, for Canada; and Mr. D. S. Kemp, Bombay, for Bombay.

The President and Honorary Secretaries were empowered to add to this list, before the next meeting of the Committee, the names of any gentlemen who had already been communicated with and who might announce their willingness to give their services to the Conference.

* Any pharmacist willing to assist in thus approaching members of Parliament should write for copies to Professor Attfield, 17, Bloomsbury Square, as early as possible.

COMMUNICATIONS, LETTERS, etc., have been received from Dr. MacMunn, Messrs. Benger, Quinlan, Umney, Symons Haydon, Stanford, Wood, Baker, Quina, J. A. H.

REPORT ON THE STRENGTH OF COMMERCIAL SPECIMENS OF "SPIRITUS ÆTHERIS NITROSI," ETC.

BY W. H. SYMONS, F.C.S.,
Pharmaceutical Chemist.

Having had my attention drawn afresh to the variability of commercial spirits of nitrous ether, I determined to secure several specimens with a view to their examination. Application was made to various houses, and all, except one, furnished me with samples. The following table shows the results obtained by processes which I found gave constant results.

For determining the amount which separated when the spirit was "agitated with twice its volume of saturated solution of chloride of calcium," a 75 c.c. pipette was closed at its point by fusion, and the adjoining tube graduated: the tube at the other end of the bulb was cut off, at about 2 c.m. beyond the 75 c.c. mark, and fitted with a cork. Fifty cubic centimetres of saturated solution of chloride of calcium were then introduced, and the pipette surrounded by ice and water. In a few minutes the spirit to be tested was carefully poured in, so as not to disturb the solution. The cork being replaced, the pipette was well shaken, and afterwards allowed to remain in the cold water (with the graduated tube uppermost) for one hour. The amount of ethereal liquid which rose, multiplied by four, gave the required percentage.

In estimating the total nitrites the process described by Professor J. F. Eykman (*Pharm. Journ.*, [3], vol. xiii., p. 63) was used. The formula for calculation of results being $\frac{V}{S \times a} \cdot \frac{H-e}{273+t} \cdot 0{\cdot}1207 =$ percentage of ethyl nitrite. V represents c.c. of NO, H the barometric pressure, e the tension of aqueous vapour, S the sp. gr. of the spirit, a the number of c.c. used for assay, and t the temperature. The constant $0{\cdot}12071 = \left(\frac{100 \times 273 \times 75 \times {\cdot}08961}{760 \times 1000 \times 2}\right)$.

Samples.	Specific Gravity.		Prepared according to Pharmacopœia.	When shaken with two vols. sol. $CaCl_2$ there separates.	Result of Analysis upon 5 c.c. (by Eykman's process).	Per centage of Ethyl Nitrite.
	Nominal.	Actual.				
No. 1	·845	·850	British 1867	10 p. cent. (*sic*)	56·5 c.c. NO at 17° C. and 752 m.m.	4·08
2	·845	·845	" "	1·8 "	46·5 c.c. NO at 17° C. and 752 m.m.	3·38
3	·845	·845	" "	·8 "	38·0 c.c. NO at 17° C. and 752 m.m.	2·76
4	·845	·843	" "	Nothing.	31·5 c.c. NO at 16° C. and 756 m.m.	2·36
5	·845	·846	" "	Traces.	26·5 c.c. NO at 17° C. and 752 m.m.	1·92
6	·845	·849	" "	Nothing.	19·0 c.c. NO at 17° C. and 752 m.m.	1·37
7	·845	·845	" "	"	13·5 c.c. NO at 17° C. and 752 m.m.	·98
8	·845	·841	" "	"	12·0 c.c. NO at 18·5° C. and 752 m.m.	·86
9	·845	·867	" "	"	6·5 c.c. NO at 17° C. and 752 m.m.	·46
10	·845	·858	" "	"	4·9 c.c. NO at 17° C. and 752 m.m.	·35
11	·845	·850	" "	"	4·0 c.c. NO at 17° C. and 752 m.m.	·29
12	·834	·835	London 1851.	"	12·5 c.c. NO at 17° C. and 752 m.m.	·92
13	·834	·831	" "	"	11·5 c.c. NO at 17° C. and 752 m.m.	·85
14	·834	·839	" "	"	11·2 c.c. NO at 18° C. and 748 m.m.	·81
15	·850	·851	" 1746	"	24·2 c.c. NO at 18° C. and 748 m.m.	1·73
16	·850	·848	" "	"	16·5 c.c. NO at 17° C. and 752 m.m.	1·20
17	·850	·844	" "	"	8·6 c.c. NO at 17° C. and 752 m.m.	·63
18	·850	·837	" "	"	5·0 c.c. NO at 18° C. and 748 m.m.	·36
19	·850	·856	" "	"	4·0 c.c. NO at 17° C. and 752 m.m.	·29
20	·850	·855	" "	"	2·5 c.c. NO at 17° C. and 752 m.m.	·18
21	—	·845	*Vide infra.*	1·7 per cent.	48·0 c.c. NO at 17° C. and 752 m.m.	3·49

The quantities of nitric oxide, and therefore of ethyl nitrite, in the table are in each case the mean of two or more experiments. The samples were, with the following five exceptions, obtained direct from London wholesale druggists. Nos. 2 and 14 I distilled myself according to the directions of the British and London Pharmacopœias respectively. From the house that supplied me with No. 1, as a sample, Nos. 9 and 10 were indirectly obtained; the latter having been purchased previously, the former afterwards. No. 21 was a 10 per cent. (by volume) solution in spirit (sp. gr. 0·834) of the ethereal liquid which rises on applying the B.P. test. The result indicates that this substance contains about 35 per cent. of ethyl nitrite. Its variability is, however, shown by Nos. 4 and 5: No. 5, probably containing more paraldehyde, threw up a trace, whereas No. 4, richer in ethyl nitrite, did not. No. 4 was purchased last May; it did not then separate anything with solution of chloride of calcium; it has been kept in a capped ether bottle and contains no more free acid than the other specimens, which are new.

From the above it will be seen that this preparation is far from what it should be. I am led to suppose that the manufacturers have not taken proper care in condensing the distillates by means of ice. It should be remembered that ethyl nitrite boils under 17° C., at normal pressure, and is therefore easily lost.

Where it is not possible or convenient to carry out Eykman's process, the Pharmacopœia sulphate of iron test (with weighed quantities) is quite capable of showing which is the better of two preparations. It may be applied as follows:—1 part of ferrous sulphate is dissolved in 5 parts of dilute sulphuric acid (B.P.), and to separate portions of 10 parts of this solution 1 part of the spirit to be tested is added. The dark-coloured mixtures may be then placed in glass vessels of equal diameter, and diluted with water until their tints, viewed horizontally, are similar. The amount of dilution shows the comparative strength. Attempts were made to obtain absolute quantitative results, using a standard solution of nitrite of potassium for comparison, and the usual process for colorimetric tests, but the results obtained were invariably too low; probably because the nitrite of potassium solution responds more thoroughly to this test, at the ordinary temperature, than does nitrite of ethyl.

MUSK.*

Musk is a secretion of the musk deer (*Moschus moschiferus*), which inhabits the Alpine regions of the northern provinces of Thibet, and is also found in the southern borders of China, and in Siberia as far as lake Baikal. According to recent reports, it has been found in the provinces of Fohkien and Kiangsi, but does not seem to be hunted there. The pouch that grows on the belly is about 2½ inches long, 1⅝ in diameter, and weighs about 30 grams (over an ounce). It must be cut off as soon as the animal is dead, tied up and dried. On the interior walls of this pouch is the musk, which looks like snuff, and which, if unadulterated, consists of smooth, dry particles, having a greasy feeling, is very friable, of a reddish-brown colour, and has the peculiar and unmistakable odour.

There are two principal varieties, Tonquin and Yunnan musk. The former comes from Thibet and Szechuen, the latter from the province of Yunnan, and both kinds find their way to Shanghai, through Chunking and Laukow. In addition to the ordinary Tonquin and Yunnan, there is a finer grade of each, distinguished by adding the term Taupi, thus Tonquin-taupi, which signifies the musk without the skin, otherwise the pouch is included. Both grades have an extremely fine perfume and bring a much higher price, but find little use in Europe. The odour is perceptibly different from the common ware, hence it might be supposed that they were derived from a totally different animal or came from another region.

A third sort is the Cabardine, or Russian musk, from Tientsin. Its perfume is not nearly so fine as that from Tonquin and Yunnan, and the loss from hair, skin, and moisture is much greater, hence its value is much less. Tonquin musk is the one chiefly exported to Europe and America. Cabardine musk is less esteemed there, and Japan is the principal market for the Yunnan musk. In the first half of 1882, Japan took 340 catties of this musk.

For some time past there has been a marked decrease in the quantity of Tonquin musk received. The Chinese dealers attribute this to the establishment of a protective law as to the hunting season. This circumstance, combined with active demand in London, and a small supply on hand, caused the price to rise from 71 or 72 taels per catty in 1881, to 120 taels in 1882. (The Shanghai tael is 1·15 dollar, and the catty weighs 1⅓ lb. avoid.) This hunting law is said to have been removed recently, but no change in price nor increase in receipts has yet been detected.

If some limit was actually put upon the musk hunting in Szechuen and Thibet, at all events Yunnan did not follow the example, for the receipts from this province are always abundant, so that the total export of musk seems but little less than last year. Independently from the fact that the price of Yunnan musk has followed that of Tonquin musk, the large production of the former had little influence upon the business in Europe, where neither sort has increased in favour or in consumption. The Chinese firms that deal in musk have, as a rule, branch houses in the chief cities of Yunnan and Szechuen, and in Chungking, Zchang, and Laukow. They advance the money to the hunters upon the musk, and thus prevent the article from falling into other hands than those of regular dealers. Every large musk firm has agents in Shanghai and Canton to look after the sales. In Shanghai, there are only five "hongs" for Yunnan and Tonquin musk; they all live in the same neighbourhood, and there is no competition between them, as they form a kind of monopoly. The business in other articles of export is done by brokers or middle-men, who are foreigners, and who carry samples of newly received products around to their customers; but with musk this is not the case. Here the buyers must seek some other means of informing themselves when a new "chop" comes in, and the musk dealers seek to secure themselves from being too quickly deprived of their wares. Musk is sold here only in the original chests of 10 to 20 catties (averaging 20 pouches), or in whole "chops." The buyer does not have his choice of the individual bags, cannot divide a chop, but must either take the original consignment just as it comes from the interior, or refuse it all.

There is no particular season for musk; it comes into the market at irregular intervals throughout the entire year. The Cabardine musk, brought from Tientsin, is sold by special "hongs."

The export of this drug will always remain within moderate limits, not only because the production is limited by nature, but also because the Occidental demand has as competitor the still stronger demand for home consumption. It is well known that in China everything smells of musk. Both sexes are accustomed to carry it with them in little boxes, and to keep it in their clothes presses. While it is losing ground in European therapeutics, the cures attributed to it in China are very manifold, as may be supposed from their mythical nature. When we consider that an export of 3000 catties, each catty containing 15 to 20 pouches of Yunnan, or 20 to 30 of Tonquin musk, means the sacrifice of no less than 60,000 musk deer, and this quantity has been reached several times of late years, and then if we add to this the consumption in China itself, which can scarcely be estimated, we see that it is not too much to fear the entire extirpation of this useful as well as graceful animal. Hence, it would be desirable that the before-mentioned rumour of the legal establishment of a period of protection should be confirmed, even if the development of this branch of trade should suffer somewhat in the immediate future.

The adulterations of this ware seem to be as ancient as the trade itself. Du Halde mentions it as being very common, and refers to pulverized rotten wood as one of the ingredients, and he also speaks of artificial pouches with which they avoided the law then in force against selling musk to foreigners. At present, really pure musk scarcely comes in the market at all. Even the best chops do not contain more than 50 or 60 per cent. of genuine substance, and on the average we must be satisfied with about 30 per cent. The adulterants of musk are generally coagulated blood, a fatty earth (or ochre), paper, hair, pieces of leather, etc., which are introduced into the bags so skilfully as to require a sharp eye and years of experience to be able to detect it. It is not customary here to make any chemical test. The musk inspector takes out a little of the substance with a silver needle, notices its odour, and estimates its value. The pods or bags are immediately assorted according to the percentage of adulteration that he thinks he has discovered in it, and put in piles called 1, 2 and 3, for the European or American market, where this classification is frequently changed and others substituted.

Each pouch is then wrapped in Chinese paper and put in a pasteboard box, lined with lead and covered with silk. Each of these boxes contains a catty of musk; they are finally put in a wooden box lined with zinc. These boxes are of different sizes, according to the sizes of the chop to be packed.

They are generally shipped by the mail steamers, being placed in the safe reserved for bullion and treasure. These precautions are necesary on account of the high price of the goods as well as liability to evaporation. The ships of the old East India Company are not allowed to take any musk on board.

The total export for the late five years was 25,664 catties, or 33,876 lbs., valued at 2,728,800 dollars. The chief port of export is Tientsin. Shanghai and Canton export very little.

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* From the report of the German Consul-General in Shanghai. Reprinted from *New Remedies*, September, 1883.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 13, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

THE APPLICATION OF ARBITRARY STANDARDS TO NATURAL PRODUCTS.

IN the earlier days following the first legislation respecting the adulteration of food in this country, among the substances which gave occasion most frequently for legal proceedings, milk was prominent and developed an extraordinary amount of conflicting "scientific" evidence, based upon the varying opinion of different individuals as to its composition when genuine. The researches of Mr. WANKLYN had, so far as they went, pointed to the comparative constancy in the proportion of "solids not fat" present in all milk, however the milk might vary in quality, provided that it had not been tampered with by the addition of any extraneous substance, and he had suggested that the proportion of 9·3 per cent. of "solids not fat" should be adopted as a standard representing the minimum quantity that should be present in milk. This standard was, however, disputed on many occasions as being excessively high, and subsequently the Society of Public Analysts resolved to adopt 9 per cent., as representing the minimum proportion of "solids not fat" that should entitle a sample of milk to be reported upon as unwatered. Although, however, this standard has been very generally accepted and acted upon, it has not escaped an occasional protest, and a decision in the Manchester City Sessions Court on Saturday last will considerably weaken its authority.

The case which then came under consideration was one on appeal in which a Derbyshire farmer had been convicted on a charge of having adulterated milk supplied by him to a retailer by the addition of 4 per cent. of water. The report of Mr. ESTCOURT, the public analyst, upon which the charge was based, was to the effect that a sample of milk obtained from the defendant contained only 8·67 per cent. of non-fatty solids, which led to the conclusion that it contained at least 4 per cent. of added water. The defendant, however, denied the correctness of the conclusion and a portion of the sample having been sent to Somerset House for examination, the official chemical authorities there—Messrs. BELL, BANNISTER and LEWIN—reported that while unable to affirm that the milk had not been adulterated they had found the constituent parts of this sample to be in the same proportion as had been observed in genuine milk, and that they did not consider it could be affirmed with certainty that water had been added. Mr. ESTCOURT's opinion was, however, supported by three other analysts, and the magistrates being in a difficulty, applied a numerical process in the weighing of evidence, and on the ground that four analysts said the milk was adulterated and three that they would not affirm that it was pure, convicted the defendant. It was an appeal against this conviction that was heard on Saturday last by the Recorder of Manchester. In the opening of the appeal it was contended by the counsel on one side that the standard of 9 per cent. of non-fatty solids was one that was in accord with the results of experiment and had the approval of many chemists, and on the other, that by the 22nd section of the Sale of Food and Drugs Act, the justices were bound to act upon the report from Somerset House and ought to have dismissed the case. This latter view of the case, however, the Recorder refused to adopt. A large number of scientific witnesses were examined on each side, but it may be stated generally that Mr. ESTCOURT's analytical results were not disputed, for although there was a disposition to pit them against the results obtained at Somerset House and to object to the latter on the ground that the milk when examined there had undergone decomposition, Dr. BELL disposed of this objection by saying that after making a slight addition, the amount of which was based upon experiment, the results arrived at by Mr. ESTCOURT were practically the same as those obtained in the laboratory at Somerset House. The question was therefore narrowed to whether any deficiency from 9 per cent. of "solids not fat" should be considered as proof—warranting a criminal conviction—that a corresponding quantity of water had been added. In support of an affirmative to this question, evidence was given by Messrs. ESTCOURT, WANKLYN, DUPRÉ, WIGNER and BLYTH; whilst negative opinions were expressed by Messrs. BELL, VOELCKER, THOMPSON and BANNISTER. Dr. BELL admitted that the average amount of non-fatty solids in fresh milk is 9 per cent., but said he had found it to vary between 8 and 10 per cent. or even higher, and once he had received a sample from Chester in which the amount was below 8 per cent. Dr. VOELCKER, whose wide experience enables him to speak with some authority, said that he had met with milk containing as low as 7½ per cent. and many with less than 9 per cent. Amongst the instances quoted by him was the milk from the cows which last year competed, as milk-givers, for prizes given by the British Dairy Farmers' Association. Out of twenty-six of these samples nine were found to contain less than 9 per cent. of "solids not fat." Dr. VOELCKER is of opinion that the standard adopted by the Society of Public Analysts is in reality too low, because it does not require a fair proportion of fat, but he is not prepared to recommend any other standard. The Recorder, in delivering his judgment, pointed out that the proceeding was of the nature of a criminal prosecution and that before confirming the conviction he ought to be satisfied beyond all reasonable doubt that the defendant was guilty of the charge brought against him. But he said that the conclusion to which he had come was that the charge had not been so made out and that he ought therefore to allow the appeal and dismiss the original conviction with costs.

As already remarked, this decision will undoubtedly considerably diminish the importance which has hitherto attached to the standard adopted by the Society of Public Analysts, but not unreasonably so. Unless we are to dismiss reiterated testimony that milk from individual cows—or even the collected yield from herds of cows—is met with containing in its natural unsophisticated condition less than 9 per cent. of non-fatty solids, it must be obvious that such a condition observed in any milk is not, by itself, a proof that water has been added sufficient to warrant a conviction for a criminal offence. It may be that such milk is abnormal; that such a condition is even a sufficient indication that it is unfit for human consumption. But that is not an offence under the Act; neither is it an offence that a cow fails to produce milk equal to a standard which in the opinion of any number of men, however competent, represents what milk ought to be. It may be desirable that there should be a standard of quality in milk fixed, and that the sale of milk that does not attain to it should be made illegal; but that would be the duty of the Legislature and cannot be allowed to be assumed by private individuals or associations of experts. This tendency to set up arbitrary and unofficial standards has been manifest in other respects than towards the article of milk; but whilst content that such standards as have been set up by the Legislature shall be enforced strictly, we protest against the idea that they may be strained to accomplish ends for which they were not enacted, or that others may be set up by irresponsible persons to meet imaginary wants, even with the best intentions.

PROFESSOR HUXLEY ON STATE INTERVENTION IN MEDICAL AFFAIRS.

On the occasion of the delivery of prizes to successful students at the London Hospital on Tuesday last, Professor Huxley delivered an address on the intervention of the State in the affairs of the medical profession, in which he raised the questions as to the grounds upon which State intervention is justifiable, the extent to which it ought to go, and the manner in which it might be most profitably exercised. Replying to the first question, he said the ground of intervention was not the protection of the public against incompetence or quackery, since if such intervention were advisable it is not practicable, as it would be impossible to prevent people from buying drugs or seeking advice from whom they please. As to the extent to which State intervention should go, Professor Huxley would limit it to securing that no man shall die without the cause of his death being formally certified, making provision that the advice of recognized experts shall be available in civil and criminal trials, and guaranteeing the competence of persons appointed to the numerous medical offices at its disposal, and he maintains that at present the State keeps within these limits in this country. Although anybody may practise medicine, a broad practical distinction is drawn between "qualified" and "unqualified" practitioners, and the Professor considers that practically the latter are very heavily handicapped. Even if the enforcement of penalties against those who profess to be qualified when they are not were somewhat swifter and sharper, he does not think the present condition of affairs would be thereby improved. As to the last question, whether justifiable intervention, as defined, is at present carried into effect in the best possible manner, Professor Huxley says that the reply given by common consent is a very decided negative. Recognizing the vast improvement that has taken place since the passing of the Medical Act of 1858, he affirms that the evidence laid before the late Royal Commission showed that there are licensing bodies that tout for custom by a low standard of examination; that others grant licences which do not involve proof of an acquaintance with the three great branches of medical practice,—medicine, surgery and midwifery; and that the law in its present state does not enable the Medical Council to deal with these evils by enforcing an equality of minimum examination and the threefold qualification before admitting a medical practitioner to registration. But the "conjoint scheme" upon which the Medical Bill recently before Parliament was based, Professor Huxley describes as a highly complex and cumbrous machinery, wholly untried and of doubtful efficacy, for the purpose of superseding Universities and corporations that are at present doing their work exceedingly well. He considers that the end in view might be attained easily and without the least interference with any of the existing bodies that have acquired a high status by doing their duty, by the addition of two simple clauses to the existing Act: one providing that no person shall be admitted to registration who fails to produce evidence that he possesses a knowledge of medicine, surgery and midwifery; and a second, providing that such evidence shall consist in the certificate of any examining body, a certain number of the members of which are appointed as coadjutors by the Medical Council. Upon the subject of medical education Professor Huxley was equally explicit and expressed an opinion that considering the many subjects now included in the curriculum the student might with advantage commence his scientific studies two years earlier.

At a meeting of the Evening Meetings Committee, on Wednesday last, it was decided that in order to afford greater facilities for the examination of specimens and apparatus exhibited in connection with the evening meetings during the present session, the doors of the Lecture Theatre shall be opened an hour before the taking of the chair at each meeting (*i.e.*, at half-past seven o'clock) and that the Curator of the Society's Museum should be requested to be in attendance to give information concerning the articles exhibited. Members and other persons wishing to exhibit objects of interest should communicate with the Curator at as early a date as possible.

* * *

We are requested by Professor Bentley to state that in addition to the students in the Botany and Materia Medica Class of last session who were awarded medals and certificates, Mr. William Johnston obtained in the examination a sufficient number of marks to have entitled him to a certificate had he been a student connected with the Pharmaceutical Society.

* * *

As the time appears possibly to be coming within measurable distance when attendance at definite courses of instruction in recognized schools will become an indispensable preliminary to the compulsory examination as to qualification for registration as a chemist and druggist, it is satisfactory to learn that arrangements are being made that will make such instruction available in different parts of the country. At the Inaugural Meeting of the new session at Owens College, Manchester, on the 2nd instant, in a report presented by the Dean of the Medical Department, it was stated that two newly constructed laboratories and a spacious museum in the new buildings just opened have been devoted to the department of materia medica and pharmacy, and that it is the intention of the Professor of Materia Medica to organize forthwith practical classes to be conducted, under his superintendence, by the Demonstrator, Mr. W. Ellborne, who was lately Assistant-Curator of the Pharmaceutical Society's Museum, which shall embrace courses of instruction specially arranged to meet the wants of students of pharmacy residing in the district. Professor Gamgee added that he believed the new arrangements would develop in the College to an extent not previously possible the teaching both of materia medica and botany, and would enable students to learn thoroughly the fundamental operations of pharmacy and the distinguishing characters of drugs.

* * *

In Sheffield the initiative has been taken by the Council of the local Pharmaceutical and Chemical Association, which has made arrangements with the authorities of Firth College for the establishment of courses of lectures and laboratory practice that will meet the requirements if the proposed curriculum should come into force. During the coming session, commencing on Tuesday next, there will be a course of twenty lectures each, on Physics (Wednesdays, 7.30 p.m.); Chemistry: Non-Metallic Elements (Fridays, 7 p.m.); and Inorganic Chemistry: Metals (Tuesdays, 7 p.m.). It is intended that a course of twenty lectures on Organic Chemistry shall be delivered next session, which would complete the curriculum requirement of eighty lectures on Chemistry, including Physics. It is also hoped that lectures on Botany and Materia Medica may be arranged for during the summar months. The Laboratory will be open for practical work daily and on two evenings in the week. Any further information could no doubt be obtained from the Honorary Secretary of the Sheffield Pharmaceutical and Chemical Association, Mr. Newsholme, Market Place, Sheffield.

* * *

In a recent communication to the Royal Microscopic Society, the veteran pharmacist, Mr. Peter Squire, described a process for preserving in a satisfactory form specimens of the beautiful fresh-water medusa (*Limnocodium Sowerbii*), the occurrence of which in the Victoria Regia tank at the Royal Botanic Gardens has created so much interest amongst naturalists. It consists in plunging the animals, removed by means of a glass-tube used as a pipette, into a dilute solution of mercuric chloride (2 to 4 grains to the pint of distilled water), previously raised to a temperature of 85° F., which is that at which the animals live. Through the consequent coagulation of albumen the bodies of the animals which during life are nearly transparent become opalescent and the minutest details become apparent. It may interest some of our readers to know that a specimen prepared by Mr. Squire is in the possession of the Curator of the Society's Museum, and may be seen upon application.

* * *

Arrangements are being already made by some pharmaceutical bodies in anticipation of the meeting of the International Pharmaceutical Congress, in Brussels, which, according to the terms of the resolution passed by the Congress in London, should be held next year. The appointment of delegates from the American Pharmaceutical Association has been referred to the Executive, and from a statement on another page, it appears that a similar nomination to represent the Pharmaceutical Society of Ireland has been completed. Meanwhile no report has reached us that any steps are being taken by those upon whom it devolves to organize such a meeting.

* * *

One of the subjects that occupied the attention of the Austrian Pharmaceutical Society at its last general meeting was the necessity for a new Austrian Pharmacopœia, the present one having been issued in 1869, and since then only supplemented by a very insufficient appendix.

* * *

We have great pleasure in stating that Professor Attfield has been elected an Honorary Member of the Denmark Pharmaceutical Association.

* * *

The Inaugural Meeting of the sixth session of the Edinburgh Chemists' Association will be held on Wednesday evening next, in the rooms of the Pharmaceutical Society, 119A, George Street, Edinburgh, when an address will be delivered by the President, Mr. C. F. Henry. A Syllabus of the Session, extending to April, 1884, has been prepared.

* * *

We regret to have to record the death of Mrs. Annie Collins, on the 17th of September, at the age of sixty-seven years. Mrs. Collins was elected a Benevolent Fund Annuitant in 1876, and is the seventh annuitant who has died since the election in December last.

Pharmaceutical Society of Ireland.

ANNUAL GENERAL MEETING.

The Annual General Meeting of this Society was held on the afternoon of Monday, October 1, at four o'clock, at its new rooms, 11, Harcourt Street, Dublin.

The chair was taken by the outgoing President, Professor Tichborne.

The first business was the ballot for the election of the Council for 1883-4. Messrs. Wells, Batt and Edmondson were appointed Scrutineers.

The President, in briefly addressing the meeting, said the members were aware that the Society had now completed its twelfth year of existence, and he thought he might say that during that period it had been fairly prosperous. They all recollected the great impulse the interests of the Society received in the first instance from its being taken up by the late Sir Dominic Corrigan; they should never forget all that they owed to his name and position and the great interest he took in the Society. When his health broke down he resigned his position as President of the Society, and he (Professor Tichborne) was selected in his place. During the time he had been in office,—and he might be allowed to refer to it as that was his last appearance before them as President,—he had endeavoured as far as he could to keep up the high position in which Sir Dominic Corrigan had left the Society. If he had erred in anything it had certainly not been from any want in that respect. On his motion a resolution had been carried at a meeting of the Council requiring that the Society should elect a new President every three years, the object being to secure an infusion of new blood into the office, and to prevent the operation of those feelings of delicacy which might otherwise restrain the members from changing their President. A triennial period had been decided on, but it might be found desirable hereafter to have an annual election. At present, however, he did not think the Society was large enough to warrant them in having a new President every year. They were making another new departure also this year. He that day welcomed them to their own house. Their new premises were not yet complete, but they were well furnished and presented a very fair appearance; and the thanks of the Society were due to the Committee to whom had been entrusted the task of carrying out the arrangements. As he had already said he thought they were entitled to come to the conclusion that the Society was fairly prosperous. It was true that only fourteen pharmaceutical chemists had passed their final examination during the last twelve months; but during that period thirty-seven had passed their Preliminary examination, which added to the previous number made three hundred and twelve in all. Besides, the Preliminary examinations of other licensing bodies were accepted. The Society consisted of between sixty and seventy members,—he wished there were more,—and there had been enrolled over two hundred licentiates, so that there was no doubt that the body of pharmaceutical chemists after a little time would become a power in Ireland. Prosecutions had been carried on and were going on at the present time, and he was glad to say that the Society was in a more wholesome condition as regarded these matters than before, for it had now a guarantee fund to defray the expense of prosecutions, which was a proof that the Society intended to maintain its position and to prevent illegal compounding in the country. If prosecutions could be carried out at a minimum of expense or at no expense to the Society it would be a most desirable state of things. The intention of the Act of Parliament was that the Society should be at no expense for prosecutions, and should even clear a couple of pounds on each, but in the practical working of the matter it turned out that each prosecution cost from £25 to £30. There had been considerable talk of late about the status of the pharmacien and it was maintained that he was more than a mere tradesman, and in fact a professional man. He thought they would all agree to that. But it was necessary to produce an impression on the public mind to that effect. That was one of the objects he had always had in view as President, and he thought that the Society should endeavour to follow it up. Unless the pharmaceutical chemist proved to the public that he was a better man than the co-operative store man he would not be able to compete with the latter. He (the President) would not detain them any longer, but would ask the Treasurer to read his report as to the financial condition of the Society.

Mr. Hodgson, Treasurer of the Society, said he was sorry there was not a larger attendance on that occasion; and he particularly regretted the absence of the Vice-President. The balance in the Bank of Ireland was £62 0*s.* 10*d.*, as compared with £17 15*s.* 11*d.* at the corresponding date last year. The income from examinations had been £212 2*s.*, as against £190 last year. Then subscriptions from members last year amounted to £68 5*s.* for sixty-five members; in the year just expired they had only received £53 11*s.* from fifty-one members. Other items brought the income for the past year up to £290 14*s.* 4*d.* The expenditure included £50 8*s.* to the examiners; £13 13*s.* for the reporting of the meetings; fees to Mr. Purcell, Q.C., for an opinion, £2 2*s.*; minor expenses of Law Committee, 17*s.* 10*d.*; salary to Mr. Fennell, £52; remuneration to porter, £9; rent up to May 1, £40; and printing and stationery, £16 14*s.* 6*d.* There was also the item of £34 14*s.* 4*d.* for the *Pharmaceutical Journal.* The total expenditure had been £228 13*s.* 6*d.*, which left a balance of £62 0*s.* 10*d.* The accounts had been vouched by Dr. Collins and Mr. Hayes. He (Mr. Hodgson) had to thank the Society for entrusting the duties of Treasurer to him. He was sorry that the funds were not larger, and he was convinced that the greatest economy would be required for a considerable period in order to keep the accounts in a satisfactory state.

Mr. Grindley: Is there any other outstanding debt?

Mr. Fennell said there was a printing account which had not been furnished.

Mr. Hodgson: There will be a very considerable sum due against the next meeting for the furnishing of these rooms, but it does not come into the present account, and will be paid out of capital.

Mr. Wells said that taking into account the unfurnished account for printing, the amount of which he understood from Mr. Fennell to be between £20 and £30, and also what would be the liability for rent, the Society was not much more than solvent.

On the motion of Mr. Brunker, seconded by Mr. Simpson, the Treasurer's account was received.

The Scrutineers of the ballot submitted their report, from which it appeared that forty-nine voting papers had been sent in and that the following gentlemen were elected to the vacancies on the Council:—Dr. Tichborne, 47 votes; Mr. Allen, 45; Mr. Grindley, 44; Mr. Hayes, 0; Mr. Doran, 38; Mr. Evans, L.A.H., 37; and Mr. Draper, 35.

The President moved that Mr. J. E. Brunker, M.A., be elected President of the Society for the next three years. That gentleman's merits were so well known that it was unnecessary to dilate upon them. As a pharmacian he was a representative man, having one of the most important establishments in the city, and he had worked indefatigably to maintain the interests of the Society.

Sir George Owens said he had not known of this proposal before, but he had great pleasure in seconding it, for he was sure that Mr. Brunker would make an excellent President.

The motion was put and unanimously agreed to.

The newly-elected President (Mr. Brunker), having taken the chair, thanked the members for the distinguished honour they had conferred on him. He promised them that as far as his exertions went they should be given towards maintaining the Society at as high a standard as possible and promoting the rapid advances which pure pharmacy was making both in that and the sister country. The honour they had been good enough to confer on him was quite unsought. Having regard to the present position of the Society he did not look on the office of President as an easy one, and he trusted that he should receive a large measure of support from the Council and the Society generally. The old maxim *Ex nihilo nihil fit* was quite applicable to the present position of the Society; it could not be worked without the sinews of war, and he trusted that an increased number of the licentiates would become subscribing members.

Dr. Montgomery moved a vote of thanks to the Society's late President, Professor Tichborne, for the very laborious and extremely courteous manner in which he had attended to the duties of the office since the death of Sir Dominic Corrigan. The members would fail very much in their duty if they did not pass a marked vote of thanks to him. At all times his services had been perfectly available for the Society; and it had been a great acquisition to it to have a scientific man like Professor Tichborne at its head. He trusted, however, that though he had ceased to be President himself, Professor Tichborne would afford to the newly-elected President the benefit of the great experience he had acquired during the number of years that he had presided over the Society.

Mr. Hodgson said that having been anticipated in moving this motion it gave him great pleasure to second it. Professor Tichborne's scientific knowledge and well-established name had given a *prestige* to the Society.

The President said he was sure the motion would be carried by acclamation. To Professor Tichborne was due the getting up of the evening meetings, which were of so much importance to the younger members of the Society.

Professor Tichborne briefly thanked the Society for the vote which had been passed, and for the complimentary remarks which had been made in reference to him.

Mr. Grindley moved that Mr. J. C. Payne, of Belfast, be elected Vice-President. Mr. Payne had thoroughly identified himself with the interests of the Society and would always support its *prestige*; he (Mr. Grindley) thought the honour which he now proposed to confer on him was due to the North of Ireland.

Mr. Wells said he had very much pleasure in seconding the nomination of Mr. Payne. He quite agreed with Mr. Grindley that the honour of the Vice-Presidentship was due to the North of Ireland.

Mr. Hayes moved that Mr. H. N. Draper, F.C.S., be elected Vice-President. He did not question for a moment the high qualifications of Mr. Payne, but he was convinced that it was essential for the interests of the Society that the Vice-President should be resident in Dublin, and always at hand to give the President any assistance that he required. Mr. Draper was one of the examiners of the Society, and from the beginning had taken the greatest interest in it.

Mr. Simpson seconded the motion, expressing his concurrence in the necessity for the Vice-President being resident in Dublin, and saying that he was sure Mr. Draper, if elected, would most efficiently perform the duties of the office.

Dr. Montgomery said if Mr. Draper accepted the office the Society would be most fortunate.

Sir George Owens said he would be delighted to pay any compliment he could to Mr. Payne, but he quite agreed with what had been said as to the necessity for having the Vice-President of the Society on the spot.

Mr. Hodgson said he had the highest possible respect and esteem for Mr. Payne, but was convinced that the Vice-President ought to be resident in Dublin

Professor Tichborne said an additional reason for electing Mr. Draper was that he had been appointed delegate of the Society to attend the international meeting of pharmacists to be held next year in Brussels.

Mr. Grindley said that as he saw so general a feeling in favour of Mr. Draper, he thought he would be doing what would be most in accordance with the feelings of Mr. Payne by withdrawing that gentleman's name.

Mr. Draper was then declared duly elected Vice-President, and expressed his sincere thanks to the members for their kindness in electing him. So far as his own personal feelings were concerned he would have liked to withdraw his name in favour of Mr. Payne, not only because he was convinced that that gentleman would have made an excellent officer, but also because he would have represented their friends in the North, who were a large and important body.

On the motion of Mr. Wells, seconded by Mr. Minchin, Mr. Hodgson was re-elected Treasurer

Mr. Hodgson said he was very much obliged to the Society. As long as he was the Treasurer he would do all in his power to keep the expenditure within limits

On the motion of Sir George Owens, seconded by Mr. E. M. Hodgson, Mr. Hugh Fennell was re-appointed Registrar.

Messrs. Allen and Hayes were re-elected Auditors.

On the motion of Mr. Grindley, seconded by Mr. Wells, the following were elected the Law Committee:—Professor Tichborne, Dr. Collins, Messrs. Allen, Hayes, Payne, Minchin, and Dr. Whitaker.

On the motion of Mr. Batt, seconded by Mr. Draper, the following were selected as the Certificate Committee:—Professor Tichborne, Drs. Collins and Montgomery, and Messrs. Payne, Allen, and Hayes.

On the motion of Mr. Minchin, seconded by Mr. Simpson, the following were appointed the Pharmacy Act Amendment Committee:—Messrs. Payne, Allen, Hayes, Drs. Collins and Montgomery and Professor Tichborne.

Professor Tichborne moved "That the *Pharmaceutical Journal* be supplied to the members, as heretofore, during the forthcoming year." Last year he observed that a number of gentlemen, after having received the Journal for a considerable time fell into arrears, and when pressed to pay up their subscriptions did not do so. Without discussing the question as to whether such a course was honourable or not, it was evidently injurious to the Society, and in order to meet the mischief he got the Council on February 7, 1883, to pass a resolution to the effect that when a member did not pay up his subscription within a reasonable time the supply of the Journal to him should be immediately stopped, but that he could afterwards get back numbers on paying up his subscription. On April 4, two months afterwards, Dr. Aquilla Smith moved and carried a resolution that at the expiration of the present year the Journal should be stopped altogether. He (Professor Tichborne) happened to be absent when that resolution was brought forward; had he been present, he would have opposed it. In the first place it prevented the remedy which he proposed from getting a fair trial. His remedy would not only have prevented the waste of money, but would have operated as a kind of feeler to see how far the Journal was an inducement to gentlemen to subscribe to the Society. He thought the question one for the general meeting of the Society, and accordingly he had brought it forward. He was, however, sorry to see that there were only three members of the Society present, in addition to the members of the Council. He maintained that the state of the accounts showed that the Society had the means of continuing the Journal, although, even if were otherwise, he did not think the cost of the Journal was the point at which they should begin to retrench. It would be better to increase the subscription to £1 5*s*. and continue the Journal. Again he was quite sure that the proceedings would not be adequately reported if the Journal were stopped as the organ of the Society. Dr. Aquilla Smith's argument was that pharmacists should subscribe for the honour of supporting the Society. He (Dr. Tichborne) did not believe they would, and he was convinced that if the Journal were stopped the subscriptions would very soon fall away.

Mr. Grindley said he had great pleasure in seconding the motion. He was the only member of the Council who voted against Dr. Smith's motion. Subscribers to the Society would have no means of knowing anything about its proceedings except through the Journal.

Mr. Hodgson said he never saw the wisdom of the original plan of supplying the Journal as an inducement to pharmacists to join the Society. On the other hand, he knew that men in the country were proud of being able to put M.P.S.I. after their names, for the privilege of doing which they had to pay their guinea. He failed to see the necessity of spending a large sum of money on the Journal in order to induce men to join the Society. Last year the Society had to pay £34 13*s.* 4*d.* for the Journal, besides £13 13*s.* for reporting its proceedings; so that all that remained out of the £53 11*s.* subscriptions, which were received from fifty-one members, was the magnificent sum of £5 3*s.* 8*d.* Was it, therefore, in accordance with common sense to continue the outlay? Since he came into the room he had ascertained that there was a large account due to the printers, of which he had previously known nothing. Again, he did not see why the original members of the Society should continue to derive any advantage from their position; and it was his intention to give notice of a motion that they should pay the same annual subscriptiou as the other members.

Mr. Hayes said the only way of ascertaining the feeling of the licentiates with respect to the Journal was to send out a circular asking them whether they would continue to subscribe to the Society if they did not get it. There was no doubt that it was necessary to curtail the expenses of the Society as far as possible.

Dr. Montgomery thought it might be well to try the experiment of stopping the Journal. He did not think it would make much difference if a few members did leave the Society on that account. Any surplus funds that the Society had should be laid out in prizes. He did not think it would be wise to send out such a circular as Mr. Hayes suggested. As to adding 5*s.* to the amount of the subscription it was a proposal that would require a great deal of consideration.

Mr. Simpson did not think it would be well to stop the Journal at present.

The President said he was originally in favour of giving the Journal; but having seen the number of members decline year after year, he thought it would be a mistake to keep matters on the present footing. Some means might be taken of ascertaining the wishes of the licentiates on the subject, or an attempt might be made to get the Journal for members at a reduced rate and so induce them to take it. It would be a loss to the Society if the reports of the proceedings in the Journal ceased. There was an omission in the reporting recently, and he heard several complaints about it.

Mr. Fennell, in reply to Professor Tichborne, said the cost of the Journal was 11*s.* 10*d.* for each member, including postage.

Professor Tichborne said he would alter his resolution so as to read "That the Journal shall be supplied for the ensuing six months." In the meantime a committee might be appointed to try if there was any way of reducing the cost of supplying it. As to the original members there were only four of them left on the Council, of whom he was one, and he had for many years paid much more than the amount of the subscription to the Society.

The resolution as altered, viz., "That the Journal should be supplied for the ensuing six months," was then put and agreed to *nem. con.*

The proceedings then terminated.

Provincial Transactions.

OLDHAM CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

At a meeting of the above Association, held in the room, Church Institute, on Thursday evening, September 27, Mr. Martin, President, in the chair, Mr. B. Swinbourn read an interesting paper on "Alcohol." The paper was well illustrated by diagrams and experiments, and, whenever necessary, by chemical equations of the various reactions.

After some remarks from Messrs. Martin and Buckley, a vote of thanks was proposed by the latter, which, having been seconded in a few appropriate words by Mr. Smith, was unanimously agreed to.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Continued from page* 238.)

Upon re-assembling after luncheon, the first paper read was—

Second Report on the Differences between the Essential Oils of Cinnamon and Cassia.

BY ALFRED H. JACKSON, B.SC., M.P.S., F.C.S.,
Associate of the Owens College, Manchester.

In the first report, printed in the 'Year-Book of Pharmacy' for 1882 (pp. 395–400) and in the *Pharmaceutical Journal*, etc., it was shown that the relative density of cinnamon was 1·0097, whilst that of cassia was 1·0366; also that the specific refractive energy of cinnamon was ·32102, whilst that of cassia was ·28685.

Residue (1).—Some experiments were made upon this substance, which had been formed by passing steam through uncombined mixtures of cassia and potassium bisulphite solution. It had a brown colour, a sweet taste, with a trace of saline bitterness; it did not rotate the plane of polarization, though it reduced Fehling's solution slightly, and more abundantly after boiling with dilute sulphuric acid; thence its sweetness cannot be assigned with certainty to the presence of a saccharose, as the Fehling's solution may have been reduced by the benzaldehyde, the presence of which was revealed by its odour, and the source of which was probably due to oxidation of the cinnamaldehyde. Some of the residue was evaporated to dryness and treated with ether, but none dissolved therein. On treating with methylated spirit a small portion entered into solution; the alcohol was evaporated off, leaving a yellow residue, soluble in water, but having a more bitter taste than the original residue, thus showing that it was not identical with it. The source of the sweetness of this residue is interesting, because it may be the same as that which gives sweetness to the essential oils.

Bertagnini's Method.—(*a*) *With Alcohol.*—In the first report it was stated that the white magma, resulting from the combination of cinnamaldehyde with potassium bisulphite, was washed with methylated spirit. This alcoholic filtrate was distilled with sodium carbonate; also by passing steam through. To the distillates sodium chloride was added, but no change or separation of alcoholic from aqueous solutions was observable, and no oil was recoverable.

(β) *With Petroleum.*—The action of American petroleum spirit (b.p. 80°–90°) was then tried. The essential oils were each shaken up with a large quantity of the spirit, and boiled; they dissolved, but mostly separated out again on cooling. On shaking some of the petroline solution of oil with the aqueous solution of potassium bisulphite, no satisfactory combination was effected.

(γ) *With Ether.*—Oil of cassia was shaken up with a potassium bisulphite solution, the mass thrown on to a filter and washed with ether until a mass of pearly-white crystals was left on the filter. The filtrate consisted of a lower layer of watery solution of potassium bisulphite, and an upper one of the ethereal solution. The ethereal solution was decanted, and the ether distilled off on a water-bath; the oily residue was then treated again with $KHSO_3$ solution, and the process repeated about a score of times, until no more precipitate was formed with the $KHSO_3$ solution. This oily residue (2)—oil of cassia deprived of cinnamaldehyde—was dried with $CaCl_2$ and distilled:—1st, distilled under 100°, a few drops of a pale yellow, sweet, pungent oil, like cinnamaldehyde; 2nd, distilled about 260°, a few grams of a dark-brown, sweet, smoky, pungent oil; 3rd, distilled at 280°, a few grams of a dark-brown, bitter, smoky, pungent oil. There was a burnt, acrid smell, and a charred mass in the retort, showing eremacausis. These two distillates were similar to the sixth distillate from the original oil.

Oil of cinnamon was then treated similarly with the $KHSO_3$ solution. Its oily residue (3) had a brown colour distinct from that of cinnamon, with an aromatic smell akin to that of clove. An attempt to determine its boiling point showed that it was not a simple body; for, on distillation it began to boil at about 200°, rising to 250°, leaving a waxy residue and decomposing at 260°. There was not a sufficient quantity at disposal for a fractionation to be made. Tested with concentrated sulphuric acid it showed a brownish-red colour; an addition of water then turned it into a light mass of greyish-white resinous matter. Although residue (3) had ceased to give any precipitate with $KHSO_3$ solution, yet to find out whether it were quite free from cinnamaldehyde, the following tests were applied. A solution of magenta chloride was decolorized by $KHSO_3$ and SO_2; its violet-red colour was at once restored by the essential oil, but not until after a long time—and then but very faintly—by (3). A more delicate test was the addition of some HCl and KNO_2 to sodium sulphanilate; to the solution of this diazobenzene-sulphonate, made alkaline by NaOH, some of the essential oil—made alkaline—was added, and a violet-red colour was developed; a similar result followed the substitution of (3) for the essential oil, thus showing that (3) still contained a very small quantity of cinnamaldehyde. From two analyses of the ultimate composition of residue (3) the following results were got:—

Residue (3)	CO_2	H_2O	C	H
·192	·525	·156	74·57 %	9·02 %
·2515	·689	·211	74·75 %	9·32 %

Mean percentage, C, 74·66 and H, 9·17.

But, as the determination of its boiling point shows that it is not a simple substance, a formula cannot be deduced from these results.

Thus this method of separation does not yield sufficiently definite results to cause one to use larger quantities of so costly an oil.

Having a small sample of the pure oil of cinnamon left, it was burnt with the following results:—

Oil of Cinnamon	CO_2	H_2O	C	H
·292	·842	·1795	78·64 %	6·82 %
·1945	·568	·124	79·64 %	7·08 %
·374	1·09	·2335	79·5 %	6·93 %

Mean percentage, C, 79·26 and H, 6·94.

A comparison of this result with the analysis of (3) shows that the elimination of cinnamaldehyde alters very distinctly the composition of the oil, and so far justifies the use of Bertagnini's process as a good one, though not delicate enough for the end in view in this research.

In conclusion, I have pleasure in acknowledging the kindly suggestions of Professor Schorlemmer during this work.

The PRESIDENT said he feared the author would not get the credit he deserved, because, like many Alpine and Himalayan climbers, he had not reached the actual summit of either of the mountains of difficulty he had so courageously attacked. He had, however, opened out and extended the track, so that either he himself, or some other worker, at some future time would be able to follow in his footsteps, and would find the road less laborious than it was before. For that work he was thoroughly entitled to the thanks of the Conference.

The next paper read was on—

THE BITTER PRINCIPLES OF NERIUM ODORUM.

BY H. G. GREENISH, F.I.C.

As a grantee of the British Pharmaceutical Conference, I have to report the progress I have made in the isolation of the bitter principles of the nerium odorum, or sweet scented oleander.

For a supply of the root, my best thanks are due to Dr. Dymock, of Bombay.

After a number of experiments, I found the following method the most convenient.

The powdered root is moistened with distilled water, packed in a percolator, and percolated with water until exhausted. It is possible thus to free the powder from every trace of bitterness. The percolate is shaken with chloroform until free from bitterness; this point is easily ascertained by warming a little of the supernatant liquid to expel the chloroform, and tasting. Although apparently free from bitterness, the aqueous liquors may still contain a small quantity of the bitter principles in solution and this may be proved by concentrating to a small bulk and again shaking with chloroform; the yield will not, however, repay the trouble.

The chloroformic solutions are mixed and shaken with water made alkaline with caustic soda as long as the latter is coloured brownish or yellow; a final washing with pure water removing any traces of caustic alkali. The greater part of the chloroform may then be recovered by distillation at a gentle heat. The remainder is allowed to evaporate spontaneously at a temperature of about 100° F.

The resulting yellow substance is dissolved in warm spirit. Should it still retain traces of chloroform, the solution must be well stirred until they are dissipated, as otherwise the subsequent operations are much impeded. To the warm alcoholic solution about four volumes of hot distilled water are added, and the whole allowed to cool. A mass of minute crystals separates which can be filtered off and washed with weak spirit; the operations of recrystallizing and washing are repeated until the crystals are obtained snow-white and quite pure.

The mother-liquor from the first crop of crystals is diluted with more water and allowed to stand twenty-four hours. Should any more crystals separate they are filtered off. The filtrate is then shaken with chloroform until exhausted, and the chloroformic solution evaporated to dryness. The residue is subjected to a repetition of the process. The final result is a pale yellow amorphous mass which, when quite dry, is easily reducible to a nearly white powder. It should dissolve entirely and easily in spirit. Should the addition of water be followed by the appearance of a precipitate soluble in caustic soda or potash with a deepening in colour, the substance is contaminated with resin. It should be dissolved in spirit, the solution diluted with water, made alkaline with caustic soda and exhausted by shaking with chloroform. The chloroformic solution will yield the purified substance on evaporation.

Although both the bitter principles are freely soluble in spirit, I prefer extracting them from the root with water as the subsequent manipulations are thereby much facilitated. The process is an advantageous one inasmuch as the substances are not brought into direct contact with either alkali or, indeed, any substance likely to produce decomposition, nor are they subjected to the action of heat but for a comparatively short time.

One of the substances, the crystalline one, is possibly identical with a crystalline substance which I formerly* considered to be a decomposition product of the bitter principles; the other, the amorphous, represents the nerioderin in a state of greater purity.

I am now preparing the substances in larger quantity, and purpose reporting on their composition and properties at the meeting of the Conference next year.

The PRESIDENT said it would be remembered that some years ago Mr. Greenish obtained two principles from this Indian perfume and poison—which he called neriodin and nerioderein—neither of which, however, he succeeded in crystallizing. He had now crystallized the one, and ibtained the other in a less impure condition than that on which he obtained it before. For this work he was entitled to the thanks of the Conference, and it was to be hoped that he would continue his investigations into these substances. The Conference was also much indebted to Professor Dymock, of Bombay, who was always ready to assist in such investigations.

A vote of thanks having been passed to Mr. Greenish and Professor Dymock,

Mr. NAYLOR asked whether it was the fact that both these principles were bitter, or only the amorphous one, and also whether they were both to be regarded as neutral, or whether that was still undecided. He thought it very improbable that the crystalline principle separated could be regarded in any sense as a decomposition product, especially having regard to the mode of extraction.

Mr. BENGER said both principles were stated to be bitter.

The following two papers were then read:—

THE QUANTITATIVE SEPARATION OF STRYCHNINE AND BRUCINE.

BY WYNDHAM R. DUNSTAN,
Demonstrator of Chemistry,
AND F. W. SHORT,
Assistant-Demonstrator of Chemistry,
in the Laboratories of the Pharmaceutical Society.

The complete separation of the alkaloids of nux-vomica has always been a matter of great difficulty, and the processes which up to the present time have been used for the preparation of the pure alkaloids are quite unsuited for quantitative application. In fact there is no direct method for the separation of strychnine and brucine which gives concordant quantitative results. Professor Dragendorff† came to this conclusion after an examination of published methods and after many trials of methods of his own suggestion, finally recommending the employment of an indirect method involving the titration or precipitation of the mixed alkaloids with a solution of potassium mercuric iodide. In the face of the above facts we made an examination of the solubility of many salts of strychnine and brucine with the view of devising a direct method for the quantitative separation of the two alkaloids. Among the salts which we prepared were the ferrocyanides of strychnine and brucine, which were obtained in the first place by the double decomposition of the alkaloidal sulphates and potassium ferrocyanide. These salts were found to differ so considerably in their solubility that we commenced a full study of their properties and solubility under various conditions. A detailed account of this work here and now would be of secondary interest; it is, therefore, reserved for a future communication, and that portion alone dwelt upon that relates to the main problem, namely, the quantitative separation of the two alkaloids.

* See *Pharm. Journ.*, [3], xi., 873.
† 'Die chemische Werthbestimmung,' p. 65, *et seq.*

The first series of quantitative experiments were made with neutral solutions of strychnine and brucine sulphates, but the results obtained showed that the separation was not so complete as might have been anticipated from a separate examination of the aqueous solubilities of strychnine and brucine ferrocyanide. For this had shown that while strychnine ferrocyanide is but very slightly soluble in water, the similar salt of brucine might be termed a soluble salt. Now it was evident that in presence of brucine, strychnine ferrocyanide was not wholly precipitated from neutral solution. The next experiments were made in solutions which were decidedly alkaline with ammonium hydrate, and here the results showed that the separation, although much more complete than in neutral solution, was far from perfect. It may be worth while to record one or two of these experiments. A weighed quantity of the anhydrous alkaloids was dissolved in dilute sulphuric acid, solution of potassium ferrocyanide added and then ammonium hydrate until the solution was distinctly alkaline, the precipitate was filtered off and washed with a little dilute ammonium hydrate. From the filtrate and washings the brucine was recovered by agitation with chloroform after excess of ammonium hydrate had been added; in these two experiments the strychnine was determined by difference.

TABLE I.

	Taken.	Found.
Strychnine	0·071	0·068
Brucine	0·053	0·056
Strychnine	0·077	0·067
Brucine	0·104	0·114

Experiments were now made in which the alkaloids were dissolved in a slight excess of sulphuric acid, so that the solution before the addition of potassium ferrocyanide was distinctly acid in reaction. From such a liquid as this it was found that strychnine was wholly precipitated, while brucine remained in solution. After a great number of experiments relative to the influence of (α) *concentration and the proportion in which the alkaloids are present*; (β) *acidity*; (γ) *time*; (δ) *temperature*, we have succeeded in devising an entirely satisfactory method for the quantitative separation of strychnine and brucine. The inferences from these experiments may be summed up as follows:—(α) Strychnine is entirely precipitated by potassium ferrocyanide from a solution acidified with sulphuric acid, both alone and in presence of brucine, even when only 0·0015 per cent. of anhydrous strychnine is contained in the liquid (*cf.* Tab. III.). Brucine alone is not precipitated under similar conditions until the strength of the solution nearly approaches that of saturation and then the salt is slowly precipitated in large silky needles entirely differin in appearance from the granular and heavy precipitate of the strychnine salt. In presence of strychnine, however, brucine is precipitated more or less completely from sulphuric acid solution by potassium ferrocyanide if more than 0·06 per cent. of brucine is present; this is shown by the following results:—

TABLE II.

	Taken.	Found.
Strychnine	0·0878	0·1206
Brucine	0·2288	0·1900
Volume 200 c.c.		
Strychnine	0·0930	0·0942
Brucine	0·0576	0 0540
Volume 100 c.c.		
Strychnine	0·003	0·050
Brucine	0·100	0 053
Volume 150 c.c.		

Tested by the nitric acid reaction the strychnine residues contained much brucine. (β) Strychnine is more completely precipitated from a sulphuric acid solution of the sulphate than from a solution of the chloride or acetate acidified with the corresponding acids. The quantity of sulphuric acid present should never exceed 0·5 per cent. by volume of H_2SO_4, the most favourable proportion is 0·25 per cent. by volume. Excess of acid causes decomposition of the potassium ferrocyanide and promotes other secondary reactions. (γ) The time required for complete precipitation depends upon the quantity of strychnine present; the precipitation is greatly facilitated by vigorously stirring the sides of the vessel with a glass rod. When this is done and precipitation occurs at once it is usually complete in three or four hours. A solution containing 0·001 per cent. of strychnine is entirely precipitated in six hours. (δ) Rise of temperature above the normal should be avoided; when the solution is heated partial decomposition of the potassium ferrocyanide takes place.

Taking into account the above facts we propose the following method for the quantitative separation of the alkaloids. Any quantity less than 0·2 gram of the mixed alkaloids is dissolved in about 10 cubic centimetres of a 5 per cent. (by volume) solution of sulphuric acid (=0·5 c.c. H_2SO_4), the solution is diluted to about 175 c.c. with water and then made up to 200 c.c. with a 5 per cent. solution of potassium ferrocyanide. The liquid is transferred to a beaker, stirred occasionally and allowed to stand from three to six hours. The precipitate is filtered off and washed with water acidulated with sulphuric acid (about 0·25 per cent.) until the washings are free from bitterness. As the precipitate is liable to alteration upon drying it is decomposed by the addition of a strong solution of ammonium hydrate, the filter washed with the same liquid and finally with chloroform, a sufficient quantity of which is used to entirely extract the alkaloid from its solution in ammonium hydrate. The chloroformic solution is then evaporated and the anhydrous strychnine weighed. Here occurs a manipulative difficulty which deserves to be mentioned. If the solution of strychnine in chloroform be directly evaporated to dryness upon the water-bath violent decrepitation will occur as the residue approaches dryness, resulting in the ejection of the greater part of the crystalline alkaloid from the dish. The chloroform should therefore be only partially expelled upon the water-bath, the remaining portion being spontaneously evaporated and the residue afterwards cautiously dried in a covered dish upon the water-bath, or the entire operation may be conducted in a flask. This behaviour is characteristic of pure or nearly pure strychnine, and is prevented by the presence of a small quantity of brucine, in which case the residue has a fused appearance. From the filtrate and washings the brucine is extracted by chloroform after the addition of excess of ammonium hydrate; in ordinary practice, however, either the brucine or strychnine may be estimated by difference. Table III. shows the results of a series of such experiments with different proportions of strychnine and brucine. It is to be noted that in these experiments the commercial crystalline alkaloids were employed, care being taken that the specimens selected were in definite crystals, but these alkaloids were not absolutely pure; the strychnine contained a mere trace of brucine and the brucine a similar trace of strychnine. It is further to be observed that in each case the strychnine and brucine have been directly determined.

As there is comparatively little difficulty in isolating strychnine and brucine from organic mixtures containing them, we have not considered it necessary to study the influence of organic matter upon the present results. When other alkaloids are present, the strychnine and brucine must be isolated before a separation is attempted. In the course of this investigation it has been frequently necessary to test a residue which was presumably brucine for the presence of strychnine and for this purpose we at first employed the well-known reaction with sulphuric acid and potassium dichromate or manganic oxide and found that for the detection of strychnine in presence of large quantities of brucine the test is useless, for the red colour produced by brucine under these conditions entirely masks the characteristic strychnine reaction.* We have made some experiments upon this point and generally upon the detection of strychnine in presence of brucine which will form the subject of a future communication. Taking advantage of the separation of strychnine and brucine effected by the method just described we have commenced experiments with the view of making the above process the basis of a method of preparing absolutely pure brucine; these experiments are still in progress. As might be anticipated the strychnine residues which were obtained gave evidence of traces of brucine when tested with nitric acid, the brucine also contained traces of strychnine. These traces were removed by reprecipitation. The results recorded in Table III. show that for all analytical purposes the separation of strychnine and brucine effected by the method above described may be considered as complete.

TABLE III.

	Taken.	Found.
Strychnine	0·034	0·030
Brucine	0·151	0·148
Strychnine	0·058	0·057
Brucine	0·103	0·0982
Strychnine	0·0162	0·0158
Brucine	0·0860	0·0852
Strychnine	0·092	0·088
Brucine	0·049	0·046
Strychnine	0·0348	0·0326
Brucine	0·0508	0·0502
Strychnine	0·030	0·0298
Brucine	0·056	0·055
Strychnine	0·065	0·065
Brucine	0·118	0·112
Strychnine	0·135	0·1324
Brucine	0·022	0·0216
Strychnine	0·039	0·0387
Brucine	0·116	0·114
Strychnine	0·08	0·075
Brucine	0·111	0·111
Strychnine	0·086	0·0844
Brucine	0·033	0·028
Strychnine	0·0348	0·0326
Brucine	0·0508	0·0502
Strychnine	0·003	0·0026
Brucine	0·100	0·100

Our thanks are due to Professor Attfield, F.R.S., for having allowed this investigation to be carried on in the Laboratories of the Pharmaceutical Society and to the British Pharmaceutical Conference for having aided the work by a Research Fund grant.

* This has been previously noticed by Shenstone (*Pharm. Journ.*, [3], viii., 446), and since these experiments were made by Hanriot (*Comptes Rendus*, xcvii., 4).

Report upon the Pharmaceutical Preparations of Nux-Vomica.—I. On Tincture of Nux-Vomica.

BY WYNDHAM R. DUNSTAN,
Demonstrator of Chemistry,
AND F. W. SHORT,
Assistant-Demonstrator of Chemistry,
in the Laboratories of the Pharmaceutical Society.

Among the tinctures of the British Pharmacopœia tincture of nux-vomica stands pre-eminent in its union of potency and stability; the principal object of the present investigation was to test its uniformity. We have already shown (*Pharm. Journ.*, [3], xiii., 665, 1053) that the nux-vomica seeds of commerce vary considerably in the amount of alkaloid which they contain; it was, therefore, interesting in this connection to examine whether commercial specimens of the tincture similarly varied in strength. Twelve specimens of the tincture of nux-vomica of the British Pharmacopœia were obtained from the principal manufacturers in London, and these were subjected to analysis. In the first instance we made a number of experiments to obtain a simple and accurate process for the estimation of the total alkaloid in the tincture. Professor Dragendorff* has already proposed a method similar to the method proposed by him for the assay of the nux-vomica seeds. We have discussed this process elsewhere, and consider that the process for the assay of the tincture is open to the same objection there pointed out, namely, that it is unnecessarily long and intricate. When tincture of nux-vomica is evaporated a resinous mass remains, which will be found to be only partially dissolved by chloroform, the greater portion remaining insoluble. It is practically impossible to wholly extract the alkaloid from the mass by the use of chloroform alone. There are two ways in which the alkaloid may be isolated from it. (1) By treatment with ammonium hydrate, which dissolves the resinous mass and allows the alkaloid to be easily withdrawn by one or two agitations with chloroform, which solution is extracted by shaking with dilute sulphuric acid, and the alkaloid dissolved from this liquid after the addition of excess of ammonium hydrate by chloroform. The chloroform is then evaporated and the residue dried at 100° C. (2) By treatment with dilute sulphuric acid, which entirely dissolves the mass, and after the addition of ammonium hydrate the alkaloid can be extracted in the pure state by chloroform. These processes both yield finally the same result as will be seen from the following figures which represent the percentage of alkaloid found in a specimen of tincture analysed in both the above ways:—

Process 1	0·302 per cent.
Process 2	0·304 per cent.

The purity of the alkaloidal residues obtained by the above processes was tested by the ammonia-tannin method, which we have described in a previous paper (*Pharm. Journ.*, [3], xiii., 1054).

The following two experiments suffice to show that the residues obtained consisted of alkaloid, (α) percentage of alkaloid nominally found, (β) percentage after ammonia-tannin process:—

	α	β
1	0·103	0·093
2	0·159	0·153

The following table shows the results of the analysis of commercial tinctures of nux-vomica. In nearly all cases the second of the two above-mentioned processes was employed, 50 grams of the tincture being taken for analysis. In the residue of strychnine and brucine thus obtained the strychnine was separated and estimated by the method of precipitation by potassium ferrocyanide described by us in a previous communication; the brucine was estimated by difference. The percentages are in all cases by weight.

* 'Die chemische Werthbestimmung,' p. 71.

Analysis of Tinctures of Nux-Vomica.

No.	Specific gravity.	Percentage of total alkaloid.	Percentage of strychnine.	Percentage of brucine.
1	0·8426	0·224	0·077	0·147
2	0·8409	0·262	0·097	0·165
3	0·8438	0·208	0·068	0·140
4	0·8392	0·124	0·049	0·075
5	0·8450	0·360	0·121	0·239
6	0·8378	0·211	0·084	0·127
7	0·8377	0·136	0·046	0·090
8	0·8552	0·181	0·066	0·115
9	0·8398	0·196	0·077	0·119
10	0·8413	0·189	0·087	0·102
11	0·8407	0·168	0·060	0·108
12	0·8436	0·263	0·131	0·132

It will be seen from these results that the tinctures of nux-vomica now in commerce vary to a very considerable extent in alkaloidal strength. The strongest tincture (No. 5) containing nearly three times as much total alkaloid as the weakest (No. 4). It will be at once conceded that the important feature in a typical tincture of nux-vomica is or should be uniformity in alkaloidal strength; the other constituents though doubtless valuable are of secondary importance. In view of the above facts it seems desirable (1) that a standard uniformity should be officially recognized; (2) that the pharmacist should be able to prepare and guarantee the tincture of standard strength. This accomplished, the pharmacist, having determined the amount of total alkaloid contained in the seeds from which the tincture is to be prepared, employs a sufficient quantity to produce by a process of uniform exhaustion the standard tincture.

The work connected with this communication, which forms part of a general investigation of the pharmaceutical preparations of nux-vomica, has been carried on in the laboratories of the Pharmaceutical Society by the kind permission of Professor Attfield, F.R.S.

The President, in proposing a vote of thanks to the authors of these papers, remarked that in the first paper they had made a most distinct advance in the knowledge of the chemistry of strychnine and brucine, and had given what seemed a thoroughly trustworthy method of determining the amount of strychnine. In dealing with the difficult subject of nux-vomica they first devised an ingenious apparatus for extracting the whole of the active principles. They then devised a method for separating and quantitatively estimating each of the alkaloids, and they were now apparently engaged in adapting their physical and chemical discoveries to the practical assay of the preparations of nux vomica. In all this they had done valuable service.

A vote of thanks to the authors was passed.

Mr. Naylor remarked that Mr. Siebold had already studied this subject pharmaceutically, and communicated his results to a former Conference. He then threw out the suggestion that the extract of nux-vomica should be employed in the preparation of the tincture, and it seemed to him that this suggestion was well worthy of consideration. They should be slow to adopt any method which would entail either on the wholesale house or the pharmacist the duty of assaying the nux-vomica, especially considering the great difficulty there would be in obtaining nux-vomica which would come up to the standard given by Messrs. Dunstan and Short. As far as he could understand, there was no standard fixed for the proportion the strychnine should bear to the brucine. He believed this was the first time the two alkaloids had been separated in a condition of purity, and, therefore, their physiological action had not yet been definitely ascertained. The weakness of nux vomica tincture which had been mentioned was probably due to one or both of two causes: first, pharmacists as a rule had not the means of sufficiently dividing the nux-vomica so as to completely exhaust it; and, secondly, if it were heated too much, the alkaloids would be destroyed.

Mr. BENGER said in the paper alluded to by Mr. Naylor, which was read by Mr. Siebold at the Glasgow meeting, it was stated that various specimens of tincture of nux-vomica had been analysed, and as the result, it had been found that in a good sample about nine parts per thousand of tincture consisted of dry extract. It was interesting to find that the results obtained by Messrs. Dunstan and Short were confirmatory of Mr. Siebold's conclusions in another respect, although arrived at by quite a different method. Mr. Siebold examined ten specimens of tincture, and found that the strongest was about three or four times the strength of the weakest, judging simply by the bitterness produced by the addition of it to a definite quantity of water, and by the amount of opalescence produced. He did not know that there was any conclusive evidence that the amount of strychnine and brucine in nux-vomica was to be taken as an absolute indication of the medicinal value. If so, it would be better at once to use liquor strychniæ or liquor strychniæ cum brucia.

Mr. HOLMES remarked that one important point which had been brought out in the paper was the great variation in the strength of the tincture of nux-vomica. He remembered hearing Professor Bentley say that he had been nearly poisoned on one occasion by taking a much stronger tincture than he supposed he was taking. Messrs. Dunstan and Short had also shown that the seeds of nux-vomica met with in commerce varied very much in strength. There were two or three varieties known, the Bombay being much stronger than the others. If this were the case and the seeds were mixed, it seemed to him that Mr. Benger's suggestion to use the liquor strychniæ was a very valuable one, for it would be almost impossible for a chemist to secure one particular kind of seed, and thus it would be very difficult to ensure a tincture of uniform strength.

Mr. TANNER said, that in his experience Mr. Siebold's suggestion for the preparation of tincture from the extract had not proved very satisfactory. A large quantity of spirit was necessary to dissolve the active principles from the nux vomica, and in the preparation of the extract evaporation of the menstruum was necessary. When the extract was redissolved to form the tincture, it did not entirely dissolve, for there was a proportion of fixed oil found in the extract; and further, in the tincture made by that method, after being kept some length of time, there was a brown deposit formed on the sides and bottom of the vessel, arising probably from some changed resinous substance.

Mr. CONROY asked if he correctly gathered that the strongest samples of tincture of nux-vomica were those of the highest specific gravity.

Mr. PLOWMAN said it was so broadly—not exactly.

Mr. CONROY said, that seemed to suggest that the rectified spirit of the Pharmacopœia was not a suitable menstruum to exhaust the nux-vomica with, and that a spirit containing more water would be preferable.

Mr. A. C. ABRAHAM observed, that formerly a weaker spirit was used, and was now generally used by foreign pharmacists. The Dublin Pharmacopœia ordered proof spirit; the French Codex was alcohol of 80° = sp. gr. 0·864; the Pharm. Germanica spiritus dilutus, sp. gr. 0·892. There was no doubt, he thought, that it dissolved the active principles more readily than rectified spirit.

Mr. JACKSON said that the use of a weaker spirit had been recommended at a former meeting of the Conference by Mr. Prescott, who used a spirit of sp. gr. ·970, and found it much better than that of the official strength. In a former communication on the subject of strychnia, either to the Conference or to the Chemical Society, Mr. Shenstone had given a process for separating strychnia from brucia; but from the remarks now made it would seem as if Messrs. Dunstan and Short had now, for the first time, introduced a process for the preparation of pure alkaloids of strychnia and brucia. He should be glad to know if Mr. Shenstone's paper had been overlooked. There had also appeared in the *Pharmaceutical Journal* a notice of the Exhibition at Vienna, in which it was stated that samples of pure brucia were exhibited. It would be very interesting to know by what process they were prepared.

Mr. WHITLEY WILLIAMS said, if he recollected rightly, Mr. Shenstone came to the conclusion that no process of precipitation succeeded in separating the strychnine from the brucine, and he was surprised to hear that this was a precipitation process. Mr. Shenstone recorded a result, in which he was corroborated by the authors of this paper, that strychnine precipitated from a ferrocyanide solution invariably gave a vivid brucine reaction. If that were so, he did not see how it was possible to separate strychnine from brucine by that process. It was probable that brucine was taken down not altogether chemically by a want of solubility of it in the ferrocyanide, but was mixed the strychnia in some physical manner. For instance, Meyer's solution was alluded to as a precipitant for the estimation of the alkaloids, and probably the proportion of pure alkaloid in a pure solution could be estimated quite exactly in that way; but if the alkaloid were mixed with some other substances and colouring matters, the precipitate invariably carried down with it a number of other things, and he believed that if Messrs. Dunstan and Short had examined minutely this precipitate of ferrocyanide of strychnine, they would have found that it still contained brucine.

Mr. REYNOLDS (Leeds) begged to congratulate the President as chief of the school which had sent this valuable contribution to pharmaceutical research. There was no more healthy indication of the condition of a school than such bye-products. The original intention might be the production of successful students; but just as in a gas works, the bye-products were sometimes more valuable than the gas, so these researches were most valuable, and it was unfortunate that there were not more schools of pharmacy in the country from which similar results might arise. He trusted that the acceptance of pharmacy as a subject of study at Owens College would lead to a multiplication of such contributions in future.

Mr. PLOWMAN said he could not attempt to reply to any criticisms on the papers, but in reply to Mr. Williams he might repeat a sentence of the paper which said—"as might be anticipated the strychnine residues gave evidence of traces of brucine when tested with nitric acid; the brucine also contained traces of strychnine. These traces were removed by reprecipitation."

The PRESIDENT said he could not allow the discussion to close without thanking Mr. Reynolds for his kindly notice of the work done by the gentlemen who had been students in the school of pharmacy of which he had the honour of being a professor; but he must not give too much credit to him or his colleagues for this work. The Council of the Society had always supported the endeavours of the students, not only to study the known, but to dip a little way into the unknown; and had encouraged the Pharmaceutical Students' Association which had similar objects to one which existed many years ago when he was a pupil there; and it had done good work in promoting original research. It was very gratifying to him to find men who had been members of the Students' Association, and some of whom had been officers, coming forward and doing work which commended itself to the consideration of the Conference.

(To be continued.)

NATIONAL ASSOCIATION FOR THE PROMOTION OF SOCIAL SCIENCE.

In the "Repression of Crime Section" of the above Association, which has been holding a meeting in Huddersfield, there were read on Tuesday last two papers on the question "Can the Law regulating the Sale of Poisons be amended so as more effectually to prevent their Employment for Criminal Purposes;" one by C. Meymott Tidy, M.B., F.C.S., Professor of Chemistry and of Forensic Medicine at the London Hospital, and the other by Mr. G. Latham Browne. The former of these is now printed; the latter, together with the discussion which followed the reading of the papers will be published in the next number of this Journal.

Can the Law Regulating the Sale of Poisons be amended so as more effectually to prevent their Employment for Criminal Purposes.

BY C. MEYMOTT TIDY, M.B., F.C.S.

I.—The Present State of Legislation Regulating the Sale of Poisons.

An Act entitled "An Act to regulate the sale of poisons, and alter and amend the Pharmacy Act, 1852," came into operation on January 1, 1869. Ireland is exempted from its operations.

So far as we are concerned at the present moment four points call for separate consideration. 1st. The articles deemed poisons under the Act. 2ndly. The persons permitted to sell the articles so designated. 3rdly. The precautions required to be taken in effecting the sale of such articles; and 4thly. Certain exceptional circumstances under which poisons may be sold by others than those named, and under conditions not regulated by the Act.

1. *The Articles deemed Poisons within the meaning of the Act of* 1868.

In Schedule A. of the Act the various articles to be deemed poisons are scheduled. They are divided, for reasons I shall discuss shortly, into two parts, called respectively—Part I. and Part II., and are as follows:—

Part I.

Arsenic and its preparations.
Prussic acid.
Cyanides of potassium and all metallic cyanides.
Strychnine and all poisonous vegetable alkaloids and their salts.
Aconite and its preparations.
Emetic tartar.
Corrosive sublimate.
Cantharides.
Savin and its oil.
Ergot of rye and its preparations.

Part II.

Oxalic acid.
Chloroform.
Belladonna and its preparations.
Essential oil of almonds, unless deprived of its prussic acid.
Opium and all preparations of opium or of poppies.

By Section 2, permission was granted to the Council of the Pharmaceutical Society of Great Britain to suggest additions to this list. Such additions are to be submitted to the Privy Council. Upon approval they are to be advertised in the *London Gazette*, and, after the expiry of one month, are to be deemed poisons within the meaning of the Act.

Of this power the Council of the Pharmaceutical Society of Great Britain has on more than one occasion availed itself, and the articles now designated poisons are scheduled as follows:—

Part I.

Arsenic and its preparations.
Aconite and its preparations.
Alkaloids—all poisonous vegetable alkaloids and their salts.
Atropine and its preparations.
Cantharides.
Corrosive sublimate.
Cyanide of potassium, and all metallic cyanides and their preparations.
Emetic tartar.
Ergot of rye and its preparations.
Prussic acid and its preparations.
Savin and its oil.
Strychnine and its preparations.
Vermin killers—of preparations of poisons, the preparations of which are in Part I. of this schedule.

Part II.

Almonds, essential oil of (unless deprived of prussic acid).
Belladonna and its preparations.
Cantharides, tincture and all vesicating liquid preparations of.
Chloroform.
Chloral hydrate and its preparations.
Corrosive sublimate, preparations of.
Morphia, preparations of.
Opium and its preparations, and preparation of poppies.
Oxalic acid.
Precipitate red (red oxide of mercury).
Precipitate white (ammoniated mercury).
Vermin killers (see Part I.)—compounds containing poisons prepared for the destruction of vermin, if not subject to the provisions of Part I.

A special Act, called "An Act to regulate the sale of poisons in Ireland," received the Royal assent on July 14, 1870 (33 and 34 Vict. cap. 26). The articles deemed poisons under this Act, as in the Pharmacy Act of 1868, are scheduled in two parts, and in all respects resemble those catalogued in the Pharmacy Act of 1868. In Ireland the King and Queen's College of Physicians is the body appointed to suggest such additions to the Act as may be desirable. Practically, therefore, it may be said that there is complete uniformity in the law governing the sale of poisons within the United Kingdom.

Secondly.—We have to consider the Persons under the Act permitted to sell the Articles deemed Poisons.

The sale of poisons or the dispensing and compounding them is limited under the Pharmacy Act: (1) To registered pharmaceutical chemists. (2) To those who before the passing of the Act of 1868 carried on in Great Britain the business of "chemists and druggists" in the keeping of open shop for the compounding of the prescriptions of duly qualified medical practitioners (Section 3), and who have been duly registered and (if registered since December 31, 1868) paid their fee; and (3) Those assistants who prior to the Act were of full age (21), and had been engaged for three years previously in the dispensing and compounding prescriptions as assistants to pharmaceutical chemists or to chemists and druggists within the meaning of the Act, and who present themselves to the Pharmaceutical Society to undergo a certain modified form of examination (Section 4)—their status being duly attested and their names registered.

By Section 17 it is enacted that the seller of a poison is the person on whose behalf the sale is made.

In Section 15 penalties are provided to protect the various titles of chemist, druggist, pharmacist, etc.

Thirdly.—We have to consider the Precautions required to be taken by the Persons permitted to sell the Articles deemed Poisons under the Act.

I have already noted that the articles deemed poisons are scheduled under two parts.

It is enacted that any vessel, wrapper or cover in which any poison enumerated in either part of the Act so scheduled is contained, must be distinctly labelled with the name of the article—the word "poison"—and the name and address of the seller (Section 17).

But in the case of those poisons scheduled under Part I. it is further necessary that the purchaser shall either be known to the seller or be introduced to the seller by some person known to him. Further, at every sale of any such article, the seller shall, before delivery, make, or cause to be made, an entry in a book to be kept for that purpose of—

(1) The date of the sale.
(2) The name and address of the purchaser.
(3) The name and quantity of the article sold.
(4) The purpose for which the poison is stated to be required. To this shall be affixed the signature of the purchaser, and of the person, if any, who introduced him.

The sale of arsenic and of its preparations was dealt with in a special Act (14 Vict. cap. 13), entitled "An Act to regulate the Sale of Arsenic." By the term arsenic is included arsenious acid and the arsenites—arsenic acid and the arsenates, and all other colourless poisonous preparations of arsenic. In addition to the precautions required under the Act of 1868 in the sale of the poisons named in Part I. of Schedule A., and which includes arsenic, the following further precautions detailed in the unrepealed Act of 1851 are demanded of the seller:—

(1) That the arsenic shall be mixed with soot or indigo in the proportion of 1 ounce of soot or ½ ounce of indigo to every pound of arsenic. But if the purchaser represent that such admixture would render the arsenic unfit for the purpose for which he required it (in other words, that he does not need it for agricultural purposes), then it may be sold without such admixture, but the quantity so sold at any one time must not be less than 10 pounds (Section 3).

(2) That if the purchaser be unknown to the seller, he must be accompanied by a person known both to the seller and to the purchaser, the sale being effected in the presence of the third person, who shall sign his name and residence in the poison book (Section 2).

(3) That the person to whom the arsenic is sold must be of mature age (Section 2).

(4) That in addition to the details required under the Act of 1868, the purchaser must also state his occupation and condition (Section 1).

The penalty for offending against this Act is £20 (Section 4).

Fourthly.—The exceptional Circumstances under which Poisons may be Sold by Persons other than Pharmaceutical Chemists, and without the usual Conditions Restricting the Sale of Poisons.

I have already noted that in the case of arsenic, should the purchaser represent that the object for which he requires the arsenic is not agricultural, and that the admixture of soot or indigo would render it unfit for his purpose, he may then be served with the arsenic unmixed with any other ingredients, but that the quantity so purchased at any one time must not be less than 10 pounds (14 Vict. cap. 13, sec. 3).

Further, none of the regulations to which I have referred apply to any article constituting a part of the prescription of a legally qualified medical practitioner, dispensed by a registered chemist and druggist (14 Vict. cap. 13, sec. 5); but at the same time it is enacted that should such prescription contain any of the articles scheduled under the 1868 Act as poisons, the chemist must then enter the prescription in a book (called a prescription book) kept for that purpose, with the name of the person to whom the medicine is sold or delivered, whilst on the bottle or wrapper containing such medicine the name and address of the seller is to be stated.

It is to be noted that by Section 17 of the 1868 Act, repeated in Section 3 of the Amendment Act of 1869, it is required (at least so I read it) that the legally qualified practitioner shall in cases where articles deemed poisons under the Act of 1868 are employed as ingredients in his medicines, place on the bottle his name and address, and also enter the prescription with the person to whom such medicine is sold or delivered in a book kept for the purpose.

Again, by Section 16, the making or dealing in patent medicines (such, *e.g.*, as chlorodyne) is excepted from the provisions regulating the sale of poisons.

Further, wholesale dealers are not included within the provisions of the Act when supplying poisons to the retailer (14 Vict. cap. 13, sec. 5) upon order in writing, in the ordinary and legitimate course of wholesale dealing, nor do the precautionary provisions of Section 17 apply to articles exported from Great Britain.

On the death of a pharmaceutical chemist the business may be continued by an executor or trustee, provided it be *bonâ fide* conducted by a duly qualified assistant.

Money penalties are in all cases named, as well for using false titles, as for any infringement of the regulations relating to the sale of poisons.

The word "poison," I would remark, is not to be found in either of the Acts relating to the Adulteration of Food of 1875 or of 1879, but the admixture for any purpose of an article "injurious to health" with an article of food (Section 3) or with a drug (Section 4) with guilty knowledge (Section 5), is prohibited under a fine of £50 for the first offence, and for a second offence (which is then a misdemeanour) of imprisonment, for a period not exceeding six months, with hard labour. It is not, however, regarded as an offence (that is, so far merely as prejudice of the purchaser is concerned) if the food or drug be a proprietary medicine, or is the subject of a patent in force and supplied in the state required by the specification of the patent (Section 6).

II.—THE PRECISE OBJECTS FOR WHICH LEGISLATION IS NEEDED.

Having thus far attempted to place before you the existing laws regulating the sale of poisons, it becomes important to consider the unlawful uses to which poisons may be applied, and to prevent which such legislation becomes necessary. We shall then be in a position to consider how far the laws at present existing are sufficient to prevent or to throw difficulties in the way of the various offences for which poisons may be employed. To this point I shall very briefly direct your attention.

In "An Act to consolidate and amend the statute laws of England and Ireland relating to malicious injuries to property" (24 and 25 Vict. cap. 97, sec. 32) it is enacted, "Whosoever shall . . put any lime or other noxious material in any such pond or water" [*i.e.* water which shall be private property, or in which there shall be any private right of fishery], "with intent thereby to destroy any of the fish that may there be or that may thereafter be put therein . . . shall be guilty of a misdemeanour, etc." This section is, by the 36 and 37 Vict. cap. 71, sec. 13, extended to salmon rivers.

It is, however, worth remarking that the word poison occurs in the 5th section of the Act entitled "An Act to amend the laws relating to fisheries of salmon in England" (24 and 25 Vict. cap. 109). "Every person who causes or knowingly permits to flow, or puts or knowingly permits to be put, into any waters [defined in the Act] containing salmon [defined in the Act], or into any tributaries thereof, any liquid or solid matter to such an extent as to cause the waters to poison or kill fish shall incur the following penalties, etc." The application of the section, however, is limited when such Act is done in the exercise of a legal right, the best practicable means having been taken, within reasonable cost, to render the poisonous material so introduced harmless. By Section 6, the defendant may, if the justices decide against him as to what constitute the best practicable means and reasonable cost, have the case decided by a jury.

The 39th Vict. cap. 13, is "An Act to prevent the administration of poisonous drugs to horses and other animals," and is cited as "The Drugging of Animals Act, 1876." It provides by Section 1 that "if any person wilfully and unlawfully administers to or causes to be administered to or taken by any horse, cattle or domestic animal any poisonous or injurious drug or substance, he shall . . . be liable, etc."

See also 24 and 25 Vict. cap. 97, secs. 40, 41.

In the "Poisoned Grain Prohibition Act of 1863" (26 and 27 Vict. cap. 113), Section 2, provides "Every person who shall offer or expose for sale or sell any grain, seed or meal which has been so steeped or dipped in poison, or with which any poison or any ingredient or preparation has been so mixed, as thereby to render the same poisonous, and calculated to destroy life, shall in either case for every such offence, upon summary conviction as hereinafter provided, forfeit any sum not exceeding £10.

Section 3 relates in similar language, and with a similar punishment on conviction, to cases where the prisoner has "knowingly and wilfully sown, cast, set, lay, put or placed, or caused to be sown, cast, set, laid, put or placed into, in or upon any ground or other exposed place or situation, any such grain, seed or meal," etc.

Section 4, except "any solution or infusion, or any material or ingredient used for dressing, protecting, or preparing any grain or seed for *bonâ fide* use in agriculture only, or the sowing of such last-mentioned grain or seed so prepared."

This Act was by the 27th and 28th Vict. cap. 115 (known as the "Poisoned Flesh Prohibition Act, 1874") extended. Section 2 of this Act provides that "Every person who shall knowingly and wilfully set, lay, put or place, or cause to be set, laid, put or placed, any flesh or meat which has been mixed with or steeped in, or impregnated with poison or any poisonous ingredient, so as to render such flesh or meat poisonous, and calculated to destroy life, shall upon a summary conviction forfeit any sum not exceeding £10. It is, however, permissible under this section for owners or occupiers of land in Ireland, "to lay or cause to be laid any poisonous matter as hereinbefore described, after a notice has been posted in a conspicuous place, and notice in writing has been given to the nearest constabulary station."

By Section 3 exemption is made to the occupier of a house or the owner of a rick or stack of wheat, etc., using poisoned preparations for the destruction of vermin, either in his house or "in any enclosed garden attached to such dwelling house or other building, or in the drains connected with such dwelling house, provided that such drains are so protected with gratings or otherwise as to prevent any dog from entering the same, or within such rick or stack any poison or poisonous ingredient or preparation for the destruction of rats, mice or other small vermin."

Administration of Poisons to Human Beings.

As regards any indictment for murder or manslaughter, or even as an accessory, it is not necessary to state the means by which the death of the deceased was caused, but in the case of murder, "that the defendant did feloniously, wilfully, and of his malice aforethought kill and murder the deceased, and in an indictment for manslaughter that "the defendant did feloniously kill and slay the deceased" (Section 6).

Attempted poisoning with intent to murder is dealt with in the 24th and 25th Vict. cap. 100, sec. 11, in these words, "Whosoever shall administer to, or cause to be administered to, or to be taken by any person any poison or other destructive thing, or shall by any means whatsoever wound or cause any grievous bodily harm to any person, with intent in any of the cases aforesaid to commit murder, shall be guilty of felony," etc. (See also Section 18).

Similarly, by Section 14 the administration or attempting "to cause to be administered to, or taken by any person any poison or other destructive thing with intent to commit murder," is, "whether any injury be effected or not," a felony punishable with penal servitude.

By Section 22 it is enacted that "Whoever shall unlawfully apply or administer to, or cause to be taken by or attempt to apply or administer to, or attempt to cause to be administered to or be taken by any person, any chloroform, laudanum or other stupefying or overpowering drug, matter, or thing, with intent in any of such cases thereby to enable himself or any other person to commit, or with intent in any of such cases thereby to assist any other person in committing any indictable offence, shall be guilty of felony, etc."

The 21st section is in all respects similar, but applies to "Whosoever shall by any means whatsoever attempt to choke, suffocate, or strangle any other person, or attempt to render any other person insensible, unconscious, or incapable of resistance," with intent to commit, or to assist others in committing any indictable offence.

Some difficulties having arisen relating to the unlawful administration of poison in cases where the intent was not to commit murder, an Act was passed in 1860, the clauses of which were included in the Act of 1861 (Clauses 23, 24, and 25).

By Section 23 it is enacted that "whosoever shall unlawfully and maliciously administer to, or cause to be administered to, or taken by any other person, any poison or other destructive or noxious thing, so as thereby to endanger the life of such person, or so as thereby to inflict upon such person any grievous bodily harm, shall be guilty of felony, etc."

By Section 24 it is enacted that "whosoever shall unlawfully and maliciously administer to, or cause to be administered to, or taken by any other person, any poison or other destructive or noxious thing with intent to injure, grieve or annoy such person, shall be guilty of a misdemeanour, and shall, etc."

Section 29 treats as a felony, whether or not any bodily injury result, causing the internal administration by any person "of any explosive substance, or any other dangerous or noxious thing with intent to bruise, maim, disfigure, or disable any person, or to do some grievous bodily harm." The section also deals with causing gunpowder to explode, or the sending to any person an explosive substance or other dangerous or noxious thing, or throwing corrosive fluid on a person. By Section 64 the mere making of explosive substances or any dangerous or noxious thing with intent by means thereof of committing a felony, is regarded as a misdemeanour.

Attempt to procure Abortion.

This is dealt with by the 58th and 59th sections.

By Section 58 it is enacted, "Every woman, being with child, who, with intent to procure her own miscarriage, shall unlawfully administer to herself any poison or other noxious thing, or shall unlawfully use any instrument or other means whatsoever with a like intent, and whosoever, with intent to procure the miscarriage of any woman, whether she be or be not with child, shall unlawfully administer to her, or cause to be taken by her, any poison or other noxious thing, or shall unlawfully use any instrument or other means whatsoever, with the like intent, shall be guilty of felony, etc."

By Section 59 it is enacted that, "Whosoever shall unlawfully supply or procure any poison or other noxious thing, or any instrument or thing whatsoever, knowing that the same is intended to be unlawfully used or employed with intent to procure the miscarriage of any woman, whether she be or be not with child, shall be be guilty of a misdemeanour, etc."

III.—HOW FAR ARE THE OBJECTS OF THE LEGISLATURE TO PREVENT THE UNLAWFUL USE OF POISONS SERVED BY THE PRESENT STATE OF THE LAW REGULATING THEIR SALE?

And here there at once arises an important and (it must be confessed) difficult question. What is a poison? The law nowhere defines it. Further, the subject (as you will have noticed) is complicated by the use of a variety of words and phrases, viz.:—

"Noxious thing," 24 and 25 Vict., secs. 23, 24, 29, 58, 59.

"Noxious material," 24 and 25 Vict., cap. 97, sec. 32.

"Destructive thing," 24 and 25 Vict., cap. 100, secs. 11, 14, 23, 24.

"Stupefying drug, matter, or thing," 24 and 25 Vict. cap. 100, sec. 22.

"Overpowering drug, matter, or thing," 24 and 25 Vict., cap. 100, sec. 22.

"Poison," 24 and 25 Vict., cap. 109, sec. 5; 26 and 27 Vict., cap. 113, secs. 2 and 3; 27 and 28 Vict., cap. 115, sec. 2; 24 and 25 Vict., cap. 100, secs. 11, 14, 23, 24, 25, 58, 59."

"Poisonous drug," 39 Vict., cap. 13, sec. 1.

"Injurious drug or substance," 39 Vict., cap. 13, sec. 1.

"Poisonous ingredient," 27 and 28 Vict., cap. 115, s. 2.

"Poisonous matter," 27 and 28 Vict., cap. 115, sec. 2.

"Poisonous preparation," 27 and 28 Vict., cap. 115, s. 3.

In the Adulteration Act none of these words are used, a poisonous body being included under the phrase an article injurious to health.

It may of course be urged that many of these terms imply the same thing. This may or may not be so, but it is curious how the terms are intermixed in different Acts of Parliament. To add to the difficulty, it is common to find in indictments for murder by poisoning, the phrase, "Deadly poison," used as though the word poison was not sufficiently expressive nor explicit.

The popular definition of a poison is, "a drug that kills rapidly when administered in small quantity;" but then many poisons do not kill in what is popularly termed a small quantity, whilst many most deadly poisons do not destroy life rapidly. Orfila defined a poison as "a substance which, taken internally or applied to the body of man or animal, destroys health or annihilates life by acting in virtue of its nature"—a definition, we must admit, of a somewhat vague nature.

I venture to contribute a definition of a poison as "anything which, otherwise than by the agency of heat or electricity, is capable of destroying life either by chemical action on the tissues of the living body, or by physiological action from absorption into the living system." There are two essentials only to my mind necessary to constitute a body a poison:—

1. That the thing shall be capable of destroying life.
2. That in doing so, its *modus operandi* should be chemical or physiological.

The substance to be a poison must be capable of destroying life. Thus the term "*deadly poison*" is, to quote Mr. Justice Erle's words, mere legal surplusage. If a thing is a poison, it is deadly. If it be not deadly, it is not a poison.

But still the question arises, are we altogether to ignore the element of dose? The question is important in discussing the question of the regulations necessary to guard the sale of poisons. To be a poison or a noxious thing, the administration of which constitutes a felony, must the substance be noxious in itself, or noxious only when administered in excess? This is no fanciful difficulty. It occurred in the case of the Queen *v.* Hennah, tried at the Cornish assizes, where the prisoner was charged with the administration of cantharides, although in quantity so minute as to be innocent. The Lord Chief Justice Cockburn and Mr. Justice Hawkins decided that to be a noxious thing the drug must be noxious in itself, and not merely noxious when an excess had been administered. Again, in the case of R. *v.* Percy (9 Cox's Criminal Cases), it was ruled that any substance which caused sickness only was not a noxious thing, whilst in a third case Chief Baron Pollock said: "We are all of opinion that the thing must be noxious in itself."

In the case of R. *v.* Cramp, a man was tried for having unlawfully administered to a woman a noxious thing (viz., ½ ounce of oil of juniper), for the purpose of procuring abortion. Vomiting and purging set in, and ultimately she miscarried. The jury found the prisoner guilty of administering a noxious thing. The question whether the oil of juniper was a noxious thing within the meaning of the Act was referred to the Court for Crown Cases Reserved. Lord Chief Justice Coleridge (with him Mr. Justices Denman, Field and Stephen), in giving judgment said: "The question is whether the prisoner was guilty of administering a poison or other noxious thing with intent to produce miscarriage. The intent was found. Was the substance administered a noxious thing? It was oil of juniper, and administered in such quantity as was the case it was certainly noxious. But it was said the substance must be some kind of poison, and probably it must be so. But what is a poison? Something destructive or injurious to human life. There is hardly any active medicine which in large quantities may not be so, and on the other hand, there is hardly any poison which may not in certain quantities and in given circumstances be salutary. The reasonable construction therefore is, that in each case it is a question for the jury whether the substance administered as it was, and in the circumstances in which it was administered, was a noxious thing. In the present case all the ingredients of the offence charged were made out. Therefore, neither principle nor authority preclude us from holding what is certainly good sense, that if a person administer with intent to produce miscarriage something which, as administered, is noxious, he administers a noxious thing. The conviction, therefore, must be affirmed."

By a *drug* or *medicine* we ordinarily understand "a substance administered with the object of restoring the normal functions disturbed by disease, or else of curing lesions which may have attacked the various tissues and organs. By a *poison* we understand a chemical substance which, introduced into the animal organism, may produce lesions or serious functional disorders threatening life. Admitting this distinction, it is equally certain that there is no boundary line—at any rate no well-defined boundary line—separating poisons from drugs and medicines. Poisons do not constitute a natural group capable of exact definition. The poison may be a medicine, and the medicine a poison, according to circumstances. After full consideration it appears to me that a poison in the hands of a poisoner should be regarded in the same light as a revolver in the hands of a burglar, and that poisoning should be deemed a form of violent death, different only in form from strangulation and the like."

I have occupied you some time in discussing the meaning of the word poison and the improper uses to which poisons may be placed, and I now ask you to return to our starting point, viz., their sale, and see how far present legislation is efficient or sufficient.

And here one fact is manifest. We can never, by any possible legislation, prevent poisons from getting into the hands of those who have made up their minds to get them and to use them improperly. The best we can do is to throw every difficulty in the way of obtaining them, and to impose such conditions that, in the event of an improper use, we have at any rate some chance of discovering the criminal. Perfect efficiency is impossible. Nor do I think that in this matter, knowing the absolute impossibility of perfect legislation, that we should attempt to over-legislate. For, on the one hand, over-legislation would draw an amount of attention to a subject which, in my judgment (and I speak with not a little experience), the less known by those who have the evil eye and the evil mind the better; whilst to others—to the educated and well-informed—other difficulties may arise. Things may come to this, that we shall be afraid to live for fear we die.

And now for the Act regulating the sale of poisons. The word poison, I have said, is not defined, but the various bodies to be deemed poisons within the meaning of the Act are scheduled.

I object *in toto* to this scheduling. It serves to draw attention to a number of drugs that had far better not be specified. The Schedule is a most remarkable document. It is, I said, divided into two parts. When the poisons enumerated in Part I. are sold, the buyer must be known to the seller, or be introduced to the seller by some person known to him, whilst certain detailed entries in the poison book are required. In the case of poisons under

Part II., such precautions are deemed unnecessary. Let me give you an example. If I go to a chemist and ask for some emetic tartar (a poison undoubtedly, but one that, owing to its emetic properties, as often fails to kill as not) either I must be known to the chemist, or I must take an introduction to him from someone that he knows. In such case, moreover, he enters in his poison book my name and address, or the name and address I choose to give him, the name and quantity of the article sold, and the purpose for which I choose to tell him I require it—all of which details must be duly attested. But if I desire to purchase some opium no such precautions are needed.

Again, if I ask a chemist for some corrosive sublimate or morphia, or for some cantharides, I must be known or duly introduced, and due entries of the sale, etc., recorded. If I ask for a preparation of corrosive sublimate or for *a preparation of morphia* (and a preparation may contain any percentage of the active agent mixed with ever so small a proportion of an absolutely inert one), or for some tincture of cantharides, I need neither be known nor introduced, nor need any written records against me be preserved.

Again, all poisonous vegetable alkaloids and their salts are (very rightly) included in Part I. But the force of this is again lessened by a few vegetable alkaloids being specially named (viz., aconite, atropine, strychnine), all of which poisons are surely included in the phrase poisonous vegetable alkaloids. It may be argued, there is no harm in such repetition. But there is this harm, that there are certain bodies not specially named, and the naming some and not others is undoubtedly an evil.

The exact meaning of the word preparation is nowhere defined. Anything may be held to be a preparation of a substance. "Preparations of prussic acid" are, for example, specially named, a phrase to my mind far from explicit. A salt of a substance is often termed in ordinary language a preparation of that substance. Thus sulphate of morphia might be and often is termed a preparation of morphia. Atropine and its preparations are included in Part I. Belladonna and its preparations in Part II. Morphia would be included amongst the poisonous vegetable alkaloids in Part I. (although why it should not be specially named I do not understand, seeing that strychnine and atropine are); the buyer of these, therefore, must be personally known or introduced. But in the purchase of preparations of morphia no such precautionary measures are demanded.

But the schedule errs by sins of omission. I shall not be accused of egotism if I claim some experience for many years, as the pupil, assistant and colleague of Henry Letheby, and since his death on my own account, with the subject of poisons and poisoning. Recalling a personal experience then of a good many years, it is remarkable that the two poisons which in my experience have been the cause of many accidental deaths, and have also been used more frequently suicidally than any other, and two poisons, moreover, of a most deadly nature, are not included in the schedule at all. I refer to carbolic acid and phosphorus.

You ask, what remedy have you to suggest? I answer, define a poison, accurately and scientifically, and omit the schedule. As a preventive measure it is unadvisable (I am convinced) to publish a list of poisons. Further, if such a list be prepared, no matter how carefully, it is sure to offer abundant material for legal quibbles.

What has been the result of all this scheduling and this Part I. and Part II. legislation? That the Act at the present time is not carried out in its entirety, and I almost venture to say is an impossible Act to be obeyed. Strictly it does not seem to have been carried out in the purchase of the aconitine used with such fatal effect by Lamson. The fact is, anybody (with a little trouble, perhaps, but very little) can get almost any poison they want, and in almost any quantity. Fancy a woman being able to purchase five pints of laudanum at one shop. I tell of that I can vouch ...

Over legislation has in this case proved under-legislation. Simplify, I say, the whole thing. Define a poison, and omit all schedule of names. Require that the sale shall be the act of a pharmaceutical chemist only, and that the pharmacist keep a record of the sale, the person's name and address, and the object as stated for which the poison was said to be required. Enough records should be demanded to throw difficulties in the way of persons procuring poisons for improper purposes, but not too many, lest too many may mean in the long run none at all. Further, it may fairly be taken for granted that with the present race of pharmacists some little judgment will be used in the sale of poisonous preparations, and for which judgment no Act of Parliament can provide. It would be absurd to require poison regulations to apply to such things as an opium plaster or a Dover's powder, or medicinal doses of pulv. cretæ c. opio or paregoric—all of which, strictly speaking, are preparations of opium. Any legislation is sure to fail unless you credit the pharmacist with a certain amount of common sense in his commercial proceedings.

Taking, then, the whole of the facts into consideration, together with the various decisions, I would venture to suggest the desirability in future legislation of using the word "poison" only in the place of the various phrases I have referred to, the chief uses of which are as battle grounds for the arguments of counsel. I would further suggest an interpretation clause defining the word poison somewhat in the terms I have proposed. In the case of the 24th and 25th Vict., cap. 100, and some other Acts, the phrase "poison or other destructive thing" will be required. I have stated that a substance to be a poison must act chemically or physiologically on the body—that is, that its action must be something more than merely a mechanical one. For example, if a person swallowed a quantity of pins, the chances are they would prove fatal. But their action being mechanical, pins, strictly speaking, are not to be deemed a poison. The phrase, destructive thing, would cover all bodies that taken internally destroy life mechanically, whilst the word poison would include all bodies that kill chemically or physiologically. The question of dose, so far as the sale of poisons is concerned, is immaterial, whilst in trials relating to offences against the person it can be dealt with as it arises.

The Sections 21 and 22 of the 24th and 25th Vict., cap. 100, relating to the use of "stupefying and overpowering drugs," with the object of assisting in the committal of an indictable offence, call for little criticism, although I am not sure, even here, that the word poison would not be better.

There is one point here I should wish to mention, viz. That poisons may be administered in a great variety of ways with equally noxious effects. Besides the mouth they may be given by the rectum or vagina, or injected into the veins, or injected subcutaneously, or applied to broken or unbroken skin, or dropped into the ears, or be inhaled, or as in the case of infants be absorbed in poisonous doses from the mother's milk. This latter fact it is important to remember. Lewald states that more iron can be given an infant by this means than by any other. I have myself found quinine, strychnia, morphia, mercury, bismuth, zinc, lead, arsenic, antimony and iodine in the milk of women to whom these drugs had been administered. That alcohol (a stupefying drug) may pass from mother to child by the breast is a fact of which I have no shadow of doubt. Therefore in all cases it should be understood that the word "administer" should include any possible method whereby poison may find entrance into the body.

I suggest, therefore, that every pharmacist should be required to keep a poison book, in which the date, the name and address of the purchaser, the name and quantity of the article sold, and the purpose for which it was said to be required is stated in all cases where poisons are asked for and sold. The Act provides (Sec. 17) that the bottle, wrapper, etc., containing the poison (that is, not the outside wrapper merely), shall be distinctly labelled with the name of the poison and the word poison, and the name and address of the seller. To this excellent provision I would only add that it appears desirable that "the poison label" should be of some special colour, red suggesting itself as that commonly employed to indicate danger.

I now pass to another part of my subject. The 1868 Act nowhere provides any restriction or lays down any provision relating to the compounding and the sale or delivery of liniments, embrocations, and the like, by pharmacists, medical practitioners or veterinary surgeons; such preparations it must be remembered are often exceedingly poisonous, and have caused (as I can testify) numerous accidental and suicidal deaths. By the 1st section of the 1868 Act, the duty of suggesting regulations as to the dispensing of poisons was referred to the Pharmaceutical Society. It is to be regretted that they have taken no steps to fulfil the obligations thus imposed upon them. The Council of the Society, it is true, did make a suggestion which, with some few alterations (for which I must be held responsible) I shall read to you, fully believing it would meet the case. I regret the members of the Society did not adopt it.

"In the dispensing liniments, embrocations, and lotions, by any pharmacist, medical practitioner, or veterinary surgeon, such liniment, embrocation, or lotion shall be put in a bottle distinctive to the touch, such bottle to be approved of for the purpose by the Councils jointly of the Royal College of Physicians and of the Pharmaceutical Society. Further, there shall be attached to the bottle, in addition, a caution label, also to be approved by the Councils of the Royal College of Physicians and of the Pharmaceutical Society, indicating that the contents of the bottle are for extenal use only."

I have carefully considered the difficulties that have been urged to such a regulation, *e.g.*, the cost of special bottles in the case of the poor—that mechanical contrivances would prevent people from using their common sense—and that by so much greater would be the danger—that a false security would be engendered—that unnecessary alarm might be excited—and so forth. And I admit a certain force in these and in many other kindred criticisms. But then if we wait until we can propose a rule to which no criticisms can be offered, I am afraid legislation must remain at a standstill. We must do our best and leave the rest.

And here I am compelled to tread somewhat dangerous ground in considering how far the precautionary measures regulating the distribution of poisons by pharmacists should apply to apothecaries, veterinary surgeons, and thers. It appears to me inevitable that in the case of medical men and of veterinary surgeons who sell drugs they should be subjected to the same rules that regulate the sale of poisons by pharmacists; whilst in dispensing liniments, embrocations, and the like, it would be scarcely practicable to except them from the precautionary provisions deemed necessary for others.

As regards wholesale dealers, drysalters, etc., no exception is possible. With them the records are, if anything, more easily obtained than in the case of retail traders, whilst the larger quantities dealt with render the necessity for such records the greater. It would, however, be absolutely necessary for some register to be kept of the wholesale druggists, drysalters, etc., entitled to sell poisons, and I cannot think that there could be a better authority to undertake the task than the Pharmaceutical Society.

Beyond this I would stop the sale of poisons altogether. It appears most undesirable that highly poisonous preparations, *e.g.*, the various vermin killers, phosphorus pastes, sheep washes, agricultural solutions, carbolic acid, etc., should be permitted to be sold without the slightest restrictions, often in unlabelled bottles, by grocers, oilmen, and the like. It is most undesirable that herbalists should be allowed to sell such articles as savin, pennyroyal, and other herbs, the procuring of which, we cannot doubt, is in most cases for a felonious object. It is most undesirable that that curious body of herbalists, who bear the ominous name of Coffinites, should be allowed to scatter broadcast their poisonous and noxious preparations of cayenne and lobelia—a mixture, which notwithstanding they assert it not to be poisonous, has, I happen to know, more than once succeeded in destroying the lives of children that have been dosed with it at their hands. If these medicines be required, let them be procured from authorized and registered agents only, and under conditions regulating the sale of poisons.

And now one word on the sale of articles of food adulterated with poisonous drugs. I shall not attempt here to criticize the Adulteration Acts or their working, although the subject is a tempting one. Since the famous work of Accum on 'Adulteration,' published with the startling motto, "There is death in the pot," anxious curiosity has been constantly kept alive by a species of trading on the credulity of the public, and "the press has literally groaned with the efforts of sensational writers on this subject" (Letheby on 'Food,' p. 233). However strongly I may feel that the Adulteration Acts have in many cases worked harshly and unjustly, in one instance I think they fail to go far enough, viz., in cases where the addition of a poisonous body to any article of food can be proved. I do not mean as illustrations of a poisonous body or a body injurious to health, the addition of alum to bread (a perfectly innocuous material within possible limits), or the use of a minute trace of magenta to colour an ice (1 grain of which is enough to colour 2 quarts of custard), but I mean *bonâ fide* poisons in definite quantity, either for the purpose of giving a false strength to a article (*e.g.*, the addition of cocculus indicus to beer), or of improving its appearance (as, *e.g.*, the use of mineral pigments to colour confectionery). In such cases surely a money fine is an insufficient punishment.

Storage of Poisons.

I wish now to draw your attention to the first section of the 1868 Act, regulating the Sale of Poisons (21 and 22 Vict., cap. 121). It provides: "It shall be unlawful for any person to sell or keep open shop for retailing, dispensing or compounding poisons, or to assume the title chemist and druggist . . . unless such person be a pharmaceutical chemist . . . and conform to such regulations as to the keeping, dispensing and selling of such poisons as may from time to time be prescribed by the Pharmaceutical Society with the consent of the Privy Council."

The Act was passed in 1868. This is 1883. What regulations have the Pharmaceutical Society made to regulate "the *keeping* of poisons?" None at all. Any chemist may keep the whole catalogue of poisons named in a toxicological treatise in his shop, labelled as he pleases, in English or in Latin, or in any other language, dead or alive, or even in chemical formula—packed in bottle, paper or box, secured or unsecured, as he pleases, on shelf, or in drawers along with harmless drugs, and constantly required medicinal preparations.

I am sure you will agree with me that some legislation is absolutely called for in this matter of storage. My own experience as a toxicologist would enable me (if it were necessary) to recount more than one case where, owing to poisonous drugs and ordinary medicines being kept on the same shelf, accidental cases of poisoning have occurred.

Let us be fair to the Pharmaceutical Society, to whom was entrusted the duty of deciding what regulations were practicable. The Council of the Society agreed to certain resolutions which were submitted to the members on December 1, 1869. So admirable were these suggestions—the work of thoroughly practical and experienced men—that I shall, with a few alterations, adopt them as regulations I firmly believe would meet the case, and would, if carried out, be of great benefit to the community:—

1. In the keeping of poisons in any shop, dispensary, surgery or wholesale warehouse, each poison shall be kept in a box, bottle or vessel distinctly labelled with the name of the article, having upon it a second distinctive label marked "Poison" (termed a poison label), the precise form of which shall be approved by the Councils of the Royal College of Physicians and of the Pharmaceutical Society.

2. In the storage of poisons one or other or all of the systems following shall be adopted:—

A. The boxes, bottles, vessels or packages used to contain poisons in any shop, surgery, dispensary or warehouse shall be kept in a separate apartment, cupboard, compartment or drawer specially reserved for poisons.

Or, if not so kept apart.

B. The bottles or vessels used to contain poisons shall be distinguishable to the touch and of a form approved by the Councils of the Royal College of Physicians and of the Pharmaceutical Society, and, unlike the other bottles, containing articles which are not poisonous, in the same shop, surgery, dispensary or warehouse.

Or otherwise.

C. The bottles or vessels used in any shop, surgery, dispensary, or warehouse, to contain poisons, shall be tied over, or capped, or secured in a manner distinguishable from the way in which bottles or vessels in use in the same shop, surgery, dispensary, or warehouse are secured for any bottles or vessels containing articles that are not poisonous.

The Pharmacy Act was conceded to pharmacists on the distinct understanding that they would do something for the benefit, and as a safeguard to the satisfaction, of the public in this matter. The Council at that time did do something, but the majority of the members, at their annual meeting on May 18, 1870, rejected their suggestions. I have carefully read and considered all the difficulties urged at the time to their acceptance. The burden of the objection is this:—We do not object to these regulations because they are bad, or even impossible, in fact most of us adopt them, but we do not like to be trammelled. We do take care, says one, in substance, but we do not want to be compelled to take care. We do not want, "says another," an Act of Parliament to make us feel our responsibilities. A third suggested that the convenience of the trade was being sacrificed by such regulations. There were bold spirits at that meeting, who thought and said otherwise. Permit me to quote the words of Mr. Edwards, a well-known pharmacist, who supposes a case (not an imaginary one, as I know of my own knowledge) of a child being poisoned by oxalic acid sold by the pharmacist for Epsom salts. "What," says he, "would the man say as he stood and looked at the cold remains of his child? Has everything been done that would have prevented this accident? Was every precaution taken to stay the hand of death, and keep the silent seal of the destroyer from these cold lips? Am I satisfied that these dangerous things on which the life of my child has been hanging have been guarded and sealed and kept with every possible precaution against accident? Are there no regulations that can affect these things and make these accidents less liable to happen? No, there is no regulation. They, say they (the pharmacists, *i.e.*) know their own business best: they have not known their own business best; and for the last ten years the feeling has been rising that they do not, or these accidents would not happen. It is quite true that some honourable and careful men may, but I want a regulation that will apply not only to the careful and painstaking man, but to everyone: not liberty for some men to do so and so, but a law which shall bind every man. I want it to apply not only to the chemist at the West End, but to the careless druggist who keeps the chandler's shop at the corner of a poor street; to every man who sells poisons, compelling him to take all those precautions that can justly be required before a human life is sacrificed. But regulations were proposed, a string of them were drawn up, but they were objected to and refused. One man said that he did not like putting his poisons in a cupboard; and another said that it was a little trouble to put them in a corner; and another that he did not approve of coloured labels; and there were some other objections of that sort, but it all resolved itself into this, that it was rather more trouble than they chose to take. I can only say this, when these effects come before me, if that is the principle on which these men make laws—if they mind a little trouble—if they think a great deal of an unnecessary precaution—if they are so careless that a little fidgetism even is sufficient ground for rejection—it is high time that other people make laws for them."

The time has come when whoever keeps for sale or dispenses poisons must be ready to accept some legislation in the matter of storage. We shall want no ingeniously devised system of espionage I am convinced to see that regulations, conceived in no spirit of opposition, are efficiently carried out. As regards the sale and storage of poisons, the intelligence and honour of that medical body who compound, as well as prescribe, and of veterinary surgeons, of pharmacists, and of wholesale traders, are certain to render any inquisitorial system—a staff of prying eyes roving up and down the country—as uncalled for as it would be objectionable. Let only fair regulations be proposed, and there is certain to be found both the will and the way to carry them out in their integrity.

I am quite ready to admit that the regulations suggested may not be complete. It is easy enough to criticize any regulations and to talk about false security—about the danger of putting up a fence unless it be perfectly secure, lest people lean against it and fall into the water. But I have yet to learn that *insufficient* legislation is necessarily *useless* legislation. The legislation of 1868 provided for that being done which has not been done. And admitting to the very full the improved education of pharmacists, nevertheless, it is to their interest that everything should be done by them to insure the public confidence which is now and then rudely shattered by a fatal accident, or by the perpetration of an exceptional crime.

And remembering this, that in the case of medical men and pharmacists, as with all other bodies, the sins of an individual member are more or less visted on the entire body, it behoves them to see that all the means indicated by the Act, and other means by which the Act may be supplemented, are duly carried out.

I see no help that medical men who compound as well as prescribe (a combination, I hope, we may before long speak of as a thing of the past), veterinary surgeons and wholesale traders, can be exempted from a certain amount of legislature. For this reason I have suggested that the Council of the College of Physicians should be associated with the Council of the Pharmaceutical Society in deciding what is needful in this respect.

If I have succeeded in placing before you the views I entertain on this enormously important subject, and thereby to provoke a discussion which may help to place the subject of the sale and storage of poisons on a footing more satisfactory to all than it is at present, with the one object of preventing death by misadventure and the commission of criminal acts at once so disastrous, so painful, and so costly, then the object I have had in view to-day will have been served.

Communications, Letters, etc., have been received from Messrs. Abraham, Borland, Mason, Stanford, Benger, Tanner, Stephenson, Dott, Woolley, Ashton, Wyatt, Conroy, Lawrence, Milne, Miller, Bedford, Nind, Quinlan, Siebold, Ekin, Brown, Naylor, Symes, R. F. J., Junior, Apprentice.

THE NEW PHARMACOPŒIAS FOR THE UNITED STATES AND GERMANY.

(*Continued from p.* 144.)

PHYSOSTIGMINÆ SALICYLAS, U.S.P. (new); PHYSOSTIGMINUM SALICYLICUM, P.G. (new).—Assuming that it be desirable that there should be an official salt of physostigmine, it is a decided advantage that the same salt should have been selected in the United States and Germany; but it is rather curious that the choice should have fallen upon one so little known as the salicylate, whilst the sulphate and hydrobromate, which have been informally adopted in France and Holland, are ignored. Presumably the compound meant is the "salicylate of eserine," brought out as a specialty by Merck, about four years since (*Pharm. Journ.*, [3], ix., 976), which was stated to remain exposed to the light three weeks without alteration. The U.S.P. describes it as occurring in "colourless, shining, acicular or short columnar crystals, gradually turning reddish when long exposed to air and light; soluble in 130 parts of water and in 12 parts of alcohol [Merck says 1 in 24 of absolute alcohol] at 15° C., in 30 parts of boiling water and very soluble in boiling alcohol. . . . The aqueous or alcoholic solution of the salt, when exposed to the light for a short time, turns reddish." The P.G. description is practically similar, but allows the crystals to be "free from colour or yellowish." The tests for the identification of the alkaloid appear to be very meagre. The P.G. maximum single dose is 0·001 gram and the maximum daily dose 0·003 gram.

PICROTOXINUM, U.S.P. (new).—The neutral principle prepared from the seeds of *Anamirta paniculata* is another substance that may be said to have obtained a very prompt admission to the Pharmacopœia. The characters given are—"Colourless, flexible, shining prismatic crystals, permanent in the air, odourless, having a very bitter taste and a neutral reaction. Soluble in 150 parts of water and in 10 parts of alcohol at 15° C.; in 25 parts of boiling water and in 3 parts of boiling alcohol; also soluble in acids and in solutions of the alkalies. When heated to about 200° C. the crystals melt, forming a yellow liquid; when heated on platinum foil they char and are finally completely dissipated." The compound is represented by the formula $C_9H_{10}O_4$. Notwithstanding all this precision, it should be borne in mind that it has been recently stated by Barth and Kretschy (*Pharm. Journ.*, [3], xi., 352) that commercial picrotoxin is a mixture of three different bodies in proportions probably varying with the seeds used in its preparation.

PILOCARPINÆ HYDROCHLORAS, U.S.P. (new); PILOCARPINUM HYDROCHLORICUM, P.G. (new).—The hydrochlorate of pilocarpine has been made official in both Pharmacopœias in preference to the nitrate, presumably because of its greater solubility, the hydrochlorate being said to be soluble in about twice its weight of water whilst the nitrate requires 8 parts (*New Remedies*, May, 1881). It is described as in "minute white crystals, deliquescent, odourless, having a faintly bitter taste and a neutral reaction; very soluble in alcohol and in water, nearly insoluble in ether or chloroform." The crystals, which melt and are completely dissipated by heat, give with concentrated sulphuric acid a yellow colour, with nitric acid (sp. gr. 1·400) a faintly greenish-violet tint, and with sulphuric acid and potassium bichromate an emerald green colour. A slightly acidulated aqueous solution gives no precipitate with water of ammonia and solution of soda only produces turbidity in a concentrated solution. The P.G. gives the maximum single dose as 0·03 gram and the maximum daily dose as 0·06 gram.

PIPERINA, U.S.P. (new).—Although this alkaloid has been recommended as a substitute for sulphate of quinine in the treatment of intermittent fevers, the measure of success attending its use would hardly have raised the expectation that it would have been included in a pharmacopœia just yet, especially as it seems quite possible that any favourable results obtained have been due to adherent impurities. The U.S.P., however, does not allow such impurities, for the crystals are to be colourless or pale yellowish, odourless and almost tasteless when first put in the mouth, but on prolonged contact producing a sharp and biting sensation, possibly through a minute portion becoming decomposed into piperidine and piperic acid.

POTASSIUM COMPOUNDS.—The U.S.P., 1880, includes twenty-one potassium compounds, and differs from the previous edition only in omitting impure carbonate of potassium (pearlash), and "carbonate of potassium" that was not quite pure. The P.G., which in 1870 also included three grades of purity of carbonate, now has only two. The U.S.P. contains both the cyanide and the ferrocyanide, but the P.G., 1880, neither; the latter having been dropped out, together with hydrocyanic acid, as no longer required. The other potassium compounds in the U.S.P. and not in the P.G. are "potassa with lime," the citrate, hypophosphite and sulphite. On the other hand the P.G. includes "tartarus boraxatus" (soluble cream of tartar), which is not in the U.S.P. The following are the principal characters of those not in the B.P.:—

Potassa cum Calce, U.S.P.—A greyish-white deliquescent powder, made by rubbing together equal parts of caustic potash and lime. It constitutes the "Vienna caustic powder," and is prepared for use by making it into paste with a little alcohol.

Potassii Cyanidum, U.S.P.—The tests indicate a compound corresponding to at least 90 per cent. of pure cyanide of potassium.

Potassii Hypophosphis (KH_2PO_2), U.S.P.—In white, opaque, confused crystalline masses, or a white granular powder, very deliquescent, odourless, having a sharp, saline, slightly bitter taste and a neutral reaction. Soluble in 0·6 part of water or in 7·3 parts of alcohol at 15° C.; in 0·3 part of boiling water, or in 3·6 parts of boiling alcohol. When heated in a dry test tube it loses adhering moisture and evolves spontaneously inflammable phosphoretted hydrogen. On triturating or heating the salt with an oxidizing agent the mixture will explode. An aqueous solution yields a white crystalline precipitate on the addition of a saturated solution of bitartate of sodium, and with test solution of nitrate of silver a white precipitate that rapidly turns brown and black, separating metallic silver. Acidulated with hydrochloric acid and added to excess of test solution of mercuric chloride it produces first a white precipitate of calomel and afterwards causes the separating of metallic mercury. Tests are given for the absence of carbonate and sulphate and of calcium, and the presence of phosphate is limited to the production of a slight cloudiness when an aqueous solution is mixed with "test solution of magnesium" (a solution of ammoniated magnesium sulphate). It is used in the preparation of "syrup of the hypophosphites."

Potassii Sulphis ($KSO_3 \cdot 2H_2O$), U.S.P.—In white, opaque, obliquely rhombic, octahedral crystals or a crystalline powder, somewhat deliquescent, odourless, having a bitter, saline and sulphurous taste and a neutral or feebly alkaline reaction. Soluble in 4 parts of water at 15° C., or in 5 parts of boiling water; only sparingly soluble in alcohol. When gently heated the salt loses its water of crystallization (18·5 per cent.); at a red heat it is decomposed, leaving an alkaline residue. It differs from hyposulphite in an aqueous solution evolving the "odour of burning sulphur" on the addition of dilute hydrochloric acid and not becoming cloudy. The iodine and starch test given corresponds to at least 90 per cent. of pure sulphite of potassium.

Quinine and other Cinchona Alkaloids and their Salts.—Of the cinchona alkaloids the U.S.P., 1870, included three: cinchonine sulphate, quinine sulphate, and quinine valerianate. No less than eight more have now been added: cinchonidine sulphate, cinchonine, quinidine sulphate, quinine, quinine bisulphate, quinine hydrobromate, quinine hydrochlorate, and chinoidin. The P.G., on the contrary, has dismissed quinine, quinine tannate, quinine valerianate, cinchonine and cinchonine sulphate, and retains only quinine sulphate, bisulphate and hydrochlorate, and chinoidin. It may be stated here that the method adopted in the P.G. for testing the strength of the bark in total alkaloids is the modification of Prollius's recommended by De Vrij (*Pharm. Journ.*, [3], xii., 765). The following are the principal features in the characters and tests of the individual alkaloids and their salts given in the two works:—

Chinoidinum, U.S.P. (new); P.G.—This rather indefinite substance has pretty well dropped out of use in this country,—where indeed it has never been received with any favour,—but it has remained in use in Germany and some other countries, and has now been added to the U.S.P., where it is described as "a mixture of alkaloids, mostly amorphous, obtained as a bye-product in the manufacture of the crystallizable alkaloids from cinchona." It is stated to be almost insoluble in water, freely soluble in alcohol, chloroform and dilute acids, and partially soluble in ether and in benzol. When triturated with boiling water, the liquid, after filtration, should be clear and colourless and should remain so on the addition of an alkali. The P.G. requires that it should dissolve clear in an equal weight of a mixture of 1 part of dilute acetic acid and 9 parts of water so as to leave scarcely any residue; it must also form a clear solution with nine times its weight of cold dilute spirit. Both works limit the amount of ash to 0·7 per cent.

Cinchonidinæ Sulphas, U.S.P. (new).—The neutral sulphate of cinchonidine is made official in the U.S.P., and is described as occurring in white, silky lustrous needles, or thin quadratic prisms, soluble in 100 parts of water or 71 parts of alcohol at 15° C., in 4 parts of boiling water, in 12 parts of boiling alcohol, freely in acidulated water and in 1000 parts of chloroform. the undissolved portions becoming gelatinous. This salt crystallizes from a dilute aqueous solution with 6 to 7 molecules of water, but from a concentrated solution with only 3 molecules. It is the form with 3 molecules which is official.

Cinchonina, U.S.P. (new).—Sulphate of cinchonine was already official in the U.S.P., and now the alkaloid is included. It is described as occurring in white, somewhat lustrous prisms or needles, almost insoluble in cold or hot water, soluble in 110 parts of alcohol at 15° C., in 28 parts of boiling alcohol, 371 parts of ether, 350 parts of chloroform and readily soluble in dilute acids. A solution in dilute sulphuric acid should not exhibit more than a faint fluorescence, showing absence of more than traces of quinine or quinidine; it is distinguished from quinine by its sparing solubility in solution of ammonia, and from quinine, quinidine and cinchonidine by being much less soluble in ether.

Cinchoninæ Sulphas, U.S.P.—Hard, white, shining prisms of the clino-rhombic system, permanent in the air, having a very bitter taste and neutral or faintly alkaline reaction. Soluble in about 70 parts of water at 15° C., or 6 of alcohol; in 14 of boiling water or 15 of boiling alcohol; and in 60 of chloroform; insoluble in ether and benzol. Heated to 100° C. it should not lose more than 4·8 per cent. in weight (two molecules of water); melts with partial sublimation at about 240° C.

(*To be continued.*)

COLD CREAM.*

Mr. Ad. Vomacka gives the following formula and directions for cold cream, in the *Seifenfabrikant*:—

White wax	200 parts.
Spermaceti	500 parts.
Oil of almonds, expressed . . .	1600 parts.
Rose water	80 parts.
Oil of rose, for each 2·4 kilos . .	30 drops.

Melt the wax and spermaceti at a gentle heat on the water-bath, pour the mass into a very shallow, warmed porcelain dish, and let it stand over night covered with paper. Next morning, begin to work the hardened mass by a gentle, uniform to-and-fro motion of the pestle, which should be held lightly between the fingers without exerting pressure, commencing at the edge, gradually working towards the middle, and mixing thoroughly.

The prescribed amount of rose water is now slowly added, in a thin stream, and while constantly stirring. If desired, 5 grams of borax may be dissolved in the rose water, which will facilitate the combination. The mortar is now well covered and set aside for one or two days, in order to give the fat a chance to combine with the water. It is then again briskly stirred for a quarter or half an hour, and, finally, the oil of rose is added, previously dissolved in a little castor oil, which latter imparts to the cold cream an extremely handsome dull lustre. . . .

To prevent cold cream becoming rancid or acid a small quantity of salicylic acid dissolved in rose water or sweet spirit of nitre may be added.

In place of oil of rose, other oils or mixtures of oils may be used, as for instance:—

1. Oil of neroli	10 parts.
Oil of rose	5 parts.
Oil of lemon	15 parts.
2. Oil of bergamot	9 grams.
Oil of lavender (finest)	3 grams.
Oil of rose	35 drops.
3. Oil of lemon	5 parts.
Oil of lavender (finest)	5 parts.
Musk	0·4 parts.

In the same manner as the above is prepared.—

Vaseline Cold Cream.

Spermaceti	150 parts.
Paraffin	150 parts.
Vaseline, white	1000 parts.
Rose water	600 parts.
Oil of rose, to every 2·4 kilos . .	30 drops.

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* From *New Remedies*, September, 1883.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 20, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

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

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

THE PRESIDENT OF QUEEN'S COLLEGE, GALWAY, ON THE EXAMINATION SYSTEM.

It is so short a time since the subject of examinations occupied these columns that some apology for referring to it again after such a brief interval might be fitting, were it not that the report recently presented to Her Majesty, by Professor Moffett, as President of Queen's College, Galway, contains something like a defence of the examination system which it is now becoming rather fashionable to decry, and moreover the report deserves special attention as expressing the opinions of an official holding an important educational trust. Professor Moffett in the outset recognizes the rapid extension of the examination system—particularly in its competitive form—and the predominant part it has begun to play in the general education of the country. He admits that it bids fair to become the director and regulator of education and to modify profoundly the old methods of instruction. But he is not prepared to acquiesce in an indiscriminate condemnation even of the competitive examination system and evidently is not terrified by the prospect of any near advent of the time—apparently perceptible to some—when competition between schools to provide teaching that shall pay in the way of immediate and material results rather than the teaching which is really fruitful and informing shall have converted the whole educational machinery of the country into an apparatus for encouraging and facilitating "cram." Indeed, even the much decried practice of "cramming" is not, in Professor Moffett's eyes, an unmitigated evil, since he considers that it is at least a reaction against the slow teaching, the drowsy and sterile routine of the old educational methods. It may be presumed that this toleration would hardly extend to some forms of teaching that are usually included under the name "cram," such, for instance, as those referred to humorously by Professor Foster in his address. Still Professor Moffett deliberately expresses his opinion that some of the objections that have been urged against methods to which the term "cramming" has been applied are theoretical and illusory, and appear to "ignore the conditions of modern "existence, the pressure and competition of actual "life, 'where every gate is thronged with suitors'" and where every appointment is sought by a crowd of candidates. So long, he adds, as the results of examinations possess the influence they actually exercise on the prospects of candidates, so long will the "cramming" method, which is a product of the competitive system, justify its existence.

Professor Moffett argues that it is necessary to recognize facts as we find them, and, whilst never losing sight of the ideal of education, to make a perfectly candid use of the opportunities which the circumstances of the country and the time afford. The system of examinations is one of these facts, and the question now is not whether we will have examinations, but what kind of examinations we will have. But when the Professor comes to reveal his mind upon this subject it is seen that his opinions are hardly so revolutionary as might have been surmised from his *quasi* defence of "cram." In fact, he adopts the opinion of Professor Vaughan, that the work to be effected by good examinations is to exclude as far as possible the favours or injuries of chance, to foil the arts of cram, to apportion the success to the industry, the talent and the good sense of the students, and so indirectly to secure good teaching and good, energetic, honest learning. In this definition there is nothing that might not be endorsed by the most orthodox of teachers. But Professor Moffett would go farther than this, and instead of remaining satisfied with such an indirect influence of examining boards upon teachers and taught, would accord to them a function which many will deem should remain in other hands. He would have examiners regard themselves not merely as judges of the students who come before them, but to some extent also as directors of the teaching of those who will follow, and, therefore, aim at making their examinations "educational agents, as guides of teaching and of study." This, however, would seem to reverse the usually accepted position of examiners and imply that they should be at liberty to travel beyond the subjects in which the candidates go up for examination, and to put questions in other subjects, not because the candidates are supposed to have been taught them, but simply because in the examiners' opinion such subjects ought to be included in the curriculum of succeeding students.

Professor Moffett's arguments appear to us to be somewhat sounder when he passes from the subject of the aims of the examiners to that of the examinations themselves. The application of the examination test, pure and simple, has, he considers, a tendency to engender certain well-known intellectual defects, of which the chief is the habit of loading the memory with the mere results of knowledge rapidly accumulated, which, when the pressure is passed, is almost as rapidly forgotten; in fact, it tends to foster "cram." He prefers that examinations should be the sequel of well-ordered courses of study and a test of the thoroughness with which a curriculum has been pursued. As to the manner of conducting such tests the Principal of Galway College has great faith in a searching oral examination, as giving more efficient and trustworthy evidence as to the fulness and coherence of a student's knowledge than is afforded by written answers. He would, therefore, extend the *vivâ voce* portion of mixed examinations as far as possible, and give it a greater importance by assigning to it a higher value in the aggregate of marks.

On the whole it will be seen that whilst holding somewhat charitable views as to the nature and extent of the evils that follow in the wake of examinations which are prepared for and passed from more or less commercial—but not necessarily unworthy—motives, Professor Moffett is in accord with the majority of other experienced teachers as to the most effective means of minimizing the evil, and would ensure that the student during at least a portion of his pupilage has been undergoing a sound and honest course of education.

PHARMACEUTICAL EDUCATION IN FRANCE.

Those of our readers who followed Mr. Möller in his very excellent account of modern pharmaceutical study in the different countries of Europe, which two years ago appeared in this Journal, will perhaps remember that besides the three "Superior Schools of Pharmacy" in France, at Paris, Montpellier and Nancy, and the mixed faculties of medicine and pharmacy at Lille, Lyons and Bordeaux, the State also conducts sixteen preparatory pharmaceutical schools in different parts of that country, in which the educational curriculum necessary for qualification to practise as a pharmacien may be followed by those persons who only aspire to belong to the second class. These schools have recently been reorganized and a decree has been issued regulating the conditions under which they are in future to be carried on, and although there are no analogous establishments in this country, and are never likely to be, it may prove interesting at a time when the subject of compulsory pharmaceutical education is again receiving special attention to refer to some of the arrangements so far as they relate to the teaching of pharmacists.

The authorized teaching staff in these schools is to include twelve titular professors, six assistant-professors, and two superintendents of practical work, besides subordinate officials. Of the twelve professorial chairs, four are to be devoted to chemistry and toxicology, physics, natural history, and pharmacy and materia medica, the other eight being associated with more specially medical subjects. One of the six assistant-professors is to be attached to the chairs of physics and chemistry jointly; another to the chair of pharmacy and materia medica, and a third to that of natural history. The qualification for a professorship of physics, chemistry or natural history is to be the degree of doctor of medicine or that of pharmacien of the first class; but only a pharmacien of the first class can hold the chair of pharmacy and materia medica. The assistant-professors will be required to hold similar diplomas, except in the case that a licence in the natural and physical sciences will be accepted to teach according to the nature of the licence. The superintendents of practical physics and chemistry will have either to possess diplomas as doctors of medicine or as pharmaciens of the first class or be licentiates in physical science. The appointments as assistant-professors are to be for a period of nine years, and, as a rule, will be decided by an open competition conducted by a faculty of medicine, a mixed faculty of medicine and pharmacy or the authorities of a superior school of pharmacy, as determined by the responsible minister; but the right is reserved to the minister to appoint assistants to the chairs of chemistry, physics, and natural history, without competition. Nine years is also to be the term of the appointments as superintendents of practical work, and these are to be dependent upon the results of open competitions conducted by the authorities of the schools in which the vacancies occur. A table of the courses of lectures delivered by the professors and their assistants and the practical work done in each school, and containing full information as to the teaching, has to be submitted to the minister. The entire expense of these establishments is to fall upon the cities in which they are situated, the respective authorities entering into an engagement to pay the cost of teaching, repairing buildings, furniture, collections, laboratories, botanical gardens and clinics. It would seem probable that if the proposition to do away with the distinction between the first and second grades of pharmacien should become law, these schools would assume additional importance.

Another decree has been issued creating two new preparatory schools at Nancy and Bordeaux in connection with the Sanitary Department, to which students are to be admitted to be trained as doctors and pharmacists for service in the army. Some details may be quoted from this decree to supplement the information recently given in these columns as to the position of pharmacy in the army in Austria. The pharmaceutical competitors will be required to be between seventeen and twenty-one years of age at the time of entry, certified to be skilled in military service, possess the university diplomas necessary for ordinary pharmaceutical studies, and have finished a stage of two years. All the pharmaceutical pupils will study in the school at Nancy, and a charge of £40 will be payable annually for board as well as a sum for outfit; but both these payments may be wholly or partly remitted at the discretion of the minister, though even then, if the pupils fail, they are to be liable to reimburse the money. Pupils in the school at the age of eighteen are to be held to have contracted an engagement of five years. When a pupil attains the diploma of pharmacien of the first class, he is to pass with the rank of second class *pharmacien aide-major* to the Val-de-Grace Hospital, Paris, where he will receive pay according to his rank, augmented by a sum of £20 for the expense of his first outfit. After remaining in the hospital a year he is to undergo a final examination, the result of which will determine his position in the service.

The Hampstead Vestry appears to have repented of its recent raid upon chemists, since, at its meeting on the 11th inst., it passed a resolution to the effect that, pending the issue of a new Pharmacopœia, it is undesirable to prosecute chemists under the Sale of Food and Drugs Act respecting sales of spirit of nitrous ether, B.P., provided that the article sold be not of greater specific gravity than that recognized by the London Pharmacopœia, "the present form for making the article being recognized as unsatisfactory by the best authorities." The resolution was moved by Mr. Preston, seconded by Mr. Beeton, supported by two medical practitioners, and accepted with only one or two dissentients. "A fault confessed is half redressed," and therefore it would perhaps not now be graceful to object that if the vestry had consulted those of its colleagues acquainted with the subject before instead of after stirring up the public analyst it might have escaped the penance. With respect to the resolution, however, we would suggest that in future the vestry, when making known its decisions, should follow a well-known and safe rule, and abstain as far as possible from giving its reasons.

* * *

Although, as mentioned recently, one of the principal objects for which the National Retail Druggists' Association was recently established in Washington is to exercise a control over the selling of proprietary articles, expressions of opinion were not wanting in the discussion that such sales are not directly or strictly speaking the vocation of the druggist. One speaker argued that any tyro in a country store can sell a proprietary article as well as the best educated chemist and druggist, and that when the pharmacist does sell it he does so not in his capacity as a druggist or as a pharmacist, but in his capacity as a merchant. He admitted that nevertheless if such things are to be sold it would be better that they should be sold by persons competent to speak a word of caution to the purchaser when dealing in dangerous preparations, but considered that this could only be regulated by public opinion.

* * *

At a Conference of the Teaching Colleges of Pharmacy recently held in Washington, it was resolved that from the year 1885 an attempt should be made to enforce a better scholastic education as a condition precedent to entering the technical colleges, and that in future more time should be given and importance attached to practical instruction in the laboratory.

* * *

The next meeting of the American Pharmaceutical Association, which now numbers about fourteen hundred members, is to be held at Milwaukee, Wisconsin, on the last Tuesday in September, 1884. The new President is Mr. W. S. Thompson, of Washington.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

October 10, 11 *and* 12, 1883.

Present on each day—Mr. Atkins, Vice-President; Messrs. Ainslie, Baildon, Clark, Gibson, Gilmour, Kininmont, Nesbit and Stephenson.

Professor Maclagan attended on each day on behalf of the Privy Council.

MAJOR EXAMINATION.

10*th.*—*One* candidate was examined, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Pirie, William ....Arbroath.

MINOR EXAMINATION.

10*th.*—*Thirteen* candidates were examined. *Eleven* failed. The undermentioned *two* passed, and were declared qualified to be registered as Chemists and Druggists:—

Allan, Henry Wemyss Fielden.Glasgow.
Bostock, Thomas Henry.........Eastwood.

11*th.*—*Twelve* candidates were examined. *Six* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Hedley, Charles Alfred ....South Shields.
Hutton, Robert Sanders ....Darlington.
Jackson, Harold ....Manchester.
Laing, George ....Edinburgh.
McGregor, James..................Edinburgh.
Maxton, William ....Edinburgh.

12*th.*—*Sixteen* candidates were examined. *Eight* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Morris, Henry Ridley ....Ipswich.
Mowatt, John Watt ....Coatbridge.
Reynolds, Edwin ....Edinburgh.
Sharp, John ....Galashiels.
Stevens, George ....Cannock.
Sutherland, Donald ....Aberdeen.
Thomson, Isaac William..........Edinburgh.
Whyte, James ....Aberdeen.

PRELIMINARY EXAMINATION.

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

Certificate of the University of Edinburgh.

McGarth, Thomas Elder.........Leith.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

On Wednesday, the 3rd inst., the monthly meeting of the Council of this Society was held at No. 11, Harcourt Street, Dublin, at 3 o'clock.

The President, Mr. Brunker, in the chair.

The other members present were—Mr. Draper, Vice-President, and Messrs. Allen, Bennett, Doran, Evans, Grindley, Hayes, Hodgson, Minchin and Wells, Drs. Montgomery and Aquilla Smith and Professor Tichborne.

The Registrar read the minutes of the last meeting of the Council, which were confirmed.

Mr. Grindley asked to have the minutes of the Annual Meeting read.

The Registrar said the practice had been to read and confirm the minutes of the Annual Meeting at the meeting of the Council held in November.

A letter was read from Dr. Kaye, Q.C., Clerk to the Privy Council, stating that the resolution of January 3, 1883, was still under consideration.

A letter was read from Mr. James N. Hardy, L.P.S.I., enclosing case and counsel's opinion upon the legal status of his compounding establishment.

On the motion of Mr. Bennett, seconded by Mr. Doran, the letter and opinion of counsel were referred to the Law Committee, who were authorized to take counsel's opinion thereon if necessary; and the Registrar was directed to inform Mr. Hardy of what had been done.

A letter from Mr. Patrick Joseph Finegan, dated 48, Henry Street, September 22, asked the Council to exempt him from the operation of the new rule, requiring four years' study of practical pharmacy, on the grounds that he had entered for the Preliminary examination before the passing of the rule, and that on September 7 he apprenticed himself for two years to Mr. Allen, a member of the Council.

Mr. Allen: I was not aware that he had written that letter; but, as a matter of fact, he is with me for two years, but on the understanding that if the decision of the Council should be against him he will have to serve the remaining two years.

The President: This gentleman presented himself at the Preliminary examination early this year and failed to pass. Then he came under the operation of the proposed new rule (which has not yet been sanctioned by the Privy Council), which requires that a candidate shall have four years' experience in practical pharmacy before he presents himself for the examination for the licence. He has since passed his Preliminary examination, and what he wants the Council to do is to put him in the same position as if he had passed the Preliminary examination at the time at which he failed. The difficulty is, how can we bind the Council which will be in office two years hence?

Dr. Montgomery: They would doubtless be guided by the opinion of the present Council.

After some discussion, on the motion of Mr. Hayes, seconded by Mr. Grindley, it was resolved—

"That Mr. Finegan's request to be admitted to the Final examination after two years' apprenticeship be on the merits of the case granted."

A letter was read from Mr. Joseph Edmondson, M.P.S.I., relative to the supply of the *Pharmaceutical Journal* to members.

The President: As it was decided at the Annual Meeting that the Journal should be continued for another six months, at present there is no occasion to go into this matter.

A report was received from the Certificate Committee.

Mr. Grindley moved, pursuant to notice:—

"That reports of Committees, recommending new rules or changes in the regulations of the Society, be not passed until they have been considered at two stated meetings of Council."

His object was to make sure that propositions of the sort would be in the hands of members of the Council a sufficient time before being brought forward, in order that they might have a full opportunity of considering them. The inconvenience of the present practice was illustrated lately, when the Council recommended the establishment of a new grade, which he thought was at variance with the wishes of the general body of the licentiates.

Mr. Wells seconded the motion. Another instance of the inconvenience of the practice of the Council not being such as was proposed was afforded when the late President got a resolution passed in reference to the supply of the Journal, and had no opportunity of being subsequently present when another resolution of quite a different character was passed.

Professor Tichborne said the resolution as it stood seemed to contemplate that the same subject should be discussed at two successive meetings of the Council, which certainly would be objectionable.

Mr. Grindley: This resolution does not relate to every matter, but only to important changes in the rules and regulations.

Mr. Hodgson: Such proposals might be brought up at one Council meeting and discussed at the subsequent one.

After some further discussion, the resolution was passed in the following form:—

"That reports of Committees and notices of motion recommending new rules or changes in the regulations of the Society shall not be discussed until the second stated meeting after their presentation."

In reply to Mr. Wells, the President said that any member of the Society who fell into arrear with his subscription would have either to pay up the arrear or be proposed as a new member.

Some financial business was then disposed of, after which the Council adjourned.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The Annual Meeting of the thirty-fourth session of the above Association was held at the Royal Institution on Thursday, September 27. The President, Mr. Joseph Woodcock, occupied the chair.

The minutes of the last meeting were read and confirmed, and the following donations announced:—The *Pharmaceutical Journal* and a complete series of specimens of Darjeeling Cinchona Barks, from the Pharmaceutical Society; the Smithsonian Reports for 1870, 1873, 1874, 1875 and 1878, from the Institution; the 'Proceedings of the American Pharmaceutical Association,' from the Association; the 'Scientific Proceedings of the Ohio Mechanics' Institute,' from the Institution; the 'Annual Report of the Liverpool Naturalists' Field Club,' from the Society; and the *Canadian Pharmaceutical Journal*, from the Editor.

The following were then elected as Members or Associates, viz.:—Associates—Messrs. Alfred Evans, F. Hornblower, W. T. Salkeld, James Shacklady, jun., H. Edward, F. Park and G. J. Poore.

The President, after a few words of welcome to the members, called upon the Secretary to read the report of the Council, which was done, and was followed by the Treasurer's statement of accounts.

The President moved:—"That the reports as read be adopted, and together with a list of members and abstract of proceedings of the past sessions be printed and circulated among the members." He, at the same time, referred to the retirement of Mr. John Shaw from the Council, and, indeed, from the Association. He alluded to Mr. Shaw's long connection with the society and the many services which he had during that time rendered to it both as an officer and as a member of the Council.

This motion was seconded by Mr. E. Davies, and carried unanimously.

Proposed by Mr. R. Sumner, seconded by Mr. Parkinson, and carried unanimously:—"That the best thanks of this meeting be given to the donors to the Library and Museum, and to the authors of papers, during the past session."

A vote of thanks was then passed to the officers and Council for their services during the past session, after which the election of four memhers of Council was proceeded with.

The proceedings then terminated.

HAWICK PHARMACEUTICAL ASSOCIATION.

The October meeting of the above Association was held in the Chemical Laboratory, on Friday, October 5, Mr. Maben, President, in the chair.

Mr. James A. Hislop read a paper on "The Preparation and Preservation of the Infusions and Decoctions of the B.P.," in which he directed attention first to the manipulation of the several operations involved in the production of a perfect infusion or decoction. Having pointed out the liability of fresh infusions to deteriorate, and discussed the causes of this deterioration, he gave the results of several experiments which had been undertaken in order to ascertain the relative power of certain preservatives. The first was a physical remedy and consisted in hermetically sealing the mouth of the vessel containing the infusion, which had previously been heated to 100° C. Infusions thus preserved kept good for an indefinite period, but on re-opening the bottle decomposition rapidly took place. One grain of salicylic acid to each ounce of infusion prevented decomposition for several weeks, and boracic acid gave similar results. Infusion containing 1 grain of glacia line to each ounce showed signs of decomposition within a week. Glycerine and borax in the proportion of 10 minims to each ounce prevented deterioration for a month, but after that time, traces of decomposition presented themselves. Mr. Hislop said that if the addition of chemicals could be at all justified, glycerine and borax would be found to possess preservative power, without any of the objectionable effects of some of the others, though it was possible to keep an infusion without chemicals in the manner already pointed out. Mr. Hislop then discussed the question of fresh *versus* concentrated infusions, his conclusion being that the former should be used, as they were in all respects a better preparation, the odour and flavour of the concentrated being distinctly inferior. Further, they were the official preparation, and the concentrated article should not be used unless sanctioned by authority.

On the motion of the Chairman a hearty vote of thanks was awarded to Mr. Hislop.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Continued from page* 293.)

The next paper read was—

The Preservation of Medicinal Herbs by Ensilage.

BY F. J. B. QUINLAN, M.D., M.R.I.A.,

Professor of Materia Medica, Pharmacology and Therapeutics, Catholic University; Examiner in the same, Royal University of Ireland.

Both the practising and pharmaceutical branches of the medical profession are agreed as to the advantages of fresh medicinal herbs over the same substances in a dried condition, and a simple process which would supply fresh herbs all the year round has long been a desideratum. In the summer months of the year fresh indigenous herbs are of course forthcoming, but during the remaining time our resource has hitherto usually been herbs dried by being hung up in a loft, or perhaps by artificial heat—and it is unnecessary to dilate here upon the inadequacy of herbs so treated. In the hands of the pharmaceutical worker they frequently fall into powder, and often he is unable to distinguish between genuine herbs in their dried state and their spurious congeners. For example, I lately made a careful microscopic examination of the stock of *Conium maculatum* in the loft of an eminent wholesale establishment, and found that it consisted mainly of *Æthusa Cynapium*, or fool's parsley; and this without the least reflection upon the honesty of the establishment, for I am certain that the adulteration arose partly from the ignorance of the gatherers, and partly from the difficulty of distinguishing between the two plants in their dried condition. The physician complains of the inferior physiological activity of the tincture, made from the dried leaves: for example, tincture of hyoscyamus, made from the fresh leaves, will, if dropped into the eye, cause marked dilation of the pupil; whereas the tincture made from the dried leaves causes no such reaction. In fact, I knew an instance where such tincture was returned with a query whether it was not tincture of belladonna. The first person who directed my attention to this point was the late Mr. Donovan, of Dublin, the eminent originator of the solution of arsenic, iodine and mercury, called after him. Mr. Donovan had a tincture of digitalis which was much relied upon, and he told me that in making this tincture he brought the alcohol to where the foxglove was growing, took the plant from the ground, bruised it and plunged it in the spirit. He maintained that tinctures, to use his own words, "should be made from the live plant," and I believe that he was right. I may here express my doubts respecting tinctures; they are no doubt convenient and handy, but the question arises whether the ethylic alcohol extracts the virtues of all herbs—in the case of laudanum it certainly takes up as well the stimulating and injurious properties of the opium. This is unanimously admitted, and in latter years this old and celebrated tincture has for internal use been almost superseded by black drop, (the manufacture of which has been successfully revived in Dublin), by Battley's sedative, the fluid extract of the Pharmacopœia, and other cognate preparations. An effort has been furthur made to preserve the active principles of fresh herbs by the "succi" first* suggested to the profession in 1835, by Mr. Squire, and by the green extracts. The preserved juices of conium, scoparium and taraxacum at once made their mark, and those of belladonna and hyoscyamus have been added; and it would not be too much to say that they have almost completely superseded the cognate tinctures. Speaking of the juices, I may express my regret that the framers of our Pharmacopœia selected ethylic alcohol for their preservation, and not glycerin alcohol, which would answer just as well and would not have an injurious effect in many cases of internal irritations. The green extracts are no doubt valuable preparations, but it is my experience that, if made exactly according to the Pharmacopœia, they will not keep through the autumn and winter. If, however, a supply of herbs in a practically fresh condition could be maintained all the year round, much benefit would accrue to the succi, the green extracts, and to some tinctures, both in regard to ease and simplicity of preparation and to efficacy of action.

I venture to bring under the notice of the Conference a simple plan of accomplishing this most desirable object by the method of ensilage; and, without the delay of describing the various modes tried, I will briefly explain the one which has succeeded perfectly. In doing so I must tender my acknowledgments to Dr. John Evans, Apothecary to the Queen and to the Prince of Wales, who placed his pharmaceutical laboratory at my disposal, and had the various silos prepared. The herbs in a perfectly fresh state are bruised to a pulp in a mortar, and then placed in glass bottles; being well tamped down until there is just room for the glass stopper, which is then forced in so as to exclude *every particle* of air, and the whole top is encased in beeswax softened by heat. This is the best capsule: tar is too dirty, sealing wax is apt to crack, and bladder rots. These bottles are now buried in the ground at a depth of three feet; and so treated, belladonna, conium and other herbs have kept for four months perfectly sweet and fit for pharmaceutical purposes. From what I have seen of agricultural ensilage I have no doubt that the bottled herbs would keep for six or even eight months, or perhaps longer. Of course every now and then a bottle will fail from imperfect manipulation, and that often without visible cause, most likely from a little air having been left in. When the bottle is taken out of the ground this failure is at once rendered evident by the spots of mildew appearing in the vegetable. I exhibit two specimens thus spoiled, one wholly and the other partially so.

* *Pharmaceutical Journal*, vol. i.

The factors of the decomposition of vegetables are the putrefactive germs contained in the air, the actinic rays of the sun, heat and moisture; and their comparative influence is shown by the following simple experiment:—Four bottles were filled with fresh leaf pulp, as already described, and were closely corked; the corks, however, were not tied or waxed. Nos. 1 and 2 were exposed to the light, but not to the direct action of the rays of the sun, the cork of No. 1 being left loose and that of No. 2 being driven very tightly in. No. 3 was put beside the others but covered by a nest of three earthen jars, one over the other, so as to expose it to the same temperature but not to light. No. 4 was buried in the ground. In thirty-six hours there was mildew and a putrefactive smell at the mouth of No. 1, and the cork of No. 2 was blown clean out by putrefactive gas. In sixty hours there was mildew in No. 2, and the cork of No. 3 was loose, but No. 4 was unaffected. Of course No. 4 would not long remain so, as the ensilage was imperfect. This experiment is useful as showing the conditions which must be avoided; and I may add that a locality shaded from the sun must be selected, and that no place answers better than a roofed shed with a free circulation of air—which will keep the soil quite dry.

There is a special class of medicinal herbs for which ensilage is indispensable, viz., those which must be used in the fresh state. An example of this is the *Galium Aparine*, which is now much employed as a dressing for ulcers and cancers. This plant is bruised fresh, made into a kind of poultice, and placed upon the sore.* By ensilage only can it be used in winter and spring.

It is unnecessary and would here be unsuitable to dilate upon the success which farm ensilage has attained in the hands of American and continental agriculturists. There is, however, nothing new in the discovery or rather revival of M. Gouffart. It was practised thousands of years ago by the ancient Egyptians, and is depicted in their tombs; it was worked in Prussia and in Spain from time immemorial; and the well-known Irish potato pit, which preserved "the murphies" so fresh and good, was a rude ensilage. Still more to the point, however, is the plan of our grandmothers, of preserving green gooseberries. These worthy old ladies, who might perhaps give some useful hints to the housekeepers of to-day, used to pack the green gooseberries tightly in tall wide-mouthed bottles, a small quantity of water being added. These bottles were placed standing in a pan of water, which was very gradually raised to the boiling point. A copious steam now rose from the bottles partly from the water and partly from the gooseberries; and at the right moment when the steam was in full vent and the water just boiled away, the bottle was corked, withdrawn from the water, tied securely, and waxed, and without delay buried in the ground. I have frequently in the depth of winter eaten well-flavoured gooseberry pies so produced; and the process is interesting as showing the possibility of ensilage† on the scale suitable to the wants and capacities of the pharmacist whether on a large or small scale. Addressing a practical audience it is of course hardly necessary to add that an ensilage bottle once opened, like a bottle of claret, must immediately be made use of.

The PRESIDENT remarked that Dr. Quinlan had raised several questions besides the one which gave the title to the paper, such as the pharmaceutical value of dried herbs, the claims of fresh juice as against green extracts, and so on. He thought he must decide that, while thanking him for all he had written, the members must in the discussion confine themselves to the main point of the preservation of medical herbs by ensilage. He was sure all would agree in giving Dr. Quinlan a hearty vote of thanks for his paper.

* *British Medical Journal*, June 16 and July 9, 1883.

† Any reader desirous of seeing a short but sufficient account of the agricultural aspect of ensilage can refer to the illustrated pamphlet by Mr. Thomas Christie, F.L.S. London, Christie and Co., 155, Fenchurch Street, E.C., 1883.

A vote of thanks having been passed,

Mr. EKIN asked Dr. Quinlan if he had taken note of the temperatures at which he preserved the plants. He understood him to say that success was due to the exclusion of the air; but he presumed that only meant outside infected air, because the very process of ensilage was dependent on a certain amount of air being shut up in the green vegetable. Some experiments had just been published, which were detailed to him by the gentleman who made them, before publication, and they promised to throw a new light on the whole matter. This gentleman had experimented for years on silos, and had paid great attention to the temperature. He found that a certain fermentation went on, and the temperature of the whole mass must then be raised beyond 50° C. when the germs became sterile, and green fodder would keep indefinitely. It would be quite possible to admit filtered air to this fodder after it had reached this stage, and unlike Dr. Quinlan he seemed to lay no stress at all on the exclusion of light. The failures which had hitherto taken place arose from the whole mass not having been raised to the necessary temperature. There was an immense field for this process pharmaceutically, but it was yet in its infancy, and a great deal of further observation was required. He hoped Dr. Quinlan would continue his researches and report again, but it occurred to him that the fermentation and high temperature necessary to success would in some cases act prejudicially on the active principles of the plants.

Dr. SYMES said Dr. Quinlan had done good service by calling attention to this method, but he did not think it could fairly be called ensilage. As Mr. Ekin had said, in ensilage as practised by agriculturists a certain amount of air was present and fermentation ensued, and if that fermentation occurred in the bottles it would probably be the initial stage in the destruction of the active principles. The practice of Dr. Donovan, which had been cited, seemed to show that herbs should not be kept even in the fresh state after they had been gathered; and it was well known that if roots were to be dried, the less they were crowded together, and the sooner they were placed in a position where they would dry rapidly, the better they were preserved. He took it the process depended on the exclusion of air, and would suggest that one of the bottles should be placed under the receiver of an air pump, with some arrangement for forcing in the stopper when the air had been exhausted. One of the experiments quoted seemed to indicate that there was some advantage in burying the bottles, but it seemed to him that if they were sealed as perfectly as was described, and then placed in a cool dark place, the result ought to be equally good.

Mr. STANFORD asked whether this process did not alter the medicinal character of the plants; because in all the agricultural specimens he had seen, the fodder was quite different to the original plants. He should think an ensilaged plant would differ as much from the original as sauerkraut from cabbage.

Mr. PLOWMAN asked whether the statement that tincture of hyoscyamus made from the fresh leaves dropped into the eye caused dilatation of the pupil, whereas that made from dried leaves did not, was founded on observation.

Dr. QUINLAN said the statement was founded on his own experiments.

Mr. PLOWMAN said he was about to remark that hyoscyamus leaves varied very much in quality. The mydriatic action was due to one or more alkaloids, and it seemed almost incredible that a tincture of fresh leaves should possess this action, while a tincture of the same leaves carefully dried at a low temperature should have the natural alkaloidal salts so altered that this action should be destroyed.

Mr. HOLMES, referring to *Galium Aparine*, asked if Dr.

Quinlan considered it to be as active in the ensilaged state as when fresh. He should also like to know if Dr. Quinlan had formed any opinion as to what the preservation was due. It was understood that in ordinary ensilage a small amount of alcohol was formed, which would naturally act as a preservative.

Mr. WILLMOTT suggested that Dr. Quinlan should continue his experiments. It must be a difficult matter to expel the air completely from the bottles; and even then it was a question how far the elements of decomposition were present in the plant itself. Some time ago he had occasion to carry out some experiments in which it was necessary to exclude the air, and to expose the product to a considerable temperature, and found that a higher point than that mentioned by Mr. Ekin was necessary. It was a question how far this would affect the qualities of the plant.

Dr. QUINLAN said it would be evident from the character of the paper and the time when he commenced the investigation that he did not bring this forward as a completed communication, but simply as one worthy of inquiry and discussion. The question was in its infancy, and his principal reason for now introducing it was in order to get additional light upon it from the various scientific and practical men before whom it was read. That expectation had been amply fulfilled, and he should now, he hoped, be able to carry on the investigation to a complete and satisfactory result. Next year he trusted to have the oportunity of stating further results, obtained with the advantage of the suggestions which had now been made. He might tell Mr. Ekin that he was quite aware of the importance of temperature. He was induced to take up the matter from seeing ensilage going on in Belgium last summer, and there, after the stuff had been cut, tamped down and covered, they occasionally ran a tube down into it with a thermometer, and if the temperature was above a certain point it was known that the silo was "done for." Of course the only object of excluding air was to exclude germs, in the same way as the old surgeons, who knew nothing about germs, always endeavoured to exclude the air from a wound; he should not have any objection to filtered air entering the bottles. Dr. Symes's suggestion about the air-pump was very valuable, and he would endeavour to act upon it; and he would also place registering thermometers in the bottles buried in the ground. He found that there was a distinct advantage in burying the bottles. Mr. Stanford's question was one which he could not as yet even approach, not having had an opportunity of testing the medicinal character of the herbs so preserved. This was the keystone of the arch and if it fell out he would take care to report the collapse which would follow. The fermentation and sweet taste which arose in ensilage was well known to every one. He was obliged to Mr. Plowman for putting the question he had, and migh state further, that the two samples of tincture of hyoscyamus were obtained from Dr. Evans's establishment, and were both made from the biennial plant, in one case fresh, and in the other dry. The one made from the green plant caused dilatation of the pupil; and a case occurred where the tincture was sent back with a query whether it was not tincture of belladona. The question whether decomposition took place could only be solved by further experiment. He thought probably some herbs would silo well, some middling, and others not at all, but he should continue the experiments and report the result next year.

The next paper read was on—

THE MULLEIN PLANT.

BY F. J. B. QUINLAN, M.D., M.R.I.A.,

Professor of Materia Medica, Pharmacology and Therapeutics, Catholic University, Examiner in same, Royal University of Ireland.

The therapeutic action and properties of the mullein plant have been thoroughly discussed in the medical journals,* and it is my intention, therefore, on the present occasion to view it in its pharmaceutical aspect only. As this drug is new in pharmacy I may mention that in the early stages of pulmonary consumption it has a distinct weight-increasing and curative power, similar to that of cod liver oil or of Russian koumiss; and that it is superior to either in the point of view of comfort to the patient. The repulsion and even disgust with which cod liver oil is swallowed by multitudes of invalids is well known; and the fact that many thousands of gallons are annually thus consumed is a sure proof of the potency of a medicine which, however, many phthisical invalids are unable to swallow at all. Koumiss, as made at Samara, in Russia, from the milk of mares, is very agreeable and s a better weight-increaser than even cod liver oil. It will not, however, bear travelling, and to go through the koumiss cure the sufferer must accomplish the long and tedious journey to Samara, in Southern Russia.† The koumiss manufactured in these countries from cow's milk is, for the chemical and physiological reasons adduced by Dr. Carrick, a very ineffectual substitute for its Russian namesake, made from the milk of the mare. Mullein is, as I shall presently show, a very palatable and agreeable remedy, and is much liked by the patients, and has, I believe, a great future of usefulness before it. I have found it equal to cod liver oil; of Russian koumiss I have no personal experience.

There are five mulleins all belonging to the natural order of Scrophularaceæ, but the one to which I refer is the great mullein, the *Verbascum Thapsus* of the botanist, and the cuineal mhuire‡ of the ancient Irish medical writers who make frequent allusion to it in the MSS. in our Irish collections. It is delineated in plate 1437, vol. vi. of Sowerby's 'British Botany,' and in the same volume, page 110, it is stated that the great mullein "is rather sparingly distributed over England and the south of Scotland." In Ireland it has been always carefully cultivated, and in many places upon a very large scale, in obedience to a steady demand by phthisical sufferers. It is on sale in most of the medical establishments in Dublin and throughout Ireland, and it is seldom that you will find an Irish newspaper in whose advertizing columns it is not offered. Still it is not in the Pharmacopœia, nor was it formally recognized by the medical profession until the present year; the only officinal prepa-

* *British Medical Journal*, January 27, February 10 and 24, and March 3, 1883; *Medical Record*, March, 1883; *Therapeutic Gazette*, March, 1883; *Australian Medical Journal*, April 1883; *Medical Press and Circular*, February 7, 1883.

† For an interesting account of this cure see the treatise by Dr. G. Carrick. Blackwood and Sons, London, 1881.

‡ The Irish name of mullein means a remedy good for asthma or cough; for it is a curious circumstance that pulmonary consumption appears to have been almost unknown among the aboriginal Irish. Alone in Western Europe, Ireland, on account of its remote situation, did not become a part of the Roman Empire; a circumstance to be regretted, inasmuch as it deprived her of the benefits of Roman civilization, which has everywhere it reached left enduring landmarks. The Roman military authorities contemplated the conquest of Ireland, and were actually preparing one legion for the purpose when the appearance of barbarians on their eastern frontier caused the Imperial government to concentrate their troops and withdraw from Britain. Consequently the English invasion of Ireland in the 12th century found the people very much in the same condition that Julius Cæsar found their British congeners — a thinly inhabited country, with scarcely any tillage, and where the population passed their lives almost entirely in the open air, and subsisted on their flocks and herds. Experience has shown that among such a people, as among the Tartars of to-day, pulmonary consumption is almost unknown; and recent German researches explain the reason why. Of course through exposure pulmonary diseases were common enough among the Irish aborigines, and for them the mullein was employed.

rations of it known to me being the fluid extract of the leaves and the same of the root, preparations which I have tried on a large scale and to which I shall presently allude. Dr. John Evans supplies the succus and the fresh leaves.

The mullein is a hardy biennial plant with a thick stock from 18 inches to 4 feet high, with very peculiar large woolly and mucilaginous leaves, and a long flower stalk with ugly yellow and nearly sessile flowers. The leaves are best gathered in the late summer or autumn, from the biennial plant shortly before it flowers. In former times the mullein appears to have been esteemed as a remedy for diarrhœa, and Dioscorides, Culpepper and Gerarde favourably allude to it in this regard.

The old Irish method of administering it was to take 4 ounces of the fresh leaves or a corresponding quantity of the dry and place them in a pint of fresh cow's milk. This was now boiled for ten minutes, strained, a little sugar added, and the mullein milk drunk while still warm. This dose is soothing and grateful to the præcordia, and phthisical sufferers like it, and experience a want when it is withheld. The superiority of the fresh leaves is very marked; and the dose ought to be taken twice or three times a day. When the leaves are not available the next best resource is the juice fortified with a little spirit or glycerine or fluid extract of the leaves. The fluid extract of the root yields good results, but I prefer the other. The taste of the succus verbasci or of either of the extracts is *per se* disagreeable; but can be completely masked by the addition of some Guinness's porter, which acts as a slight adjuvant, and forms an agreeable mixture. The best method of all is the fresh leaves boiled in milk; but sometimes in advanced cases with delicate stomachs so much milk decoction is found to be heavy. In that event it is necessary to first peptonize the milk with pancreatic fluid and to add a pinch of sodium bicarbonate. The mullein decoction made with peptonized milk digests at once, and the slight bitterness of the peptone is completely covered by the taste of the mullein. In advanced cases of consumption the mullein, although powerless to cure, relieves the cough and diarrhœa, and thus leaves the stomach free for nourishment; in fact it is itself looked upon by the patient more as a food than as a medicine.

Mullein is one of the herbs which I have ensilaged, and I trust by that means to keep it fresh and fit for the milk decoction all the year round. I may here allude to a remotely possible source of risk connected with it on account of the resemblance of very young mullein leaves to young leaves of foxglove. I know an instance in which a gardener during the present season actually transplanted a very young plant of foxglove into a mullein bed. Of course later on this resemblance would not deceive the most inexperienced.

The PRESIDENT having moved a vote of thanks to Dr. Quinlan,

Mr. HOLMES asked whether the specimen of the plant exhibited was the same as was used in the experiments described, because it appeared to him not to be *Verbascum Thapsus*, which had a much more woolly surface.

Dr. QUINLAN said that the plant was usually more woolly; the specimen was, however, the *Verbascum Thapsus*.

Mr. CONROY asked if the cultivated plant was equal to the wild plant in its medicinal properties, for many plants lost in therapeutical value by cultivation. He should also like to ask whether the Doctor had satisfied himself that the beneficial results were attributable to the mullein, and not to the milk in which it was taken or the stout which followed it.

Mr. H. WYATT said this plant, though comparatively little known in the north of England, was much valued in some parts of the Midland Counties as a horse and cattle medicine and particularly in Ireland. A great portion of the working population of Bootle came from Ireland, and it was from them he first heard of it being used as a domestic remedy in consumption. When it was known he had some in his garden, the out-patients of the Bootle hospital frequently asked him for it, and it was in his capacity as dispenser to that institution that he witnessed the beneficial effects and became acquainted with the peculiar method of preparing it with milk, the only way by which the nauseous taste is masked. He did not think there was much doubt about the specimen exhibited being the real plant as it corresponded very well with five plants he had, making allowance for the difference which he found cultivation made in the margin of the leaf. His first plant came up spontaneously and it seemed identical with specimens he had since obtained from Warwickshire. His old Irish gardener never would admit the plant was ugly, and once remarked to him, "Sure it's not such an ugly plant; for there's one bright baby always at the top of it;" referring to a peculiarity in its mode of flowering; it always had a bright ring of flowers round the top of the spike.

Mr. BORLAND said it was hardly correct to say that this plant had only lately come into use medicinally, for he found it was used for almost all the ailments to which Dr. Quinlan referred as far back as 1753, and was mentioned in an old dispensatory written by Dr. James at that date. It was not, of course, recommended as a substitute for cod liver oil, that not being known.

Mr. WILLMOTT hoped Dr. Quinlan would state the source from which these plants could best be obtained.

Mr. ATKINS asked if the plant was popularly used in Ireland for pulmonary diseases.

Dr. QUINLAN said it was, and was curative in the earlier stages and palliative in the later. The objection raised by Mr. Conroy that the beneficial effects noticed might be due to the milk or the stout was one which had been mentioned again and again, but he had been able to bring forward a number of experiments showing that where the milk or stout was administered without mullein, there was no such weight-increasing power shown; he could not, however, here go at length into that question which was really a medical one. He agreed with Mr. Borland that this plant had been used long ago, for it was mentioned by Culpepper, Gerarde, and other writers; but it had died out, and the profession had ceased to employ it, and its use was only kept up amongst the Irish humbler classes. Whether the wild or cultivated plant was the better, he could not say positively, but as far as he could judge they were equally good. The demand in Ireland was so great that the supply of wild plants was not sufficient to meet it, and it was cultivated on a very large scale. It fetched a good price, 2*d.* or 3*d.* per plant. As to the mode of using it, the only really good preparation was the one he had mentioned, boiling it in milk; when boiled in water it would no doubt be equally useful, but its taste would be so nauseous that it would not be readily taken.

The Conference then adjourned.

On Wednesday morning, the Conference re-assembled at half-past ten.

THE LATE MR. ATHERTON.

The PRESIDENT said he had just received an intimation of the decease of an old friend of the Conference, one of its earliest supporters—a man who was local secretary of the third meeting, at Nottingham, and one who by his tact and energy did much towards the success of the meeting, and towards floating the then young Pharmaceutical Conference. It was mainly to his powers of organization that the first Annual Exhibition of Pharmaceutical Appliances was held in connection with the Conference. He was sure every member of the Conference would join with him in deep regret at the loss of John Henry Atherton.

A paper was then read, entitled—

Additional Notes on the Bitter Principle of Hymenodictyon Excelsum.

BY W. A. H. NAYLOR, F.C.S.

In a paper read at an evening meeting of the Pharmaceutical Society in April last, I had the honour of presenting a preliminary account of an inquiry undertaken with the object of ascertaining the nature of the bitter principle of the dried bark of *Hymenodictyon excelsum.* In this communication were embodied results which show that the investigation was pursued to an extent which led to the discovery of an alkaloidal substance, the existence of which was deemed to supply an unequivocal answer to the question at issue. It also contained by inference the affirmation that the bitterness of this particular bark was not due to æsculin, or to its decomposition product, æsculetin, as alleged by Broughton, who had previously examined it. Further, it gave a description of its general properties and its behaviour towards certain reagents. In addition, such data were supplied as it was thought might afford an insight into its constitution. The conclusion arrived at was to the effect that it bore a relation to either beberine or the amorphous alkaloid of cinchona or paricine, by comparison among which the last enjoyed the largest degree of favour.

And now having hastily glanced at the facts hitherto obtained, it may be permitted me to remark that in fulfilment of a promise made at the time of these results, I have meanwhile more completely investigated the subject, and these additional notes are submitted as a sensible advance upon our knowledge of the bitter and probably active principle or principles of this valuable drug.

Method of Extracting the Alkaloid.—Three methods were experimented with for extracting the alkaloid. The first differed only from that previously employed in respect of the process used for purifying the crude base. This consisted essentially in mixing the finely powdered bark with one-fourth of its weight of lime and converting into a thick paste with water. The mixture was dried and exhausted with 90 per cent. of alcohol. The percolate was acidified with dilute sulphuric acid, the alcohol recovered by distillation, and the residue treated with hot water. From experiments with this solution it was found that the addition of carbonate of ammonium caused a black precipitate, which was assumed to be a decomposition product. After filtration caustic soda was added, when a feebly coloured gelatinous precipitate fell. The whole of the remaining solution was similarly treated. The crude alkaloid from caustic soda was dissolved in ether and the ethereal solution poured into large quantities of light petroleum spirit and allowed to stand. By this treatment reddish flocks at first separated out, which subsequently agglomerated and deposited. The alkaloid was recovered by distillation, redissolved in dilute sulphuric acid and reprecipitated with caustic soda, and purified by solution in ether.

The second method was more simple and consisted in exhausting with chloroform the mixture of lime and bark dried at a low temperature and withdrawing the alkaloid from solution by agitation with weak sulphuric acid. From this acid solution the alkaloid was separated by caustic soda. To obtain it in a state of purity it was only necessary after washing it thoroughly to take it up in ether, evaporate, and subject the residue once more to the same operation.

The third method contemplated the extraction of the alkaloid by the use of oxalic solution, but from the difficulty experienced in effecting a complete removal of the colouring matter from the product the process was abandoned. In instituting a comparison of the respective merits of the three methods, the second deserves the preference when adjudged on the basis of purity of product rather than that of quantity in regard to yield.

Description of the Alkaloid.—In the moist condition, as obtained by precipitation with caustic alkali, it is a gelatinous mass of a cream colour and greedy of water, which it retains with extreme tenacity. By exposure it shortly acquires a decided yellow colour, which deepens with increase of temperature and passes into a light brown at 100° C. It has a persistently bitter taste, which is more quickly perceived when in solution than when in the solid state. It is readily soluble in alcohol. ether, chloroform, benzol, and light petroleum spirit, On evaporation of its ethereal solution at a slightly elevated temperature it separates out in the form of oily drops. If the heat be continued beyond that required for the complete evaporation of the ether, the oily drops coalesce and the whole assumes the character of a soft sticky resin. It commences to fuse at 66° C., and at 70° C. it will flow with ease sufficient to admit of its transference to another vessel. It neutralizes acids completely and the solutions are not fluorescent. It refuses to yield crystallizable salts with nitric, hydrochloric, acetic, sulphuric, phosphoric and hydrobromic acids. Its solution in hydrochloric acid is precipitated by nitric acid, sodium nitrate and phosphate, potassium iodide, ferro- and ferridcyanide and bichromate, and mercuric chloride, in addition to the usual alkaloidal reagents. Potassium sulphocyanide added in excess to a neutral solution of the base in acetic acid gives reddish-yellow oily drops. A feebly acid solution gives with bromine a bright yellow precipitate and with solution of chlorinated lime a white precipitate unaffected by ammonia. A two per cent. solution in 90 per cent. alcohol is optically inactive.

Composition of the Alkaloid.—For determining the composition of the alkaloid two series of combustions were made. The one from the base obtained by the lime process, the other from the products resulting from the chloroformic extraction. It was first of all ascertained that the alkaloid suffered no loss between 100° and 110° C. This was regarded as trustworthy evidence that it became anhydrous above 100° C., and in more than one instance its combustion afforded satisfactory proof of its stability at 110° C. It may be stated that in every case the body was burnt with cupric oxide in presence of metallic copper in a stream of oxygen. The products obtained by the lime process (1) and by chloroformic extraction (2) respectively after purification by æther gave as a mean the following numbers:—

	(1.)	(2.)
Carbon	77·02	77·45
Hydrogen	11·02	10·82

As the products by chloroformic extraction (2) gave a slightly higher percentage of carbon, its nitrogen was alone estimated. Two determinations were made by the method of measurement. In one experiment ·364 gram of alkaloid gave 34·2 c.c. of gas, which when corrected for temperature pressure and tension of aqueous vapour was found to be equivalent to 11·32 per cent. of nitrogen. The platinum compound was next prepared and examined. To a solution of the purified alkaloid in hydrochloric acid perchloride of platinum was added to complete precipitation. The double compound was thoroughly washed with warm water and dried at 105° C. When moist it was yellow, when dry reddish-yellow. It was appreciably soluble in boiling water from which it separated on cooling in a granular condition. On ignition it left 25·27 per cent. of platinum. A determination of its chlorine yielded 27·70 per cent. From these results the following formula has been deduced for the alkaloid, $C_{24}H_{40}N_3$. For the purpose of ready comparison the results obtained are placed by the side of those theoretically yielded by this formula.

	Found.	$C_{24}H_{40}N_3$.
Carbon	77·45	77·83
Hydrogen	10·92	10·81
Nitrogen	11·32	11·35
Pt. compound . . .	25·27 pt.	25·24 pt.
Cl in pt. compound .	27·70	27·22

The platinum salt will therefore have the formula $C_{24}H_{40}N_3.2HClPtCl_4$.

For the alkaloid I propose the name "hymenodictyonine." Its main peculiarity is the absence of oxygen in its constitution, and thereby it adds one more to a numerically small class whose natural bases are, perhaps with one exception, volatile.

The salts of the hydrochlorate and nitrate have been prepared, and their study has already commenced.

The determination of their composition and that of certain derivatives of the alkaloid are engaging my attention, and I hope shortly to be able to publish an account of them. It is also extremely desirable that the physiological action of the alkaloid should be put to the test. In regard to this point it may be recorded that a gentleman having incidentally tasted a little of the alkaloid equal in size to a pin's head, experienced flushing of the face followed by giddiness and frontal headache.

In addition to the alkaloid an indifferent principle has been obtained from the bark. It was associated with the first precipitate of crude alkaloid produced by the caustic soda in the lime process. It was observed from its remaining insoluble when the alkaloid was treated with strong alcohol or ether. Repeated boiling with alcohol left it almost colourless. It then presented the appearance of tannic acid. A microscopical examination showed it to consist of micaceous scales. It has a pure bitter taste, quite distinct in character from the bitter of the alkaloid. It is sensibly soluble in hot alcohol but not in ether or chloroform, and is readily dissolved by dilute acids, from which it is precipitated by caustic alkalies. In reaction it is neutral. Nitrogen does not enter into its constitution. It appears to be a neutral principle, and possibly may be a decomposition product of a glucoside. It was dried at 105° and burnt, when it gave the following numbers, which closely correspond to the formula $C_{25}H_{49}O_7$:—

	Found. (1).	Found. (2).	Theory. ($C_{25}H_{49}O_7$).
Carbon . . .	65·00	64·84	65·07
Hydrogen . .	10·76	10·50	10·62.

Whether this body be an educt or a product cannot at present be definitely asserted, and until this point has been ascertained it has been thought advisable not to designate it by any particular name.

The conclusion to be drawn from these results appears to be that the bitterness of the dried bark of *Hymenodictyon excelsum* is due in part, if not in the main, to the existence of an alkaloid whose composition is represented by the empirical formula $C_{24}H_{40}N_3$. In part too its bitterness may be due to the neutral principle having the composition $C_{25}H_{49}O_7$, or to a substance of which it may be a product of decomposition.

There now remains to me the pleasing duty of acknowledging the assistance which my friend Mr. T. G. Nicholson has rendered me in the prosecution of this investigation.

The President proposed a vote of thanks to Mr. Naylor. He thought his expectation that he had made a distinct advance in the knowledge respecting the bitter and probably active principles of this drug was thoroughly well founded. It was to be regretted that, as he stated, the salts refused to crystallize, but it was to be hoped that they would reconsider their decision and succumb to the irresistible coaxing of Mr. Naylor at some future time.

The vote of thanks having been passed—

Mr. Dott inquired if Mr. Naylor considered the formulas he had given for the alkaloidal and neutral principles were probable, seeing they both contained an uneven number of perissad atoms.

Mr. Williams wished to ask Mr. Naylor if he analysed the volatile alkaloids as well as the solid, and found the numbers the same in both cases, because as he distilled it with caustic potash he should imagine that the product of distillation of the solid alkaloids in the presence of caustic potash would probably be very different from the body he started with.

Mr. Holmes asked whether the results obtained by Mr. Naylor threw any light on the constitution of quinine. This plant belonged to the same natural order as the cinchonas. Mr. Naylor mentioned some decomposition products having a peculiar odour, and it might be possible that some of these products might have a similar character to some of the decomposition products of quinine.

Mr. Moss asked if Mr. Naylor had examined the neutral principle of *Hymenodictyon excelsum*, with a view to ascertain whether it was a glucoside or not. With regard to the uneven numbers in these formulas, he apprehended they were merely empirical formulas, and did not profess in any way to give the exact constitution of the bodies referred to.

Mr. Naylor, in reply, said Mr. Moss had anticipated his reply to Mr. Dott. He regarded these as probable formulas, but they were only empirical. The derivatives of the alkaloid had yet to be carefully studied, when possibly they might be able to arrive at the constitutional formula. With regard to the other point, namely, the neutral principle, it was quite possible it might be a decomposition product of some glucoside, and he thought it highly probable, but that was a point which still remained to be cleared up. He was careful not to state in his paper that the alkaloid was volatile, because he was not quite certain as yet whether the volatile portion was a decomposition product or whether it was actually the alkaloid itself.

(*To be continued.*)

NATIONAL ASSOCIATION FOR THE PROMOTION OF SOCIAL SCIENCE.

(*Continued from page* 300.)

Can the Law Regulating the Sale of Poisons be amended so as more effectually to prevent their Employment for Criminal Purposes?

BY G. LATHOM BROWNE.

(*Abstract.*)

The inefficiency of the existing legislation has long been recognized by lawyers and medical men, and especially by the Council of the Pharmaceutical Society, which for some years has directed its attention to its amendment. As the result of their deliberations they have in the present year submitted to the Privy Council a draft Bill for the amendment of the Pharmacy Acts, which may, if treated by an experienced draftsman, in all probability form the basis to new legislation. As it proposes to cover the whole question of the sale of drugs, I have in the course of these notes only referred to those suggestions in it which more especially refer to the sale of poisons.

Cotemporaneously with this movement in England, *projets de loi* dealing with the practice of pharmacy in the French Republic have been introduced in its Legislative Assembly, and referred to a Commission, which has lately presented an exhaustive report on the whole subject, and agreed on certain propositions which will form the basis of a Bill in place of the two *projets* previously submitted to the Assembly. To such of its recommendations as affect the sale of poisons I have referred in these notes. A sketch of its general provisions was given in an article in the *Pharmaceutical Journal* of July 14, 1883.

The sale of poisons is at present regulated by the following statutes:—

(1) Arsenic and its acids and other colourless preparations of arsenic.

By the 14th Vict. cap. 13, 1852, "all persons selling arsenic are ordered to keep a book, in a prescribed form, stating the date of sale, the name, place of abode, condition or occupation, of the purchaser, the quantity sold, and the purpose for which it is required. To every such entry the signature of the purchaser, and of his referee and of the seller are to be affixed, and no arsenic is to be sold to anyone unknown to the seller, except in the presence of some witness known to him, and who also knows the purchaser. Nor is any arsenic to be sold to any one under age."

It is also provided by the same statute that, "before the sale, arsenic shall be mixed with soot or indigo in the proportion of 1 ounce of soot or ½ ounce of indigo to 1 pound of arsenic: except in cases where, according to the representation of the purchaser, such mixture would render it unfit for his purpose, when it may be sold without such mixture in quantities of not less than 10 pounds." This Act, however, does not extend to the sale of arsenic by any legal practitioner, nor to its sale by wholesale or retail dealers upon orders in writing.

In the case of the trial of Madeline Smith for the murder of her lover L'Angelier, Edinburgh, 1857, it was stated by Professors Penny and Christison that the indigo, especially when it is waste and not pure indigo, can be removed from the arsenic by dexterous manipulation.*

In the same case it was admitted by the storekeeper of a firm of printers and dyers in Glasgow, that they "purchased arsenic in quantities of from three to four hundredweight at a time in its pure state, which was put into store among other things quite open—that, when any was taken out of the barrels for use, the lid was loosely laid on again—that it was taken from store in open wooden pails, and that the abstraction of an ounce or two would not be missed."

By this statute the sale of arsenic was alone protected; the sale of all other poisons was left entirely unguarded, and the sale of them and of arsenic, subject only to the statutory provisions, was open to the most illiterate.

In consequence of the numerous cases of poisoning by more refined methods, and of deaths arising from the dispensing of poisonous drugs by incompetent persons, the Legislature was induced in 1868 to pass the Pharmacy Act (31 and 32 Vict., cap. 121), by which, and by its Amendment Act in the following session of Parliament, the sale of poisons has hitherto been regulated.

By this statute, whilst the rights of chemists in trade previously to January 1, 1868, were preserved, it is provided that, for the future, it should be "unlawful for any person to sell or keep open shop for retailing, dispensing, or compounding poisons, or to assume the title 'Chemist and Druggist, etc.,' in any part of Great Britain, unless such a person shall be a pharmaceutical chemist, or a chemist and druggist within the meaning of this Act, *and be registered under this Act, and conform to such regulations as to keeping, dispensing, and selling of such poisons as may from time to time be prescribed by the Pharmaceutical Society with the consent of the Privy Council.*" The poisons to be included in the operation of this Act are given in its first schedule. By Section 16 of the Act, however, it was provided that the Act should not extend to any legally qualified apothecary or veterinary surgeon, nor interfere with "*the making or dealing in patent medicines, nor with the business of wholesale dealers supplying poisons in the ordinary course of wholesale dealing.*"

Subject to these provisions, it is further enacted by Section 17 that it should hereafter "be unlawful to sell any poison either by wholesale or retail, unless the box, bottle, vessel, wrapper or cover in which such poison is contained be distinctly labelled with the name of the article and the word 'poison,' and with the name and address of the seller of the poison." And it is enacted that the provisions in the Arsenic Act, before quoted, with reference to its sale to any person, should be extended to the sale of all poisons, stated in the *first part* of the first schedule to the present Act, and to any other poisons that might hereafter be added to it by the Pharmaceutical Society with the consent of the Privy Council. But as in the previous section wholesale dealers in poisons, whether for export or the home trade, are excepted from the precautions provided in the case of poisons in the first part of the Schedule, or of attaching the label with the name and address of the seller, and not any of the provisions of this section are to apply to medicine supplied by legally qualified apothecaries or one registered under this Act, "provided such medicine be labelled in manner aforesaid with the name and address of the seller, and the ingredients thereof entered with the name of the person to whom it is sold or delivered" in a proper book of prescriptions. So far, however, as the sale of arsenic was concerned the provisions of the Arsenic Act, 1852, are preserved intact.

In the next session of Parliament the provisions of this section were relaxed in favour of a legally qualified medical practitioner. By the Pharmacy Amendment Act, 32 and 33 Vict. cap. 117, sec. 3, it was enacted that in the case of a medical man, the entry of the name of the purchaser, the name and quantity of the poison sold, and the purpose for which it was required, and the signature of the purchaser, are not to be required.

How this relaxation of precautions may operate was seen on the late trial of Dr. Lamson for the murder of his nephew. In that case it appeared that the aconitia was sold to him by an assistant in the shop of Messrs. Allen and Hanbury, merely on the faith of the assistant finding the name of Dr. Lamson in the Medical Directory.

"Suppose," said Sir Henry Hawkins to the assistant, "I applied and gave a name out of the Medical Directory, and asked for 2 grains of aconitia, would you sell it to me?"

Answer—"If I were satisfied at the time that you were a medical man I should let you have it."

The Judge—"Then anybody of respectable appearance and well dressed might apply? and is there anything by which you can satisfy yourself that the applicant is not an impostor and telling you what is not true?"

Answer—"The only thing would be the style of writing—whether it was in the style characteristic of a medical man."

The Judge—"That seems hardly satisfactory."

Mr. Poland—"The Act does not require registration in the case of sale to a medical man."

The Judge—"It strikes me that anyone could go, if he had sufficient knowledge to write in the technical style of medical men, and get poison without difficulty; and though the matter is not before us in this case, it may be that the law requires amendment in this particular."*

The jury appended to their verdict a presentment urging greater restrictions on the sale of poisons, with which the judge thoroughly agreed and undertook to forward to the Home Secretary. During the past session of Parliament it was announced that a "New Poisons Act" was preparing—like many other promises it has come to nothing.

The following defects in the existing legislation on the sale of poisonous drugs may be noted:—

(1) The business of the wholesale dealers in poisons in the ordinary case of business is not fettered with any precautions. Hence, especially in the case of arsenic and in its acids so largely used in manufacture, hundredweights are kept in the stores of manufacturers with as little precaution as in the case of most innocuous materials.

* Trials for Murder by Poisoning: Case of Madeline Smith, evidence of Professor Penny and Professor Christison.

* See Report of the trial of Dr. Lamson, 'Trials for Murder by Poisoning,' p. 544-5 note. The difficulty of tracing the purchase of the aconitia to Lamson in this case was increased by the practice of Messrs. Allen and Hanbury's shop only to enter, in cases of purchases by medical men, the amount paid with the letter C against it. Hence a doubt was for a time raised whether it was atropia or aconitia that had been sold. This is apparently the custom with all chemists and druggists.

See the evidence already reported in the case of Madeline Smith. By the Draft Bill of the Pharmaceutical Society, Section 3, it is proposed that a register should be kept by the wholesale seller of the sales of all poisons for twelve calendar months, but no provision is proposed to be made for their safe custody by the purchasers in a locked store, or for their being delivered out only by a responsible person, and being taken thence under proper precautions. Surely these precautions are absolutely necessary.

(2) The exception in favour of medical practitioners from the entry of the sale required in the cases of other persons, is liable to serious abuse, if no other means of identity are used than those of finding the name given by the purchaser in a Medical Directory, or the form in which the purchaser writes the prescription which he tenders to the seller. See the case of the sale of aconitia to Lamson previously reported.

(3) *Vermin Killers.*—Though by the Pharmacy Act, 1868, the sale of such of these compounds as contain strychnia and other poisons, in Part 1, Schedule A., is limited to certified chemists and druggists, and subjected to the same precautions as that of the poisons in the first part of the Schedule, there is no doubt that they are still sold by unqualified persons, especially in poor neighbourhoods and country places. That they are marked with the word "Poison" and with the name and address of the seller is little or no protection. Besides, those vermin killers, in which phosphorus is the active ingredient, are not even required to be labelled "Poison," and yet they are intensely poisonous, and have been made use of, especially in France, for criminal purposes, though less frequently in this country (see the case of Fisher, a girl convicted at the Norwich Autumn Assizes, 1871, of attempting to poison a family by putting phosphoric vermin paste in the teapot). In the case of Silas Barlow, 1878, it was admitted that the vermin killer had been bought of an unqualified person, and the purchaser, though he noticed it was labelled "Poison," had left it openly in the room which at one time the murderer had occupied, and where he had ready access to it.* "If," said Dr. Bernays, "they are used at all, they should never be made or sold except by the legitimate pharmaceutists of the country under proper precautions."

(4) Though by the statutes the keeper of a chemist's shop is made responsible for the sale of any poison in contravention of their provisions, by his servant or apprentice, the actual sale of these drugs by incompetent persons, especially in country shops, is not practically prevented. Hence the frequent cases of errors made in selling poisonous articles in mistake for innocuous medicines, with the most serious results to the purchasers. The sale of drugs by any one but a qualified chemist should be made unlawful, and subject the master to the withdrawal of his licence.

(5) *Patent Medicines.*—These drugs, for internal or external use, the chief characteristic of whose composition is their secresy, and of which the technical names of their ingredients are in most instances suppressed, or concealed by the most fanciful and attractive titles, are the source of almost unlimited danger to the public, as they can now be purchased of various tradesmen, besides chemists and druggists, grocers, oilmen, and especially at co-operative stores. By an Act passed in the year 1783 (23 Geo. 3, cap. 1), a stamp duty for the purposes of revenue was for the first time imposed on these articles, and by a subsequent Act in 1785 (25 Geo. 3, cap. 62, sec. 16), it was further provided that "any person whatsoever, who has or claims to have any secret art or sole right of compounding preparations of drugs and advertising the same as specifics for the cure or relief of any complaint or malady shall fix a Government stamp to the vials, vessels, or inclosures containing them." The object of these Acts was simply the increase of the revenue, and of course in no way warranted the efficacy or the safety of the secret composition. It is impossible, however, for the Government stamp not to be regarded by the ignorant among the public as a warranty of the specific to which it is attached. The result has been a sale of these specifics to a most dangerous extent, no less than *seventeen millions* of patent medicine stamps having been issued in the year 1881, and, apparently, to judge from the amount received from this source, a large number in the past financial year.* Many of these specifics are, no doubt, as harmless as they are useless, but a far greater proportion are composed of the most potent poisons. The newspapers teem with instances of the fatal results of their incautious use, and no wonder. "No word of specification or limitation as to what may or may not form the component parts of these secret mixtures occurs in any Act; no directions or restrictions of labelling are required in order to show the technical name or nature, whether simple or potent, respecting these mysterious compounds. The one requirement is the exhibition of the stamp certifying the Government duty." In the interests of the revenue these dangerous specifics are specially protected by the Act to regulate the Sale of Poisons; the Pharmacy Act, 1868, sec. 16, providing that "Nothing hereinbefore contained shall extend to or interfere with the making or dealing in patent medicines."

The practice of patenting medicines appears to be peculiar to this country; at least, in France, Austria, Belgium and Germany, foods, drinks, medicines, and chemical products cannot be patented. According to the existing law in France the sale of secret remedies is prohibited, and their courts of law have decided that this designation covers any medicine not prepared from the prescription of a medical man, or not contained in the Codex, authorized by the Government after a favourable report from the Academy of Medicine, to which a sample of the composition and prescription of its contents have to be sent for analysis before their sale can be permitted. It appears also from the reports of the Municipal Laboratory of Paris for some ten or twelve months, that no item of patent medicines, proprietary drugs, or secret remedies is to be found in the tabulated lists of samples there analysed and reported upon. And though this restriction is considered by the Commission by which a new Pharmacy Act has been prepared, and which will in all probability be enacted in the next session of the French Legislature, to act as a prohibition of the sale of a large quantity of specialities of known composition, and must operate as a bar to pharmaceutical progress, they do not recommend its relaxation except in the cases of compounds not including certain excepted poisons. They also recommend that even in these cases they should be sold only by pharmaciens and with this precaution, that the labels on them shall bear the names and doses of the active ingredients, and that where an official drug is used, its Codex name shall be given. On the other hand, the Commission are of opinion that all "secret preparations" of undisclosed composition should be strictly prohibited. The suggestion of the free traders in medicines, even to the extent that any pharmacien should be at liberty to sell any medicinal substance, whether poisonous or not, upon the express demand of the buyer, supplemented in the case of a poison by his signature, was rejected.

By the "Draft Bill" of the Council of the Pharmaceu-

* See the case of Silas Barlow, for poisoning his mistress with a vermin killer, in all probability that sold under the name of "Battle," in a threepenny packet of which Dr. Bernays found 10 per cent. of strychnia. In a specimen analysed by Dr. Tidy he found as much as 23 per cent. of strychnia. The vermin killers of Battle, Gibson, Miller, Marsden, Hunter and Barber, all contain strychnia, and legally ought only to be sold under the same restrictions as that poison. To Dr. Bernays's remark Mr. Justice Denman, who tried the case, added, "a very proper suggestion for the consideration of the Legislature."

* The amount received in 1881 was £139,762 18*s.* 10½*d.* and in 1882, £145,266 0*s.* 6*d.*

tical Society, section 4, it is suggested that "it should be unlawful to sell by wholesale or by retail any patent medicine, or any article bearing a patent medicine stamp, being or containing a poison within the meaning of the Pharmacy Act, 1868, unless the box, bottle, package or vessel in which the same is contained, wrapper, if there be only one, or the outermost wrapper, if there be more than one, be labelled with the name and address of the first seller, name of the patent medicine and the word 'Poison.'" By the 9th section it is proposed that the retail of such patent medicines shall be limited to chemists and druggists authorized to retail poisons under the Pharmacy Act of 1868, with this very dangerous exception, that nothing in this section shall extend to or interfere with the wholesale dealing of patent medicines, or with the wholesale dealing with poisons in the ordinary case of wholesale business. By the section previously cited (Sec. 4), however, these patent medicines would have to be labelled with the name and address of the first seller, the name of the medicine, and the word "Poison."

I willingly admit that this is a movement in the right direction, and valuable as far as it goes, but I cannot but think that in dealing with these sources of public danger we might take a leaf out of the book of the Central Sanitary Bureau of Japan, quoted by Mr. Hubbard from the *British Medical Journal* of July 2, 1880, in his valuable article on Patent Medicines before referred to. By the laws of that country, "proprietors of patent medicines are bound to present at the Government laboratory a sample, with the names and proportions of the ingredients, directions for its use, and explanations of its supposed efficacy, before they are allowed to vend them. During the year reported on no fewer than 11,904 applications for licence to prepare and sell 148,904 patent and secret medicines were made. Permission for the preparation and sale of 58,638 different kinds was granted, 9918 were ordered to be discountenanced, and 70,943 remained to be reported on. The majority of those which were authorized to be sold were of no efficacy, and but few were really remedial agents. But the sale of these was not prohibited, as they were not dangerous to the public health."

The disclosure of the compounds of these specifics to an official chemist, under the seal of secresy, ought not to be objected to by any inventor. He must know that he is at the mercy of any qualified analyst, who can, if he cares, discover and disclose his secret, to which the Government stamp is no protection. The results of the analysis of patent medicines are repeatedly being divulged in the public journals and prescriptions published for their composition. To label them with the word "Poison" —to make conspicuous on the label the technical names of their ingredients—the full limit of a safe dose—and to confine the sale of them to qualified chemists, and to subject their sale to the same precautions as to registry as other poisons, may do much good. Far better would it be if the Government were empowered to refuse the stamp (which it is impossible to prevent being regarded as a warranty) to all inventors who are not willing to submit their compounds to an official analyst. The miserable sum of £150,000, out of eighty-eight millions of our taxation—thus obtained at the risk of the public health—is not to be thought of for a moment. Far better would it be to abolish the stamp altogether, than, for the sake of such a paltry revenue, to continue so dangerous a source of deception.

In suggesting these further restrictions on the sale of poisonous drugs and of those secret remedies so popular as patent medicines, I have endeavoured to avoid unnecessary interference with legitimate trade, and yet to secure some additional protection to the public. The legitimate requirements of trade demand consideration, but the protection of the public is of paramount consideration. No legislation will prevent poisoning; all that can be done by it, is to make poisoning more difficult and its detection more easy. Among many suggestions on this subject, that of defining by statute the maximum quantity that may be safely sold of any poison to one purchaser, has been suggested. That such a restriction might be beneficial in checking accidental poisoning I allow. I do not, however, see its value in the case of the criminal poisoner, who could evade it by purchasing another and another dose of different chemists. Palmer did not purchase the strychnia of only one chemist: Madeline Smith purchased the arsenic at different shops, and Lamson did the same with aconitia. Besides, if the quantity to be sold at one time and to one purchaser is to be limited to a medicinal and not fatal dose, who shall decide what that is? How the most eminent medical authorities differ on this point was forcibly shown in Palmer's case, and it must be admitted that it varies with the condition and constitution of the person to whom it is administered.

With these concluding remarks, I offer the preceding suggestions as a contribution to the amendment of the existing law by which the sale of poison in this country is regulated.

The following is the discussion that followed the reading of this paper, and that by Dr. Tidy, on the same subject, which was printed in last week's number (page 294):—

Mr. H. Bendelack Hewetson, Leeds, said that he spoke with some amount of diffidence in the presence of such celebrated authorities, but it was a principle incumbent upon every medical man to bring forward the conclusions to which he had been driven by experience in his practice, especially in relation to such a subject as the sale of poisons. Dr. Tidy had alluded to the danger of dispensing liniments and lotions in bottles of the ordinary type. An instance of that had occurred quite recently to himself. He had been sent for in a great hurry to a patient who was said to be dying. He had, on the previous night, given the patient, who was suffering from rheumatism, an ordinary sedative draught together with a liniment for application to the affected joint. The first night he had taken the draught properly out of the medicine bottle, but, on the second night, the nurse, having been ordered to repeat the dose, had deliberately given the patient two ounces of belladonna liniment, which was, of course, a deadly poison. The draught and the liniment had been dispensed in precisely the same kind of bottle, and thus the ignorant nurse had easily been led to mistake the one for the other. The patient was absolutely unconscious for seven hours, but, by careful treatment, was restored. The question of drugs sold by quacks under the pleasing names of soothing syrups, mother's rest and so on, was a very important one. A short time ago a little child was brought to him at one of the infirmaries suffering from an affection of the eyes. The child presented symptoms of narcotic poisoning, and the evasive answers to his questions which were made by the person who brought the child confirmed his suspicions in that respect. He ordered the child into the hospital, and, within eight hours, it died. Although the coroner's inquest distinctly showed that the child had died from the effect of repeated small doses of narcotic poison, it was impossible to fix responsibility upon anyone. The child was one for whose parents it was convenient that it should be got out of the way. There was a wholesale system of killing young children by means of these quack medicines going on at the present day, and, although it was impossible by strict legislation to prevent it, there clearly ought to be some amount of restriction put upon their sale. A certain degree of restriction ought also to be placed upon the wholesale sale of poisons for manufacturing purposes. The daily association with poisons, especially those used in the manufacture of dyes, if it did not actually threaten the lives of the workmen so employed, certainly produced very marked phases of ill health.

Dr. Richard Smith said the most noticeable suggestion in Dr. Tidy's paper was the abolition of the Schedule of Poisons and the substitution for it of a definition of the word "poison," which should be accurate and comprehensive. If that were done the difficulty would arise when the article was purchased as to whether it was for internal or external use. The same thing at one time might be a dye and at another time might be a poison. Magenta, for instance, and in fact all the anilines were essentially poisons if regarded from the point of view of internal use. Many of them indeed had a very mischievous effect when used upon clothing worn next to the skin. It was impossible in any Act which might be passed to regulate the sale of poisons to distinguish in every case between those substances which were used in the ordinary arts of life, and those which were to be taken medicinally or might be used criminally for the destruction of life. But if the schedule were done away with that difficulty would be increased tenfold. The present schedule was not perfect; in fact, it was weak from every point of view. Still, if it were done away with, in addition to the above, there would arise another difficulty, namely, that the chemist would be left to form his own judgment in each particular case as to what was or was not a poison. It might happen that on one side of the street a substance would be called a poison, and the purchaser of it asked for his name and address and subjected to other inquiries, while on the other side of the street it would be sold without any difficulty whatever. For instance, oxalic acid, though a deadly poison, was frequently used for cleaning brass and other like domestic purposes. The shop at which that article was sold with the least trouble and the fewest inquiries would come to be the most popular in the neighbourhood, not only amongst those who desire to purchase drugs for criminal purposes but amongst perfectly well meaning persons. The competition of trade would thus lead the chemist to take as loose a view as possible of the meaning of the word "poison." Especially would that danger arise in the case of substances not poisonous in small doses. If the schedule were done away with the consequence would be that by buying small quantities, and buying them repeatedly, a person might altogether escape questioning except in the case of the very strongest drugs. That point, therefore, would require reconsideration before it could be with advantage incorporated in an Act of Parliament. He quite agreed with the suggestion that in any future legislation upon the subject it would be incumbent upon medical practitioners and veterinary surgeons to submit to some restrictions, and he would even make such restrictions more severe than Dr. Tidy had suggested. Although the majority of general practitioners who did their own dispensing were exceedingly careful, there were instances, and those not rare, where such dispensing was done in the most careless manner that could be conceived. There were cases where servant girls and grooms had been set to make up medicines, and they had had at their command poisons of the most deadly character, together with the Epsom salts which formed the greater proportion of the medicine given to the poorer class of patients. It might be a strong measure, but it was eminently desirable that in all cases where a prescription contained an acute, or to use a term which had been found fault with, a deadly poison, it should be compulsory upon the medical practitioner to have it made up by a registered pharmacist. Such a course would only be carrying out what was the general custom of the higher branches of the profession; it would not be a serious financial injury to the general practitioner, while it would certainly give a little additional security to the public. There was a great deal to be done with regard to the question of patent medicines, which had been alluded to more particularly in Mr. Lathom Browne's paper. It was much to be desired that every so-called patent medicine should be really patent. It ought to be incumbent upon every person who put forward a specific to state distinctly, under a penalty for mis-statement, any powerful ingredient which was contained in that specific. In some cases this was done by the proprietors of so-called patent medicines. If such medicines were really patent, that was laid open to the world, so that medical men might know their constituents, and the public generally be aware of what they were taking, there would be little risk arise, at all events, of acidental poisoning. The public would be on their guard, and consequently the mischief would not be done. At present the public had no means of discriminating between a number of simple, perhaps harmless, remedies of the type of Cockle's pills and others—he did not wish to advertise them by mentioning their names—and those which contained positively dangerous ingredients, such as mercury and other deleterious substances. The real point to be aimed at in the improvement of the law was not the abolition, but the careful amendment of the schedules to the Act relating to the sale of poisons. Provision ought to be made for the proper keeping of drugs and poisons in the hands of those entitled to deal in them, and also for the publication of the constituents of so-called specific remedies. The sale of such specifics, as well as of poisons, ought to be confined entirely to pharmaceutical chemists or persons properly qualified to deal in them.

Mr. Michael Carteighe, President of the Pharmaceutical Society of Great Britain, said that he ventured to take upon himself the responsibility of criticizing the two papers read, especially the one by Dr. Tidy, as it was important that the latter gentleman should be corrected on one or two points. Dr. Tidy had been using vigorous language all round, in which, from the point of view of the medical jurisconsult, he was perfectly justified. Dr. Tidy's experience in cases of criminal poisoning was very great, perhaps greater than that of any other living expert, but that gentleman would pardon him for saying that he had treated the subject rather from the point of view of the Public Prosecutor and toxicologist than from that of practical everyday experience. Poisons were used for so large a number of purposes of a legitimate character that it was quite obvious to any thinking person that it would be impossible to insure perfect safety in regard to the sale of them. In England the use of poisons for manufacturing purposes was greater than in any other country. Dr. Tidy's remarks with reference to the question of what was a poison and what was innocuous would be extremely valuable to lawyers, and everything that he said upon that score appeared to be incontrovertible; but, on the other hand, Dr. Tidy had lost sight of the lines upon which legislation had hitherto been conducted in this country. By the advice, not only of the Pharmaceutical Society, but also of the medical advisers to the Government, the principle had been accepted in connection with legislation upon this subject that it was impossible to prevent criminal poisoning, just as it was impossible to prevent one man getting a pistol and shooting another. In most if not all cases in which the law was supposed to have broken down, crime could not have been prevented had the law been stricter. At the same time the law ought to provide every facility for bringing offenders, whether medical men or otherwise, to justice. With regard to accidental poisoning the principle was different. He personally had had something to do with drafting the existing Act relating to the sale of poisons. That Act had been somewhat maligned, and no doubt it was a little difficult to understand in certain cases; but the principle of the Act was essentially this: that accidental poisoning could be prevented, and a certain amount of security given against criminal poisoning, by registration and other means. Despite everything that Dr. Tidy had said, the chief security in his judgment was to be found in the intelligence of the person who sold the poison. What was the use of making laws to become a dead letter? It was admitted that the existing law was not carried out; he, for his part, was aware that in some districts it was not, and yet Dr. Tidy was asking for further restrictions. To a certain extent, he agreed with him, but they must be careful not to draw the rope of legislation too tight lest it break. The two cardinal points to be kept in view were the proper training and qualification of the seller, and the inditing, labelling, or doing of something at the time of sale which should also afford additional security to the purchaser. It was perfectly obvious that when persons were on the register, and had had some fair amount of training and education, their whole livelihood depended upon their exercising care in the practice of their profession. No doubt there had been rare cases, such as that mentioned by Mr. Hewetson, where druggists were a little to blame in sending out lotions and liniments in bottles similar to those containing draughts, but such cases were much less common than formerly. That was attributable to the better education of pharmacists as a class, and the greater responsibilities attaching to them. If a man was found to have committed a mistake of the kind referred to his business was at stake. It was not a mere question of a fine; if the public had its confidence in him shaken the consequences were much more serious than would be represented by any fine which might be imposed upon him by Act of Parliament. Mr. Lathom Browne had in his paper mentioned that the French were disposed to relax the severity of the restrictions which are now placed upon the sale of poisons in that country. The French law was at the present time very much what Dr. Tidy would make it in England; but, from his (Mr. Carteighe's) inquiries amongst French pharmaciens and others, he found, as he expected to find, that practically it was evaded with the tacit consent of both buyer and seller, because it was impossible to carry it out. There were legitimate uses for poisons, and therefore there must be places where such poisons could be bought and sold. There was no way of affording the public the complete protection it required other than by restricting the sale of a large number of drugs which were not statutory poisons, but which were very potent and very mischievous, to qualified persons. That constituted the real difficulty. When the present Act was passed, the Pharmaceutical Society would have, with the concurrence of the Government, increased the Schedule by including in it many drugs very potent and capable of doing almost as much mischief as those now classed poisons. But they were prevented by free trade doctrines, and the sale of poisons for use in manufactories was so gigantic that the Society found it impossible to go further at that time. The Pharmaceutical Society, therefore, might claim credit for itself that it was sufficiently public spirited to insert in the Schedule the minimum only of articles, because the practical effect of including the others would have been to limit their sale to persons registered under the Pharmacy Act. At the same time it was undoubted that the only complete safeguard for the public would be to place restrictions upon the sale of all potent drugs. Dr. Tidy criticized the Act, and asked, amongst other questions, why there were two schedules. He would give one reason. Take the case of such a thing as red precipitate. It was a domestic remedy. It might be a very undesirable thing that it should be a domestic remedy, but the fact remained that it was. No mother would consent to the sale of it being restricted to the ordering by a prescription. Doubtless it would be a much better thing not to use domestic remedies, but to call in a medical man. Still the system had grown up, and though it was becoming less common, yet there was an enormous amount of domestic doctoring, and while it existed a certain amount of latitude must be allowed. The use of these things was perfectly well understood by the public. Moreover, red and white precipitate were substances not easily swallowed accidentally. They had a distinctive character about them, and would be properly labelled, and to ask that they should be sold under the same restrictions as applied in the case of, say, strychnia, was to ask for what would be impossible in practice, though possibly logical in principle. Speaking from statistics he was able to say that in certain poor districts in London such articles were sold to as many as a hundred persons on a Saturday for use in domestic medicine. He doubted whether it would be possible to register every sale, or whether any additional security would be afforded by so doing. Every person who purchased red or white precipitate knew how to use it, and was familiar with its dangers. In such a case he ought to be allowed to purchase it with less difficulty than a poison like strychnia. With regard to cantharides, that was used for a specific unlawful purpose and its being placed in Part I. of the Schedule was, so to speak, a piece of preventive medicine. Dr. Tidy was also very satirical about preparations of prussic acid being called a poison; but, as a chemist, he must be perfectly familiar with the fact that medicinal prussic acid was a preparation containing only 2 per cent. of real prussic acid. The sense in which the word "preparations" was used in the Schedule was perfectly well understood by medical men and pharmacists, and the Pharmacopœia was the authority for its introduction. In that work salts of morphia were not classed as preparations of opium. With regard to the vexed question of poison bottles, there was one serious objection to a special kind of bottle. It was this. With the better class of people there was not so much difficulty in getting a special bottle used for the purpose intended. But with others it was found that they declined to throw away the special bottles, and hence the latter, when emptied of their original contents, were filled with harmless domestic liquids, even though the word "poison" formed part of the bottle. It would be impossible to compel people to take the bottles back to the chemist after they had done with them and, consequently, the difficulty he had mentioned was a serious one. With regard to wholesale dealing it would be seen from the paper of Mr. Latham Browne that the Pharmaceutical Society had, at the suggestion of the Government, prepared a clause dealing with it. It was impracticable to deal with it in the way Mr. Lathom Browne suggested. We did not hear much of accidental poisoning from arsenic in places where arsenic was used for manufacturing purposes; nor of poisoning from oxalic acid in places where the latter was largely used in the manufacture of straw hats and bonnets. Of course there might be cases of criminal poisoning, where one workman, knowing the nature of the substance, used it feloniously; but it would not be logical to fetter an entire industry on that account. Dr. Tidy's remarks with reference to the regulations were not quite correct. What was done by the members of the Pharmaceutical Society was this. A series of suggestions were adopted in the form of recommendations, which were printed and sent out to every registered chemist and druggist. He did not wish to say anything about the wisdom of such a step, but that was what was done, and it had been productive of a great deal of good, though those recommendations had not the force of law.

Dr. Tidy: Was not the Council turned out because it proposed these regulations?

Mr. Carteighe said that the printed recommendations had been sent out to every chemist and druggist and a certain amount of good had arisen from them. One of the objections raised to them was that it seemed a little unfair to ask pharmacists to adopt what many of them thought troublesome precautions, while the great mass of cases of accidental poisoning occurred in workhouse infirmaries, hospital dispensaries, and in the surgeries of medical men, the dispensers in which were not to be subjected to those regulations. He cordially agreed with Mr. Smith that it would greatly conduce to the safety of the public if every medical man would discontinue the practice of dispensing medicines. He thought medical men would be willing to do that as pharmacists became better educated. The public also as it became better educated would understand and appreciate the advantages and security of this system, which was in vogue all over the Continent.

Dr. Tidy said that as a medical man he was very glad to second the last remark which Mr. Carteighe had made as a pharmacist. He hoped the day would come when pharmacists and medical men would each attend only to their respective work. With regard to Mr. Carteighe's remark about not drawing the rope too tight, no one felt the force of that more than he did, and he hoped he had made that perfectly clear in his paper. At the same time it was necessary to draw the rope just tight enough. Mr. Carteighe had remarked upon the improved education of pharmacists, and it was certainly the fact that the present race of pharmacists was very different from the past. That was one of the reasons why the question as to what was or was not a poison might be very fairly left to the improved education of the pharmacist instead of drawing up a schedule which fettered him in the way that the present Schedule did by compelling him to include certain things which were perfectly useless, and leaving out other things which it was of the utmost importance should be included. He could assure Mr. Carteighe, as head of the Pharmaceutical Society, that there was no feeling of opposition to pharmacists in anything he said. On the contrary no one was more conscious of what the Pharmaceutical Society had done to raise the education of chemists and druggists. But with that improved education they surely might omit the Schedule, and leave it to the judgment of the pharmacist whether to insert the entry of a sale in the poison book or not. He was quite ready to admit that there were very serious objections to omitting the Schedule, but there were also very serious objections to retaining it. In fact it was a balance of difficulties. There was a good deal of point in the remark of Mr. Smith that if the Schedule were abolished the chemist who made the fewest inquiries would attract all the trade away from his more scrupulous rival. He was very much struck by that remark, but, still there were such grievous difficulties involved in the retention of the Schedule, that he would prefer to have it removed, and to trust to the individual judgment of the pharmacist. If the sale of poisons was taken out of the hands of herbalists, quack doctors, grocers and oilmen, and limited to properly qualified persons there might be allowed, within certain limits, such freedom as was consistent with the improved education of pharmacists as a body. He entirely agreed with Mr. Carteighe's remarks concerning accidental poisoning, but still he thought the subject required some regulations, and that it would be well for the Pharmaceutical Society to legislate in such a way as to meet the feelings of the public on the matter.

The Chairman, in closing the discussion, said that the storage of poisons in chemists' shops might be improved with advantage, for it had often struck him that poisons were stored in a very careless manner. He had also frequently thought what marvellously clever fellows chemists must be to be able to read doctors' prescriptions without making mistakes, for, as a general rule, the more eminent the physician the worse he wrote. Dr. Tidy's remarks about preparations and tinctures reminded him of his experience in Colorado, in the Rocky Mountains. Colorado was a temperance city, and it was impossible to get any intoxicating drink in the ordinary way. But a man had nothing to do but to go to a chemist's shop and ask for tincture of myrrh and he got what he wanted. There was just a little something put into the alcohol to make it saleable by law. He was very glad to hear that there was such a demand for Epsom Salts, for he possessed a piece of land at Epsom on which he was anxious to build a house, but he had hitherto been deterred from doing so from the fact that there was no water anywhere near it except what was supposed to be impregnated with Epsom salts.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The opening meeting of the seventh session of this Association was held in the rooms, University Chambers, on Wednesday evening, the 10th inst., when the President (Mr. C. Parkinson) delivered an address. There was a large attendance.

The President, after a few preliminary remarks, said that the pharmacist of to-day found himself in the unhappy position of having been educated to perform services for which there is a gradually decreasing demand. For many years past the cry had been "Educate, Educate, Educate!" Education was to be the panacea for all woes; to weed out from the ranks incompetent men, to raise the pharmacist in the estimation of the public, to make him prosperous in life and send him down to the grave full of riches and honour. Unfortunately, this programme had been very imperfectly carried out, and now the cry was "Legislate!" He ventured to assert that the chief aid to pharmacists must come from themselves. The knell of monopoly was being sounded from every platform, and with an extended electorate the chances of legislative redress would become even more slender than they were at present. There could be no doubt but that the great success of the stores was due to the fact that for some years past the depressed state of trade and agriculture had compelled the peer, as well as the peasant, to husband his expenditure, and make money go as far as possible, and while the stores had powerful and influential friends, both in the Legislature and the press, it could hardly be supposed that a blow aimed so manifestly at them would be allowed to pass unchallenged; pharmacists should therefore look to themselves for help, and not be deluded into trusting too much to legislation. After referring to the supply of medicines by herbalists and stores, Mr. Parkinson said another factor in the consideration of this question was the deluge of novel and elegant pharmaceutical preparations, which our American cousins have been showering upon upon us for some time past, and which physicians are not ashamed to prescribe. It was possible almost to count on the fingers the names of the eminent physicians who are contented with the preparations of the pharmacopœia. It was no use shrugging shoulders and calling on Jupiter to shatter the machinations of these wicked men. Pharmacists must make preparations of their own of equal elegance, and bring them before prescribers with equal persistence. Associations and Acts of Parliament could do something for them, but could not make incapable men successful, or indolent men wealthy, or confer distinction without merit. He then referred to the social position occupied by pharmacists, and concluded with some words of advice to his hearers as to the adoption of habits of personal economy and the cultivation of the nobler parts of their moral and intellectual natures.

At the conclusion of the address, Mr. F. H. Alcock proposed a hearty vote of thanks to the President, which was seconded by Mr. Wrenn, and carried unanimously.

BOOKS RECEIVED.

Pharmakognosie des Pflanzenreiches. By F. A. Flückiger. Second Edition. Part III. Berlin: R. Gaertner. 1883. From the Publishers.

Die Theerfarben-Fabriken der Actien-Gesellschaft Farbwerke vorm. Meister Lucius und Brünning in sanitärer und socialer Beziehung. By Dr. Grandhomme. Heidelberg: G. Koster. 1883. From the Publishers.

The Vegetable Materia Medica of Western India. By W. Dymock. Part III. London: Trübner and Co. 1883. From the Publishers.

The Newer Materia Medica. Designed and Issued to the Medical Profession by Parke, Davis and Co. Detroit: 1883. From the Publishers.

Obituary.

WILLIAM SQUIRE.

It is with deep regret that we are called upon to publish this week the death of Mr. William Squire, who until recently was the senior partner in the firm of Hearon, Squire and Francis, wholesale druggists, of 5, Coleman Street, E.C. The sad event took place suddenly on Thursday, the 11th inst., at his residence, The Grove, Feltham Hill. Although the health of the deceased had been in a failing condition for some time, the advance of infirmity was so natural as to restrain those graver fears which arise from the apprehension of imminent danger. Only within a few hours of his release did he evince any symptoms which could clearly be recognized as premonitions of an approaching end. The immediate cause of death was congestion of the lungs.

Mr. Squire was in his seventy-second year, having been born at Doncaster in 1812. He was apprenticed to the late Mr. Judson, chemist and druggist, Ripon, and at the expiration of his term in 1833 he came up to London to gain experience in a wholesale drug house. For a short time he was in the employ of Messrs. Hodgkinson and Co., and on leaving them he entered the then firm of Hearon, Bright and McCulloch. Here he went through the usual routine work, step by step, until he had acquired a thorough knowledge of the business requirements of each department of the house. He was then promoted to the road, a position which he amply justified by his almost unprecedented success as a traveller. Shortly an opportunity was afforded for his admission as a partner, an offer which he as gladly accepted as he had deservedly won.

As his new position entailed increased responsibility so he found wider scope for the exercise of his ability, and to his honour be it recorded that he brought his rare business capacity and tact to bear upon all that affected the commercial interests of the firm, so that he rapidly rose to be its presiding genius. He continued to be the ruling spirit until little more than a year ago, when, by his retirement, he brought to a close a most successful business career.

Although from the fear of notoriety the subject of our memoir shrank from taking part in pharmaceutical politics, he was always ready to lend a helping hand when by so doing he could further the interests of the members of his calling. The liberality of his gifts, cheerfully and unostentatiously distributed to not a few of his brethren in their time of pressing need, merits more than passing mention. Nor can we omit to refer to the assistance he has rendered the Pharmaceutical Society in his capacity as an auditor. In his riper years his advice was much sought after, and among his commercial compeers on the Drug Exchange he was reputed to be one of the best judges of the quality of drugs. Regarded as a man he was essentially a gentleman. Although naturally commanding, a dignified ease marked his bearing. Courteous ever in his address to a stranger, he occasionally appeared to be peremptory in his manner. A remarkable shrewdness characterized his observance of men and things, and he possessed to a large degree the rare faculty of discriminating character. Such are some of the qualities which contributed to his social advancement, and by their exercise he secured and maintained the hearty goodwill of his *employés*.

No surer evidence of the esteem in which the deceased was held could have been adduced than was supplied by the numerous gathering which assembled to pay its last tribute to his memory. In addition to the present members of the firm and a staff of the older servants, there were to be found among the mourners those who had come long distances from the provinces to seal their loyal devotion to an honoured friend.

Notice has also been received of the death of the following:—

On the 3rd of August, Mr. George Newlove, Chemist and Druggist, Stretford New Road, Manchester. Aged 62 years.

On the 27th of September, Mr. William Whincup, Chemist and Druggist, Essex Road, London, N. Aged 50 years. Mr. Whincup had been a Member of the Pharmaceutical Society since 1869.

On the 29th of September, Mr. Samuel Thomas Severs, Pharmaceutical Chemist, Lupus Street, Pimlico. Aged 36 years. Mr. Severs had been a Member of the Pharmaceutical Society since 1876.

On the 5th of October, Mr. Llewellin Palser, Chemist and Druggist, Wotton-under-Edge. Aged 64 years.

On the 5th of October, Mr. Peter Strang, Chemist and Druggist, High Street, Perth. Aged 53 years.

On the 7th of October, at Forest Gate, Mr. Frederick Hill Cumine, Chemist and Druggist, King's Lynn. Aged 64 years.

On the 8th of October, Mr. Samuel Sainsbury, Pharmaceutical Chemist, Strand, London. Aged 75 years. Mr. Sainsbury was one of the Founders of the Pharmaceutical Society, having been a Member since 1841.

Correspondence.

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

Liquid Extract of Cinchona.

Sir,—I have but now met with and read the paper by Dr. Paul, "On the Liquid Extract of Cinchona," reported in your issue of March 10, 1883. I have followed the discussion, and as I was the writer or "assisted" at the authorship of the paper read before the College of Physicians by Mr. Battley in 1838 and alluded to by Dr. Paul, I wish to add that I think Mr. Battley attained the object in view, viz., that of "separating and securing nearly the whole of the medicinal properties of the bark." Mr. Battley was aware that there was some quinine left in the residuum, but the preparation was a most elegant one, "leaving unchanged the medicinal qualities of the substance acted upon, separating and removing therefrom, as far as possible, every matter not possessing remedial virtue." It was very highly esteemed by Dr. Farre and other distinguished physicians of that day as offering a means of administering bark under circumstances when the patient could not take quinine, and I have little doubt that if the successor of the late Richard Battley continues, as is presumable, the same process, the preparation will long hold its own against all comers. In justice to another, it is not for me to recapitulate the operations, but I may say that the finest cordifolia bark procurable was used, that the water employed was cold, that it was not a mere digestion and evaporation, but a process of manipulation and elimination, and that no spirit was added at the completion; the result being that it was as uniform a product as could be made. Analysis could not determine the mode of manufacture; criticism did not deter its use. It grew rapidly in professional favour, and was approved by the highest authorities, and if pharmacists could have kept to this one most valuable medicine, instead of purchasing cheaper and much inferior imitations, much time and much fighting would have been spared, and the profession would not have been baulked in the use of an admittedly valuable remedy, still admitted to take high rank. Mr. Battley never advertised it, yet it found its way both in public and private throughout the country and abroad.

One of the speakers at the meeting observed that "the pharmacy of cinchona bark is in a great muddle." He says that "he had always looked on the fluid extract of cinchona contained in the Pharmacopœia as a continuation of a preparation which was originally brought before the College of Physicians by Richard Battley about the year

1830." The framers of the Pharmacopœia have much aided this state of things. Did they apply, before completing their work, to those who were acquainted with the matter in all its details? Did they? In the year 1830 I was working with Mr. Battley in his laboratory, and I can certify that the extractum cinchonæ liquidum of the British Pharmacopœia has no more relation to the "liquor cinchonæ" introduced by Richard Battley, as then and there prepared, than has the extractum opii liquidum to the "liquor opii sedativus" of the same discoverer. I would not have intruded these observations, but having been a party to the work of 1830 and 1838, by the late Richard Battley, I venture to do so.

12, *Wilson Street, Finsbury.* W. E. HEATHFIELD.

CHLOROPHYLL IN ANIMALS.

Sir,—As I find some inaccuracies in the account, published in the *Pharmaceutical Journal* of September 29, of my paper read before Section D of the British Association at Southport, I shall, with your permission, endeavour to give the necessary corrections.

What I discovered in invertebrate animals was not chlorophyll "in the intestines," but chlorophyll in the appendages of the intestine, *e.g.*, in the liver of Helix, Limax, Ostræa, Anodonta, in the pyloric corea of starfishes, and in the intestinal appendages of Echinus, etc. The finding of such pigment in the "intestine" of an animal would no more prove that the chlorophyll was formed by the animal, than would finding sulphate of copper in a man's stomach prove that he had synthetically built up that salt. The enterochlorophyll discovered by me is described in the current volume of the Royal Society's 'Proceedings' (No. 226, 1883), and my reasons for concluding that it is a synthetic production were given at Southport.

But I could not really have proved the correctness of my views if it had not been for this very Journal. As my attention was called to a paper by Mr. Pocklington, published in this Journal in 1873, in which he asserted that he had obtained proof, by means of the microspectroscope, of the presence of chlorophyll in the wing cases of cantharides, I repeated his experiments and can vouch for their accuracy, and I was able further to extend his experiments in such a manner as to prove beyond all doubt that the body found by him is chlorophyll. I called especial attention to his experiments in the paper read at Southport, and I now take this opportunity of observing that Mr. Pocklington deserves great credit for the work which he has done on the chlorophyll of cantharides.

The work of Sorby, Lankester and others had already shown that in Spongilla, Hydra, and some other invertebrates, chlorophyll was present, but Brandt, the Hertwigs, and others maintained that it was due to "symbiosis," *i.e.*, to living parasitic algæ, and the point which I wished to establish was, that such a view is incorrect with regard to its occurrence in other invertebrates, especially since Professor Carl Semper has endeavoured to extend this parasitic theory to all instances of the occurrence of chlorophyll in animals.

C. A. MACMUNN, B.A., M.D., F.C.S.

Wolverhampton.

THE CONFERENCE ADDRESS.

Sir,—As one who has taken a great though latent interest in the progress of pharmacy during the past ten years, I most heartily concur with Professor Attfield's suggestion of appealing to "the great mass of the community" by a distribution of the Conference address. Indeed, I intend that a copy shall come into the hands of every magistrate, medical man, or men who are aspiring for Parliamentary honours in the forthcoming compaign, including the coroner for this division.

Might I suggest that the Secretary of the Society should be instructed to request all Local Secretaries to make this one effort, as by acting collectively throughout the country we shall be reaching at least that part of the community who hold to a very great extent our interests at stake.

I regret that our Pharmacy Bill was not more closely associated with the Medical Bill which is shortly to come before the House, for a partnership, even if only a sleeping one, would have been not only more beneficial to medical men and pharmacists, but to the community at large.

Rugby. A. G. CHAMBERLAIN.

Sir,—Although many and grievous have been the complaints made of late by our suffering fraternity,—not by any means relieved by the statements contained in Professor Attfield's address at the British Pharmaceutical Conference,—the means proposed to alleviate the unsatisfactory condition of supply and remuneration in the drug trade have been comparatively few, which induces me to trouble you with a suggestion having for its object the bringing back the sale of medicines to the public to its legitimate distributors.

I propose that the Pharmacy Act should be amended and expanded by rendering it illegal for anyone to retail any drugs or compounds contained in the Pharmacopœia without the name and address of a pharmaceutical chemist or chemist and druggist attached to it (whose name is on the Register) upon the label; but that anyone, be he grocer or oilman, huckster, storekeeper or draper, or whatever his business, may be at liberty to supply the public, provided always that upon the label the chemist's name is distinctly printed, who must be responsible for its purity. This would be a simple and easy manner of defining the responsibility of the chemist on the one hand by reference to the Register, and on the other its being contained or not in the Pharmacopœia could be at once decided by reference to that official authority, both standards being already in existence and ready to hand. As the sale of medicines is becoming more and more convenient if supplied in packets or in bottles, and the Parcels Post forwards every parcel so cheaply and expeditiously, no complaint could possibly arise even in the most thinly populated district, that pure drugs were not within the reach of the public throughout the kingdom. The chemist need not be required to supply the drugs to the retailer himself, but having satisfied himself, after examining them, as to their quality and purity, supply his labels to the retailer at a price that would remunerate him for his knowledge and trouble, and the retailer, if he preferred, could purchase the articles himself elsewhere. The effect of this arrangement would be that the chemist would derive some benefit from all medicines sold, and the advantage of more widely circulating his name and qualification, and the public would no longer be supplied as at present from unsatisfactory sources with inferior drugs and adulterated compounds. I submit the above proposition as a simple and comparatively satisfactory solution of the disadvantageous position at present occupied by my brethren in the trade.

Wandsworth. GEORGE NIND.

W. H. P.—We are not aware that such a work has been published.

B.—Probably Mayne's 'Medical Vocabulary' (Churchills; price, 10s. 6d.) would answer your purpose.

"*Quærens.*"—According to section 16 of the Pharmacy Act, 1868, the previous sections relating to registration do not extend to the business of a legally qualified apothecary.

R. F. J.—The numbers mentioned are in stock and can be obtained through the publishers, Messrs. Churchill, 11, New Burlington Street, W.

W. P. F. Miller.—*Viburnum Opulus.*

G. Gordon.—(1) *Calamintha Clinopodium*; (2) *Stachys arvensis.*

Junior.—See a paper on "Glycerine Jelly," by Mr. Pocklington, in the *Pharmaceutical Journal*, [3], v., 401.

Inquirer (Ilfracombe).—The prescription is probably from a German practitioner, as all the ingredients ordered are in the German Pharmacopœia. The first is the artificial Carlsbad salt, which is a mixture, finely powdered, of sodium sulphate, dry, 44 parts; potassium sulphate, 2 parts; sodium chloride, 18 parts; and sodium bicarbonate, 36 parts.

J. A. H.—The process mentioned is the only one for the purpose with which we are acquainted; it is not dangerous if properly carried out.

F. A. Brown.—We have not met with the term: you are recommended to address your question to one of the journals associated with the iron industry.

Sub Umbra Floresco.—No formula for such a preparation has been published.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. R. H. Groves, Fitch, Plant, Williams, Schacht Siebold, Southall, Abraham, Ince, Barnes, Willmott Biologist.

"THE MONTH."

Probably the most important incident during the past month, in its bearing upon the treatment of disease, is the publication of the report of the German Scientific Expedition which was sent to Egypt to investigate the circumstances attending the recent outbreak of cholera in that country. Although the Commission did not arrive on the spot until after the virulence of the epidemic had considerably abated, the investigation at once set on foot under the able direction of Dr. Koch yielded results so interesting that an application was made to the German Government, and acceded to, that the Commission might be authorized to proceed to India and continue the study of the disease in its Asiatic home. One fact appears, however, to be already clearly established, namely that in every cholera corpse examined a particular form of bacterium, resembling in size and form the bacillus of glanders, was found in the coatings of the intestines. In some cases the bacilli had penetrated into the utricular glands of the mucous membranes and there set up considerable irritation; they also had settled in larger numbers on the villi of the intestines and had often penetrated into their tissue. In severe cases which had terminated in bloody infiltration of the mucous membrane of the intestines, the bacilli were found in very large numbers, and they had not confined themselves to the invasion of the utricular glands, but had passed into the surrounding tissue, into the lower layers of the mucous membrane and in some cases right into the muscular skin of the intestine. It is interesting to learn that similar bacilli were observed by Dr. Koch a year ago in a cholera-infected intestine received from India, but in that case the possibility of their having been a product of putrefaction was not excluded. As these bacilli were observed in Egypt in all the cholera cases investigated, and were not found in the intestines from several persons who had died from other diseases, or even in one case where a man had died from another disease a few weeks after he had recovered from an attack of cholera, Dr. Koch feels warranted in saying that there can be no doubt that they stand in some relation to the operation of cholera. But he is careful to point out that it cannot yet be concluded that they are the cause of that disease, and that it could just as well be assumed that the operation of cholera causes such disturbances in the mucous membranes of the intestines that among the many bacteria always parasitic in the intestines one form of bacilli is thus enabled to penetrate into the tissue of the mucous membrane. In order to determine this point it seems necessary to isolate and cultivate the bacilli and ascertain whether they are capable of reproducing the disease in a fresh subject; but in connection with this branch of the investigation there is a difficulty that has not yet been surmounted, in that no animal has yet been found which is susceptible to the choleraic poison. Dr. Koch and his colleagues have experimented upon mice and monkeys, dogs and poultry, but hitherto without results, although it was almost certain that some at least of the matter injected was capable of setting up the disease in a human subject. Another point of interest that requires to be cleared up, is the observation that in some places the epidemic dies out long before all the people have taken the infection, although infectious matter still remains scattered all over the district. This is thought to indicate that conditions arise under which the infectious matter loses some of its virulence.

Dr. Domingos Friere reports the discovery in the blood of patients suffering from yellow fever of an organism which he calls *Cryptococcus zanthogenicus*. He describes it as exhibiting minute points at first, and then large round cells with greyish or fringed margins and bright transparent centres. He believes that it does not lose its vitality when the body of a person who has died of yellow fever is buried; for having placed a guinea-pig in a chamber with earth taken from the grave of a man who died a year previously the animal died in five days, and its blood was found to be full of the characteristic organisms in various stages of development.

The possibility of the communicability of diseases through the instrumentality of flies has recently been pointed out by Dr. Grassi (*Brit. Med. Journ.*, p. 688). He found that the ova of human parasites which were exposed in a dish were taken in by flies at the mouth and discharged again unchanged in their fæces a few hours afterwards. The importance of protecting human food from flies and the necessity of keeping the rooms of persons suffering from infectious diseases free from flies is therefore obvious.

The change that takes place in the composition of gelatine under the influence of a digestive ferment has been the subject of an investigation by M. Tartarinoff (*Comptes Rend.*, xcvii., 713). The product of the action of artificial gastric juice upon gelatine was carefully analysed and yielded results showing that the modification is not a profound one and that the process of peptonization of gelatine is mainly one of hydration. The analytical results were also almost identical with those previously obtained in the analysis of products of gelatine by digesting it without pepsine in solutions of hydrochloric acid of varying strength and at different temperatures.

In a recent paper (*Pharm. Journ.*, [3], xiii., 603) Messrs. Dehérain and Maquenne recorded some observations on the action of a microscopical organism presenting the characters of the butyric ferment of Pasteur, which was found to be present in garden oil and capable of reducing the nitrates occurring in it. They now report the results of experiments in another direction and state (*Comptes Rend.*, cxvii., 803) that when the ferments of arable soil are allowed to act upon cane sugar in aqueous solution, at a temperature of 35° C., in the presence of calcium carbonate and sheltered from contact with air, there are produced small quantities of ethyl alcohol and still smaller quantities of superior alcohols; together with acetic, butyric and propionic acids in proportions representing nearly one-half the sugar employed, the acetic and butyric acids being by far the more abundant. These results therefore confirm the inferences drawn from the previous experiments that the dominant ferment in the soil belongs to the class of butyric ferments.

The residual pulp from the diffusion vats of beet-sugar manufactories is used largely in some parts of the Continent as cattle fodder, and has gained a reputation for favourably influencing the yield of milk from cows fed upon it. Some experiments made by Messrs. Andouard and Dézaunay show, however, that this is only partly the case (*Comptes Rend.*, xcvii., 809). It was found that "diffusion pulp" that had been preserved in a silo, when given to a cow in quantities at first of 27 kilograms and then of 55 kilograms daily, produced immediately an augmentation of 32 per cent. in the yield of milk, and that whilst the richness of the milk in caseine and mineral salts did not appear to be affected, the proportion of butter was increased 12·40 per cent. and that of sugar 23·64 per cent. But on the other hand the food appeared to communicate to the milk a less agreeable flavour, causing children to refuse to drink it, as well as a predisposition to the acid fermentation, and Messrs. Andouard and Dézaunay express a doubt whether butter of good quality could be made from such a milk. It is thought that this modification in the flavour may be attributable to the considerable proportion of acetic acid and homologues developed in the pulp by fermentation whilst in the silo, and that perhaps it might be avoided by using the pulp fresh from the presses.

Hippurate of sodium is said to be now attracting attention as a remedy for diseases in which the excretion of uric acid in excess forms a prominent feature. A few months ago Dr. Garrod called attention to the fact (*Lancet*, April 21, p. 672) that solutions of the alkaline hippurates when added to and allowed to remain for some hours with those of urates caused the disappearance of uric acid, so that it could not, after the addition of hydrochloric acid, be detected either by the microscope or by the murexide test. This action of hippuric acid upon uric acid is supposed by Dr. Garrod to take place in the urinary organs of herbivorous animals, since uric acid is found in the urine of suckling calves, but not when the animals feed entirely on vegetable food, hippuric acid being then found in the urine instead of uric. The urine of herbivorous animals is generally alkaline, whilst that of man is acid. Dr. Garrod therefore prefers the use of alkaline salts of hippuric acid, giving also some alkaline citrate if there be abnormal acidity of the urine. He states that in cases of gout, gravel and calculus he has obtained great advantage from the use of hippurate and benzoate of sodium, preferring the salts of potassium and lithium when he wishes to increase the quantity of the urinary excretion. Benzoate of sodium has a similar action to the hippurate, as might be expected from the fact that benzoic acid when absorbed from the stomach takes up glycine and becomes converted in the system into hippuric acid and is thus thrown out in the urine. The use of a vegetable diet which would give rise to the formation of benzoic or hippuric acid in the system might, Dr. Garrod thinks, be devised for those who suffer from the diseases above mentioned.

Benzoate of cinchonidine is recommended by M. Bouchardat in mild cases of diabetes with excessive production of uric acid. It is made, according to M. Byasson, by dissolving freshly precipitated cinchonidine, prepared from 200 parts of the sulphate, in a solution of 60 parts of benzoic acid dissolved in 200 parts of alcohol of 90 per cent., poured into a porcelain vessel containing 3000 parts of boiling distilled water. The solution of the salt before being allowed to cool should, if necessary, be rendered slightly alkaline by the careful addition of ammonia. The salt crystallizes out on cooling.

Tannate of sodium has been lately recommended instead of tannin to lessen the excretion of albumen in albuminuria; but the statements concerning its value are somewhat conflicting. Ribbert found that it lessened the excretion of albumen in animals. Dr. Brien, on the other hand, found in four carefully observed cases of patients suffering from chronic albuminuria, that it was of no use whatever; some patients can take it well, others vomit after every dose (*Practitioner*, Oct., p. 294).

The *Lancet* (Oct. 20, p. 704) gives a summary of some recent investigations of Albertoni on cotoin and paracotoin, which were published in the *Archiv für exp. Path. und Pharm.* (Sept., 1883). Albertoni finds that repeated small doses of cotoin increase the appetite of healthy men without causing unpleasant sensations and without producing constipation. It does not become dissolved in the gastric juice but passes unchanged in the intestines, where it would appear to be absorbed, as it is excreted by the urine. The falling off in the amount of indican in the urine during its use is supposed to be due to a secondary effect, which depends on the cure of the internal lesion. The experiments made show that cotoin can determine an active dilatation of the vessels of the abdomen, an action not known to be possessed by any other substance. Paracotoin is a weaker cotoin in its physiological action. Albertoni considers that cotoin is of value in the diarrhœa met with in the various forms of mental disease, in chronic intestinal catarrh, in looseness of cachectic states, and in the relaxation of pellagra, phthisis and rickets. Its use is contraindicated in states of severe hyperæmia of the intestines, and where a tendency to melæna exists. Doses of 15 and 20 centigrams per day were thought to be more effectual than smaller ones. The administration of bismuth with cotoin is suggested as likely to be of special value.

The question of the medicinal effects of the spiritus ætheris nitrosi of the B.P. has received attention from Dr. Leech, of Owens College, who has published the results of his investigations in the *Practitioner*. He considers its action as analogous to that of nitrite of amyl, and that it is a distinct depressor of arterial tension. Its diuretic action he attributes to its effect on the circulation. The samples used in his experiments answered to the B.P. test and contained but little aldehyde. It may be hoped that his investigations may be carried further, and that the influence of paraldehyde on the effects of spirit of nitrous ether may be taken into consideration, since Mr. J. Williams has pointed out that it is a possible ingredient in sweet spirit of nitre, inasmuch as the odour of the latter closely resembles that of paraldehyde.

Dr. Méhu calls attention (*Journ. Pharm.*, [5], viii., 339) to the property possessed by glycerine of removing certain compounds from ethereal solutions, which might have an important bearing in analytical investigations. He has found that upon shaking an ethereal solution of ferric sulphocyanide or perchloride with glycerine, the glycerine takes up the whole of the ferric salt leaving the ether colourless; similar results follow with ethereal solutions of chloride of gold, nitrate of uranium, or the violet liquid produced by shaking an aqueous solution of methylamine violet with ether. In other cases glycerine appears only to remove a portion of the compound dissolved in the ether; among these Dr. Méhu mentions mercuric chloride.

Whilst engaged in the operation of preparing theobromine from cacao beans Herr Schmidt has observed (*Archiv*, [3], xxi., 675) the separation from the last mother-liquor of a small quantity of long acicular crystals, corresponding in appearance and behaviour with caffeine, which was obtained pure by dissolving in cold benzol and recrystallizing the evaporation residue from hot water. The occurrence of a second crystalline alkaloid, "existing in larger quantities in some descriptions of cocoa than in others, and in larger proportion in the husk than in the kernel," had been previously recorded by Mr. Bell (*Anal. and Adult. of Foods*, p. 85) who, however, only speaks of it as a "theine-like alkaloid," containing 25·48 per cent. of nitrogen (anhydrous caffeine contains 28·86 and with one molecule of water 26·41 per cent.). Herr Schmidt, however, found the alkaloid to be identical with caffeine, and the gold salts to correspond exactly in appearance and in composition. The two alkaloids may be separated by taking advantage of their different solubility in cold benzol.

A commercial specimen of ammonium bromide submitted to analysis by Herr Schmidt is reported (*Archiv*, [3], xxi., 679) to have contained a very considerable quantity of soluble barium salt, the addition of dilute sulphuric acid to an aqueous solution (1 in 20) having produced a copious precipitate of barium sulphate.

According to Herr Ost (*Journ. f. prakt. Chemie*, xxviii., 271) commercial ammonia frequently contains small quantities of pyridine, which is not surprising, since the gas liquor from which ammonia is principally obtained is known also to contain pyridine. The pyridine may be detected by incompletely neutralizing the ammonia with hydrochloric acid; the pyridine is the last to combine with the acid, and becomes easily perceptible by its intense odour as the saturation approaches completion. It appears that both pyridine and pyrrol occur in the majority of specimens of crude ammonia.

In an interesting paper published some time since (*Pharm. Journ.*, [3], xii., 706) Mr. Kennedy gave a description of the distillation of oil of birch bark (*Betula lenta*) in Schuylkill county, Pennsylvania, and mentioned that the oil was sent into the market as oil of wintergreen, with which, with the exception of a slight difference in the boiling point, he thought it was identical. Subsequently a sample of the oil was examined by Mr. Pettigrew, who arrived at the conclusion that the volatile oil of birch differs from that of gaultheria in that it consists entirely of salicylate of methyl and contains no terpene, and that the specific gravity (1·180) attributed in the new United States Pharmacopœia to oil of gaultheria is really that of oil of birch, the specific gravity of oil of gaultheria being 1·0318. From some further information communicated by Mr. Kennedy to the American Pharmaceutical Association it appears, however, probable that a quantity of terpene is lost during the distillation of oil of birch, which is carried on in a very crude way, for whilst the heavier portion of the distillate (salicylate of methyl) which sinks to the bottom is collected, another portion which floats on the surface and is known among the distillers as "light oil" and "light ring" is washed away and lost. It would appear that in some parts of Pennsylvania the products of the distillation of the leaves of *Gaultheria procumbens* and of the bark of *Betula lenta* are mixed indiscriminately, one or the other preponderating according to the relative abundance of the material in the locality, and the mixture being sent into the market as "oil of gaultheria." The quantity produced is very large, amounting last year, in the counties of Carbon and Monroe alone, to twenty tons.

In a paper read before the American Pharmaceutical Association Mr. Colcord mentions that he has found an admixture of glycerine with strained honey prevent crystallization for a considerable time. The honey was placed in a bottle in a water-bath and as soon as it had melted the glycerine was stirred in in the proportion of an ounce to a pound and a half. As this was a first attempt it would seem to be worth experimenting as to the smallest quantity of glycerine that would suffice for the purpose.

According to another paper read before the American Pharmaceutical Association the annual production of bromine in the United States amounts to from 450,000 to 500,000 lbs. It is obtained from the bittern of salt-wells—*i.e.* the residue after the salt has been removed from the brine—and in six localities named the bittern is so rich that for every two barrels of salt it yields one pound of bromine. The separation of bromine is said to be now carried on at all the brine works where it can be conducted profitably, and unless fresh deposits are discovered the production is more likely to decrease than increase.

According to the *Scientific American*, the "steaming" of windows, and the frosting of panes consequent in cold weather, may be prevented by coating them with a slight film of glycerine.

Twenty years ago comparatively little attention was paid to physiological botany; but since that date, and especially during the last few years, it has been cultivated almost to the exclusion of descriptive botany, and systematic botanists have been at a discount as teachers of botanical science. This has been especially the case in Germany. But the cultivation of any science in one particular line to the neglect of other branches naturally leads after a time to a reaction, and this, we learn from the *Gardeners' Chronicle* (p. 500), has recently manifested itself. Dr. Schweinfurth, the celebrated traveller, at a meeting of German naturalists and physicians at Fribourg last month, when dealing with the present state of botany in Germany, pointed out that there were everywhere traces of the consequences of the exclusive cultivation of the anatomical and physiological branches of botany. Teachers were wanting, botanical gardens were falling into decay, and the directors of these establishments looked down with contempt on the few representatives still remaining of the old school of botanists. There can be no doubt that even in this country Sachs' 'Text-book of Botany' has had considerable influence both on the character of the teaching and of the examinations in this country, but systematic botany can hardly be said to be neglected in England at present. The declension, in systematic works on botany, of the old practice of giving some account of the economic uses of the plants described in them is, however, very noticeable and much to be regretted, since, often, it is not to be obtained elsewhere without a considerable expenditure of time and trouble. Dr. Schweinfurth gives as an example of what ought to be done in relation to cultivated plants, by mentioning that *Pennicillaria*, a tropical grass which affords food for 50,000,000 or perhaps even 100,000,000 persons, is practically unknown and not alluded to even in the most recent works.

The practical value to the world in general of the scientific study of botany must be in its application to the wants of mankind. An instance of this truth has recently forced itself upon the attention of the public. A short time since a parliamentary paper issued relative to an investigation carried out by Messrs. McDougall Bros., on behalf of the Secretary of State for India, on the quality of Indian wheat (see *ante*, p. 161), showed that while four Indian wheats were hardly equalled by any other kind for what is wanting and deficient in the English market, and while the flour yielded a larger proportion of bread than any other wheat examined, yet these wheats possessed a distinctly beany almost aromatic flavour, which would prove to a certain extent a bar to their general use. Some light has now been thrown on the probable cause of this flavour by M. Balland (*Comptes Rendus*, xcvii., 805) who has examined Indian wheat and found several leguminous seeds in the varieties exported from Bombay. A mixed sample taken from several sacks gave three leguminous seeds per 100 of wheat. Among those which were detected, and which have been determined by M. Léon Masse, are the seeds of *Vicia peregrina*, 1·2 per cent.; *Cicer arietinum*, var. *nigrum*, 0·7 per cent.; *Ervum uniflorum*, 0·2 per cent.; linseed, 0·05 per cent. A few seeds of *Cajanus indicus*, *Acacia Lebek*, *Tamarindus Indica*, *Cassia?*, *Rhyncosia?*, *Citrullus vulgaris* and *Ricinus communis* were removed by sifting. It is not surprising, therefore, that wheat containing these seeds, especially castor oil seeds, should have a peculiar flavour.

A similar injurious admixture in Californian wheat has been recently pointed out by Mr. W. Southall (*Miller*, Oct. 1, p. 586). The sample examined contained a quantity of the seeds of *Melilotus alba* and *M. parviflora*, and lesser quantities of black mustard, *Centaurea melitensis*, a species of spurrey and several others. The want of agricultural care in excluding weeds from the vegetable crops and in the collection of products has no doubt a considerable influence in preventing the full development of the resources of our great Indian Empire. The linseed imported from our Indian provinces would be much more valuable in the market if care were taken to exclude foreign seeds, while gum acacia and various resins, if cleanly collected and carefully sorted, would doubtless pay for the care bestowed upon them. Considering how rapidly many introduced weeds spread in a new country, one means of excluding weed seeds would be to carefully sift the grain before sowing it.

Mr. A. S. Wilson in his remarks "On the Closed Condition of the Seed-vessel in Angiosperms," has made some interesting suggestions with regard to the use of the pistil or carpels. He believes they serve to guard the ovules from any external influence that would tend to degrade their chemical constitution or lead to a misappropriation by fungi of the nutritious matters they contain; that in fact the loose cellular substance of the style and the acid secretion on the stigma may serve to filter the air before it reaches the ovules (*Nature*, Oct. 11, p. 581).

A case of poisoning by laburnum pods is recorded in the *British Medical Journal* for October 13 (p. 728). The symptoms were the same as usual. The remedies used for the patient, a boy seven years of age, were mustard and water to assist the vomiting, and subsequently a teaspoonful of aromatic spirit of ammonia well diluted with water.

Another case is mentioned in the *British Medical Journal* (p. 675, October 6), in which two children and a nursemaid were poisoned by laburnum seeds. In this case brandy was the stimulant used to overcome the narcotic influence of the seeds, and recovery took place in due course.

Medicinal plants in blossom are now becoming fewer every week. Nevertheless, a communication has been received from Mr. R. I. Lynch to the effect, that the following may be seen in flower in the Cambridge Botanic Garden at the present time: *Chenopodium anthelminthicum*, the oil of the seeds of which is well known in the United States as an anthelminthic; *Linum usitatissimum* and *L. catharticum*; lavender, tobacco, the castor oil plant, hemp, and the singular rose of Jericho, *Anastatica hierochuntina*. *Ecballium officinarum* is also now in good condition for collecting the fruit. Buckthorn berries and rose hips are also in a fit state for gathering. At the Botanic Garden, Regent's Park, the *Eriobotrya japonica* is now in full blosssom; *Olea fragrans* perfumes the Economic house with its delicious odour, and *Petiveria alliacea* is in full blossom.

At the drug sales this month, a small parcel of gamboge in tears was offered for sale, and some Jamaica jalap of excellent quality, which was quickly purchased. Some spurious cinchona bark (*Stenostomum acutatum*) was put up for sale, but it does not appear to have met with a purchaser. Some saffron, in which marigold flowers dyed with nitrocresylate of sodium were mixed, has been met with in commerce during the last few weeks, possibly from the same source as that recently detected in Russia.

THE NEW PATENT LAW.

The following has been sent for publication:—

"With the object of affording information to the public until the new rules* under the Act are completed, the following information is issued by direction of the Board of Trade:—

"1. Applications and all other documents will be required upon strong, wide-ruled foolscap paper (written or printed on one side only), having a margin of 2 inches on the left-hand part thereof. The use of parchment will be discontinued. Copies of specifications will no longer be required.

"2. The sizes of the drawings will remain unchanged, but they will be required upon drawing-paper instead of on parchment. A copy of the drawings will be required upon thin Bristol board.

"3. Forms of application (stamped) will be placed on sale at the chief post-offices in the United Kingdom.

"4. The forms required for an application will be—(*a*) for provisional protection—application form and form of provisional specification; (*b*) for complete protection—application form and form of complete specification. Where a complete specification is not left in the first instance, it may be left at any time within nine months after application for provisional protection.

"5. The fees will be £1 for each stamped form of application and £3 for each stamped form of complete specification. No fee will be charged for the form for provisional specification.

"6. Applications may be left at the Patent Office or sent by post. If sent by post, they must be addressed to the Controller, Patent Office.

"7. The 'declaration' in the application form must be made by the inventor or inventors. All other documents may be prepared and signed by agents.

"Note.—'Applications' for letters patent made during the present year must be proceeded with in accordance with the existing laws and rules.

"H. Reader Lack.

"Office of Commissioners of Patents,
"25, Southampton Buildings, Chancery Lane."

* See before, p. 73.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 27, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

THE LOCAL GOVERNMENT BOARD ON THE SALE OF FOOD AND DRUGS ACT.

IN accordance with what has now become an annual custom, the Twelfth Annual Report of the Local Government Board that has just been issued contains about a dozen pages devoted to an official commentary upon the statistics returned to the department under the provisions of the Sale of Food and Drugs Act. Probably a considerable portion of this elaboration might have been omitted without any very serious loss to the public, but, on the other hand, there are some points in it worthy of consideration and comment. Decidedly, however, the most definite impression produced by the reading of the report is a sense that whatever part the Act may play as a terror to evil doers, it is nevertheless, as a legislative performance, far from being a credit to the statute book. In fact the present report seems to show clearer than ever that the Sale of Food and Drugs Act is a law that is disobeyed, evaded or burlesqued with impunity at the pleasure or to suit the convenience of any of the authorities entrusted with the duty of carrying it into effect. In justification of this remark we would say that in the first place it took at least half-a-dozen years to persuade a fair proportion of the local authorities to make the appointments necessary for a show of enforcing its provisions, and now when analysts have practically been appointed throughout England it is found that in a large number of cases the post is allowed to become a sinecure. The public analysts for the five counties of Berks, Dorset, Hereford, Hertford and Suffolk do not appear to have been troubled with a single sample to analyse during the year 1882, whilst those for another five counties—Cambridgeshire, Cornwall, Northumberland, Shropshire and Westmoreland—received only forty samples between them. Turning to the boroughs, it is found that from sixty-nine, with an aggregate population of more than a million, the reports are "absolutely *nil*;" whilst in such boroughs as Ashton-under-Lyne, Blackburn, Coventry, Durham, Kidderminster, Middlesborough, Northampton, Nottingham, Oxford, Plymouth, Preston and Rochdale the Acts are reported to have been "entirely, or almost entirely ignored." In sharp contrast to the foregoing stands the statement that in the metropolitan district alone there were 5401 samples examined, or nearly 28 per cent. of the whole number in England and Wales.

In addition to the unequal and irregular manner in which the law is carried out or ignored in different parts of the country, the statistics in the "Abstract of Reports of Public Analysts" betray something more than a suspicion that a wide divergence obtains in the manner of interpreting analytical results. Thus taking the samples included under the heading of drugs, we are told that 387 samples were examined, which were all obtained either in the metropolitan district or in one of twenty-three counties. Of these all the samples (65) collected in the metropolitan district were reported to be unadulterated, and a similar remark applies to all the samples examined in fifteen of the counties. Nevertheless with this clear sheet for Greater London and two-thirds of the counties in which drugs were examined, we are gravely assured that in the other eight counties the adulteration of drugs was so exceptional—for instance, in Durham, 14 samples out of 35—as to bring the proportion of samples adversely reported upon up to 14·5 per cent. of the whole quantity examined throughout the country. But this absence of any approach to uniformity is not confined to drugs, and is evidently to be attributed rather to the idiosyncrasies of the local officials than to such a piebald character in the national trading morality as would otherwise be indicated by the statistics quoted. Putting on one side as misleading some ridiculous averages on small numbers that are given, we are told that in the county of Derby 52 samples out of 169, or nearly 31 per cent., were adulterated, and in the extra-municipal districts of Warwickshire 77 out of 324, or about 24 per cent., were reported against. On the other hand, in Gloucestershire, of 552 samples only 7, or 1·4 per cent., were returned as adulterated; in Leicester, only 1 out of 119; and in Mile End Old Town, out of 32, none. The whole set of statistics being subject to these disturbing influences we are afraid that the information that the adulteration detected in 1882 exceeded that of the previous year by 0·40 per cent.—15·07 against 14·67 per cent.—is not an overwhelmingly important contribution to the public knowledge.

Another failing that vitiates and impairs the value of these returns is the almost total absence of information as to how many prosecutions were instituted in reference to the 2931 reported cases of adulteration, and in what proportion of these convictions were obtained. In the one instance where such information is given,—for the county of Essex,—it is stated that in respect to 98 samples that were reported to be adulterated, including 45 of milk and 30 of gin, 60 convictions were obtained, and, as the official reporter puts it hypothetically, "*if*" the same proportion obtained elsewhere it might be assumed that proceedings were successfully taken in respect of rather less than two-thirds of the whole

2931; a very safe remark, but otherwise not of much value. However, taking the figures for what they are worth it appears that in percentage proportion of adulteration "spirits other than gin" again headed the list with 26·3 per cent.; then followed gin with 23·6 per cent.; milk with 19·6 per cent.; coffee with 18·7 per cent.; mustard with 17·9 per cent.; drugs with 14·5 per cent., and other articles ranging from that figure to as low as 0·6 per cent. in the case of flour. With respect to drugs regret is again expressed in the report that so few samples—only 387—were examined; but it is satisfactory to learn that the Local Government Board, more susceptible to emotion than such bodies are usually supposed to be, is made "glad" by a minute "diminution in the adulteration of drugs," so far as it is evidenced by the figures showing a fall from 15 per cent. in 1881 to 14·5 per cent. in 1882. We, on our part, should be "glad" if the Board evinced a clearer perception of the probable nature of the great majority of the cases classed under drugs. One remark in the report, to the effect "that the difference between a genuine and an adulterated medicine may be a matter of life or death for the patient," might be passed over for its triteness did it not imply a belief in the existence of a practice which we venture to say is not established by any evidence brought under the notiee of the Board in the reports; whilst another remark that "it is noticeable that in some cases the drugs condemned were bought not from chemists but from grocers" is an ingenuously perverse way of stating the facts. Indeed the Board seems disposed to be quite sympathetic towards grocers, for the report enlarges upon the "difficulty" experienced by those tradesmen in respect to paregoric, since if they sell a genuine article they are liable to a penalty under the Pharmacy Act, whilst if they supply a spurious one they come within reach of the Sale of Food and Drugs Acts. Surely the difficulty is only of the nature experienced by all persons who seek to evade the statute law.

Athough we have ventured thus to criticize some of the features in this report which appear to us to be more or less unsatisfactory, we readily recognize that these imperfections arise from defects in existing legislation rather than from any shortcomings of the Board to which, amongst other multifarious duties, it falls to report upon work done under an Act that accords to it a minimum power of control. We believe, indeed, that in the past the Board has exercised an extremely healthy influence upon the manner in which the Act is carried out, and we are glad to observe in the present report an injunction to over-zealous officials to remember that the Sale of Food and Drugs Acts are not intended to prevent the sale of poor articles, but that of adulterated articles. Pointing in the same direction there is printed in the Appendix an extract from a letter received by the Board from the Principal Chemical Officer of the Commissioners of Inland Revenue, expressing an inability to adopt the "definitions" and "limits" for genuineness of milk laid down by the Society of Public Analysts, for the simple, but all-sufficient, reason that they are not borne out by analyses of hundreds of samples known to be genuine.

The *Medical Press and Circular* for the 24th inst., in an editorial article, referring to the statement made at the recent annual meeting of the Pharmaceutical Society of Ireland by the retiring President that the Society was "fairly prosperous," finds it difficult to accept this hopeful view of its position, and expresses an opinion that there "must be something radically wrong when an institution which is—practically—in command of pharmacy in Ireland is not able to do more at the end of twelve years than maintain a languishing existence." Our medical contemporary is not disposed to blame the past officers for any dereliction of duty, but maintains that the fatal error which has resulted in the Society "being well-nigh starved out of existence" consisted in the neglect to exercise the power conferred under the Act to license two grades of pharmacists,—the pharmaceutical chemist and the chemist and druggist. It further alleges that the first Council of the Society, having been composed in great majority of doctors and apothecaries, was not likely to see the propriety of setting up a large class of rival dispensers throughout the country by licensing chemists and druggists under the Act, and "deliberately elected to narrow the operations of the Society to the few Irish towns in which a high class pharmacist can live." In conclusion, a hope is expressed that "the new Council and its new President and Vice-President will mark their accession to office by inaugurating a policy of liberality and by manifesting that they realize the fact that their duty to the public is higher than their obligation to protect their own class at the public expense."

* * *

Apropos of a notice that appeared in the *Times* of some recent translations of German text-books on botany, a correspondent has called attention to the long time that frequently elapses between the appearance of the original work and that of the translation, as well as the usually great disparity in the price of the two editions. As to the apparent delay there may be a sufficient explanation in the fact that it is necessary for a book to acquire some reputation before a publisher could be expected to venture upon its reproduction in another language, and besides this there is the time required for translation and printing. But it must be confessed, it is not quite so clear why a copy of an English translation of a German scientific work shonld as a rule cost from 50 to 100 per cent. more than a copy in the original language.

* * *

The dispute to which we referred a short time since as having cropped up between the United States customs officers and importers of chemicals as to the liability to pay duty on sulphate of cinchonidine has been terminated by a decision of the Treasury department that the salt shall be allowed to enter the country free of duty. This decision, although opposed to the strict reading of the Act, is probably in conformity with the intention of the framers of the new United States tariff law.

* * *

The above dispute having been thus disposed of, another appears to have taken its place, as to the liabilty to pay import duty on carbolic acid. One section of the Tariff Act provides that acids used for mechanical, chemical or manufacturing purposes, unless specially enumerated or provided for otherwise in the Act, shall be free from duty, and as carbolic acid is not mentioned by name and comes fairly within the definition as used for medicinal purposes, it might have been deemed by a superficial reader to be exempt from duty. But another section of the Act provides that all preparations of coal tar, not colours or dye, and not specially enumerated or otherwise provided for, shall be subject to a duty of 20 per cent. *ad valorem*, and the customs authorities claim that this section covers carbolic acid.

* * *

The *Canadian Pharmaceutical Journal* reports a case that has occurred at a place called Mount Bridges, in which the death of three children followed quickly upon the administration to them of a substance that had been supplied as santonin. At the inquest the jury came to the conclusion that the substance supplied was strychnine, and returned a verdict accordingly. The seller, who has been arrested, was not a qualified druggist, but was acting as a temporary manager of branch business, the owner of which is also unregistered.

* * *

On Wednesday last, a presentation was made to Professor Bentley on the occasion of his retiring from the post of Dean of the Medical Faculty of King's College, London. The testimonial consisted of an illuminated album, containing an address and a list of the subscribers, together with a purse.

* * *

The number of full entries of students at the metropolitan medical schools this session is unusually large, being 609, as compared with 461 in 1879, 468 in 1880, 472 in 1881 and 371 in 1882. The school at St. Bartholomew's heads the list with 120 entries, and University College follows next with 83.

* * *

According to a statement in the Report on the Botanic Gardens and Government Plantations in South Australia applications for medicinal herbs have become frequent, and among those that Dr. Schomburgk speaks of as having been supplied, are the common English broom (*Cytisus scoparius*), a decoction of which is used for dropsy in the colony; the leaves of the mullein (*Verbascum Thapsus*), a decoction of which is used as a remedy in consumption; and the globular spurge (*Euphorbia pilulifera*), a decoction of which is said to be used with good results in asthmatic complaints.

* * *

We publish on another page the new rules that have been issued by the Board of Trade under the Patent Acts of last session. It will be seen that they promise to decrease the expenditure of time and money by inventors, whilst the utilization of the post offices as depôts for the forms of application will no doubt prove a great convenience.

* * *

The first meeting of the Chemical Society in the new session will be held on Thursday next, November 1, when papers will be read on "The Production of Hydroxylamine from Nitric Acid," by D. Divers; "Some Compounds of Phenols with Amido-Bases," by G. Dyson; and the "Chemistry of Lacquer (Urushi)," by H. Yoshida.

* * *

At at meeting of the Chemists' Assistants' Association to be held on Wednesday evening next, the 31st inst., a paper on "New Remedies," by Mr. J. F. Burnett, will be read.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

October 17, 1883.

Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Brady, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Southall, Tanner, Taylor and Thresh.

Dr. Greenhow attended on behalf of the Privy Council.

MAJOR EXAMINATION.

Six candidates were examined. *Three* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Evans, Evan James ....Aberystwith.
Jones, Frank.................. ......Manchester.
Longtoft, William ....Bedale.

MINOR EXAMINATION.

Nineteen candidates were examined. *Ten* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Barton, Francis ....Guernsey.
Baxter, William ....Bromley.
Beck, William Henry ....Selby.
Blades, William Wrench.........Northwich.
Boyden, Alfred Ernest ....Burnley.
Briggs, George William ....Bulwell.
Burn, James William ....Flintham.
Clarke, Herbert ....Lowestoft.
Clayton, George ....Manchester.

October 18, 1883.

Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Brady, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Southall, Tanner, Taylor and Thresh.

Dr. Greenhow attended on behalf of the Privy Council.

MAJOR EXAMINATION.

Five candidates were examined. *Three* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Ord, Septimus William ....Newcastle-on-Tyne.
Puckey, Courtenay ....Herne Hill.

MINOR EXAMINATION.

Twenty candidates were examined. *Fifteen* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Cole, William ....West Cowes.
Doubleday, Frederick Wm......Norwich.
Farman, Bartholomew Robert...Norwich.
Farrer, Edward .. ..Kendal.
Fletcher, Francis Round.........Netherton.

October 19, 1883.

Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Brady, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Southall, Tanner, Taylor and Thresh.

MINOR EXAMINATION.

Twenty-five candidates were examined. *Sixteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Davies, Daniel ....Saundersfoot.
Gibson, John.........................Barnard Castle.
Gray, William Underwood......Lincoln.
Harding, John William ....Macclesfield.
Harold, John Patrick ....London.
Jones, Ivor Lloyd...................Swansea.
Loeffler, George Berthold ......London.
Mann, William.......................Leicester.
Marshall, Sam ....Hyde.

October 24, 1883.

Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Brady, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Southall, Tanner, Taylor and Thresh.

MINOR EXAMINATION.

Twenty-five candidates were examined. *Twelve* failed. The undermentioned *thirteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Jones, James Herbert............Liverpool.
Mitchell, Thomas Maxwell......Leeds.
Nobbs, Arthur Perkins ....Newport, I. W.
Notcutt, William Brighty ......London.
Owen, David James...............Swansea.
Price, Henry Thomas ....Shrewsbury.
Pumphrey, Arthur ....York.
Reade, Leonard James ....Wolverhampton.
Rutherford, Fredk. A. Regd....Bristol.
Sharp, Stephen ....Heywood.
Smith, Alexander Newsome ...Radford.
Smout, Charles Lickfold.........London.
Turner, Thomas ....London.

October 25, 1883.

Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Brady, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Southall, Tanner, Taylor and Thresh.

Dr. Greenhow attended on behalf of the Privy Council.

MINOR EXAMINATION.

Twenty-five candidates were examined. *Eighteen* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Jones, John Richard ....Swansea.
Price, Charles Cleaver............Bristol.
Richards, Benjamin... ....St. Dogmells.
Turner, John Edward............Woodbridge.
Wokes, Thomas Siminson ......Hull.
Woodruff, Albert Edward ......Sandwich.
Wrenn, William Albert ....Penge.

PRELIMINARY EXAMINATION.

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

Certificates of the College of Preceptors.

Lawton, Charles Edward ......Lockwood.
Petter, Edward Arthur ....Folkestone.
Tomlinson, Frank Lofas ....Manchester.
Vercoe, John Lean ....Holywell.
Walker, Richard Thomas ......Wigan.

Certificate of the Royal College of Surgeons of England.

Calkin, John Ernest ....Salisbury.

Certificates of the University of Cambridge.

Foot, Wm. Rolstone Whiteway.Totnes.
Jones, Martin Llewelyn ....Aberdare.
Newbold, Victor Emanuel ......Sutton.
Richardson, Thos. Wm. Percy .Ryde.
Sage, Edward Thomas............Atherstone.
Smyrk, Frank Alfred ....Evesham.
Walden, Henry Ernest ....Southampton.
Wardley, James ....Birmingham.
Wilkinson, J. Edw. Beaumont...Manchester.

Certificate of the University of Durham.

Leech, Frederick Samuel ......Gateshead.

Certificates of the University of Edinburgh.

Burnett, John D.............. .....Fraserburgh.
Speedie, Robert ....Edinburgh.

Certificate of the University of London.

Farnworth, Walter ....Blackburn.

Certificates of the University of Oxford.

Huskisson, Owen Dudley ......London.
Routley, Edwin Walter ....Bath.

The report of the College of Preceptors on the examination held on October 2 was received.

Three hundred and ninety-one candidates had presented themselves for examination, of whom *two hundred and twelve* had failed. The following *one hundred and seventy-nine* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

Abbott, Alfred Arthur............Alresford.
Alexander, John ....Aberdeen.
Anthony, Thomas..................St. Austell.
Anderson, George William......Thirsk.
Baker, Harry Ernest ....Bristol.
Bell, Charles Bains ....Hull.
Bell, William Irving ....Shipley.
Blair, Thomas ....Glasgow.
Bond, Arthur Lawrence.........Tiverton.
Brough, William Hamond ....Brechin.
Brown, Henry Armstrong ......Sunderland.
Burnett, Augustus Frederick...Highbridge.
Carter, Thomas Jos. Walmsley..Fulwood.
Charlton, Kate.......................Birmingham.
Colebank, John.....................Carlisle.
Coleman, Walter Graham ......Leicester.
Comyns, Joseph Robert ....Maryport.
Craig, Andrew.......................Aberdeen.
Crerar, Donald B. ....Crieff.
Cumming, John ....Aberdeen.
Davenport, Richard C. ....Talgarth.
Davies, Evan James ....Cardigan.
Davies, Griffith.....................Cardigan.
Davies, John..... ....Llandovery.
Davy, Harry Richard ....Leicester.
Dumaresq, Rawlings ....Guernsey.
Dunsford, Thomas William......Modbury.
Edward, Robert F. Sharp ......Aberdeen.
Emmett, Charles Ernest.........Dartmouth.
Evans, David William.............Llansadwrn.
Farquhar, John McKelvie ......Greenock.
Ferguson, John Eustace ....Birmingham.
Ferriday, Arthur Harry ....Oakengates.
Fifield, Tom Hadley ....Birmingham.
Fothergill, Alfred...................Newport, Mon.
Fowlds, William ....Keighley.
Francis, John Hancorne ....London.
Frayn, Alfred ....Stonehouse (Devon).
Gammidge, Albert Edward ...Leicester.
Gillespie, John ....Glasgow.
Glover, Arthur Sandon ....London.
Godding, William ....Tunstall.
Grant, Duncan.......................Montrose.
Grayson, John Henry ....Whitehaven.
Guerin, Alfred Bishop ....London.
Hagen, Frederick John ....Bristol.
Haggis, Henry Charles ....Portsmouth.
Hague, Charles Henry............Ashton-under-Lyne.
Hall, James ....Leicester.
Hallam, Samuel Robinson ......Burton-on-Trent.
Hampson, Herbert Edwin ......York.
Harrison, Amos ....Horsley.
Hart, Jane ....London.
Harvey, Ernest James............London.
Hayhurst, Robert....................Mexborough.
Heap, Isaac Henry ....Hanley.
Hearnshaw, Fossey John C......Southport.
Heaton, John ....Rastrick.
Henderson, John Beattie ......Accrington.
Henderson. Thomas Cuthbert...Lochee.
Hendry, Patrick Muir............Edinburgh.
Henry, James ....Galashiels.
Henry, James ....Canonbie.
Hepworth, John Stafford ......Hyde.
Hetherington, Thomas............Moffat.
Hind, William Tom...............Leicester.
Hobbs, Alfred Ernest ....Tunbridge Wells.
Hoblyn, Edward Robert.........Exeter.

Hodgetts, Nathaniel ....Birmingham.
Horn, Charles ....Hull.
Hyslop, Harry ....Stockport.
James, Taliesin ....Merthyr Tydvil.
James, William Montford ....Market Drayton.
Jaques, Arthur Stennitt.........Newcastle-on-Tyne.
Johnson, Edgar David ....Abergavenny.
Johnson, Frederick ....Chatham.
Johnstone, James...................London.
Jones, John Rothwell.............Ormskirk.
Keall, Charles Edgar ....Newcastle Emlyn.
Keinch, John Thomas.............Bolton.
Kendall, James William.........Whitehaven.
King, James, jun. ....Kilmalcolm.
Knighton, Tom.......................Staveley.
Lakeman, Nicholas Frank ....Modbury.
Langley, William Henry.........Nottingham.
Leadbeater, Sidney Herbert ...London.
Lee, Annie Mary ....Birmingham.
Lee, Richard Baxter ....High Ackworth.
Lewis, David Griffith ....Cardigan.
Lewis, Richard George ....Carmarthen.
Liggins, Thomas Pearson ....Putney.
Lillingston, Leonard William...Oxford.
Little, George ....Falkirk.
Littlefair, Thomas ....Shap.
Lockton, Frederic ....Grantham.
Loten, George William ....Hull.
Loveluck, Griffith David.........Taibach.
Lunn, Arthur ....Cambridge.
McAllister, William Frederick.Leicester.
MacBean, James Barnet.........Edinburgh.
McCulloch, Alexander............Elgin.
McLullich, James ....Kilmarnock.
Manfield, Robert Hall ....Pontefract.
Marshall, Daniel ....Bolton.
Maudson, Charles Frederick ...Leeds.
Mayne, James ....Carn Brea
Meldrum, Alexander ....Leith.
Miles, Ernest Blommart.........Worthing.
Miller, Alfred ....Chatham.
Moore, William ....Wisbech.
Morris, Edward Herbert.........Bedford.
Moulson, James Oglevie ....Bradford.
Newell, William Robert ....Southsea.
Newman, George Franklin......Portsmouth.
Norton, Frank ....Cheltenham.
Olds, George ....Farnboro' Station.
Onyon, Ellis Aitken................Lincoln.
Owen, William Lewis ....Llanon.
Page, Percy Dodson...............Boston.
Perren, Herbert Joseph ....Brighton.
Phillips, Daniel......................London.
Pinkney, William....................Middleton, Teesdale.
Poustie, James Henderson ....Alva.
Price, Peter ....Bromsgrove.
Pye, Alexander Greig ....Atherstone.
Quarmby, Thomas William......Market Drayton.
Ratcliffe, Samuel, jun.............Southport.
Reedman, Robert William ....Birmingham.
Rees, David Charles...............Ipswich.
Retallick, William Cyrus ....St. Austell.
Ritson, Robert Russell............Bolton.
Roberts, Edward William ....Wolverley.
Roberts, Robert ....Menai Bridge.
Roberts, William Arthur ....Bangor.
Robertson, John Wright.........Dundee.
Robinson, Frank Cole ....York.
Rodgers, Ivo Frederick ....Stafford.
Rose, Edgar ....Leamington.
Rowlands, Thomas ....Menai Bridge.
Rowles, Walter David.............Newbury.
Rowley, Frank........................Manchester.
Rutherford, Alfred E. Raif......Bristol.
Scobell, Herbert William ....London.
Scott, Henry ....Middlesborough.
Selby, Henry Collingwood ......London.
Shand, James Sellar ....Huntly.
Shaw Harry ....Wakefield.
Simpson, Peter ....Glasgow.
Smallman, Frederick Richard...Ludlow.
Smith, Edward Gibbs ....Walton-on-Naze.
Spafford, Henry John ....Hull.
Speechly, George ....Bishop Stortford.
Stebbing, Henry Fairhead ......London.
Stevenson, Alexander ....Kilmarnock.
Stevenson, Richard ....Atherstone.
Sumner, Henry Alfred ....Birmingham.
Swallow, Edward....................Stalham.
Sykes, Frederick John.............Halifax.
Thomas, Frederick Charles......London.
Thomas, William ....Cemaes.
Thorley, Walter ....London.
Thornton, George....................Mirfield.
Tiffany, Joseph.......................Mirfield.
Treharne, Charles Edward......London.
Turner, Ebenezer....................Whifflet.
Turpin, William ....Newcastle-on-Tyne.
Vargas, Santiago Inocencio......London.
Wadsworth, Edgar ....Huddersfield.
Wallis, William ....York.
Whitaker, William ....Accrington.
Whitehead, John Henry.........Leeds.
Whitelock, Richard ....Plymouth.
Wilson, Alexander ....Greenock.
Wilson, Kendrew John ....Thirsk.
Wippell, Alice Mary ....Perth.
Woodcock, Bertrand Joseph ...Newark-on-Trent.
Woodward, Albert Edward ...Lancaster.
Wools, Victor John.................Margate.
Wynter, Walter Robert ....Seaford.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	8	6	2	Lancaster	7	2	5
Birmingham	24	14	10	Leeds	29	12	17
Brighton	4	3	1	Lincoln	8	4	4
Bristol	8	4	4	Liverpool	8	3	5
Cambridge	7	3	4	London	58	24	34
Canterbury	3	1	2	Manchester	24	10	14
Cardiff	6	4	2	Newcastle-on-T.	11	4	7
Carlisle	12	7	5	Northampton	4	0	4
Carmarthen	13	8	5	Norwich	8	1	7
Carnarvon	6	4	2	Nottingham	14	6	8
Cheltenham	2	1	1	Oxford	2	2	0
Darlington	6	2	4	Peterborough	5	1	4
Dundee	8	5	3	Sheffield	5	2	3
Edinburgh	16	5	11	Shrewsbury	7	4	3
Exeter	15	7	8	Southampton	10	4	6
Glasgow	25	11	14	Truro	6	3	3
Guernsey	1	1	0	Worcester	5	2	3
Hull	6	4	2	York	9	5	4
Inverness	1	0	1				

The questions set for examination were as follows:—

Time allowed: Three Hours for the three subjects.

I. LATIN.

1. Translate into English:—

(i.) Omnibus rebus ad profectionem comparatis, diem dicunt, qua die ad ripam Rhodani omnes conveniant. (ii.) Hac oratione ab Divitiaco habita, omnes qui aderant, magno fletu auxilium a Caesare petere coeperunt. (iii.) Acriter utrimque, usque ad vesperum, pugnatum est. (iv.) Ipse interim in colle medio triplicem aciem instruxit legionum quatuor veteranorum, ita, uti supra; sed in summo jugo duas legiones, quas in Gallia citeriore proxime conscripserat, et omnia auxilia collocaret; ac totum montem hominibus compleri, et interca sarcinas in unum locum conferri, et eum ab his, qui in superiore acie constiterant, muniri jussit.

2. Decline *omnia auxilia* in the plural only, and give the genitive and dative singular of *unum locum*.

3. From what verb does *conferri* come? What part of the verb is it? Explain the construction.

4. Write out the present indicative of the verb from which *jussit* comes. Give the principal parts of this verb.

5. Translate into Latin:—(i.) He captured one of the sons of the general. (ii.) Cæsar was informed that the enemy was at hand. (iii.) On the tenth day we arrived at the town, which was being besieged by the Gauls. (iv.) The guides having already set out from the camp, we will follow them quickly.

II. ARITHMETIC.

[The working of these examples, as well as the answers, must be written out in full.]

1. A person buys 25 lambs for 915 fr. 25 c., and 30 more for 1420 fr. 75 c., and sells them at 43 fr. 5 c. each. What does he gain or lose? (Answer in francs, etc.)

2. What fraction must be added to

$$2\tfrac{1}{3} + \frac{3\frac{1}{3} - \frac{1}{6}}{3\frac{1}{3} + \frac{1}{6}} - 2\tfrac{5}{7} \text{ of } \tfrac{4}{19}$$

that the sum may be equal to 3?

3. Reduce $\cdot875$ of 17*s.* 6*d.* + $\cdot1\dot{6}$ of £1 8*s.* 1½*d.* to the decimal of £7.

If 30 men in 5 days build 100 yards of wall 5 feet high and 18 inches thick, what length of wall half as high again, and half as thick again, will 45 men build in 7 days?

5. A sum of money is divided between A., B. and C., in the proportion of 5, 7 and 9. B.'s share was 7½ guineas: find the others.

III. ENGLISH.

1. Give six instances of plural forms not ending in *s*, which occur in nouns of common use. State also from what languages such forms are respectively derived.

2. Give words formed by the following suffixes (one from each), and explain the force of each suffix:—*age, hood, kin, less.*

3. Parse fully—"Any pains that I take for you is as easy as thanks."

4. Write a short composition on *one* of the following subjects:—

(i.) The Fisheries of Great Britain.
(ii.) Modern Warfare.
(iii.) The Telephone.
(iv.) The Theatre.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Continued from page* 312.)

In consequence of the great length of the next paper, an abstract of it was read by the author. The paper was entitled—

Remarks on Experiments with the Ointment Bases.

BY W. WILLMOTT.

An invitation to deal with the subject of ointments has appeared in the Conference List* for some time past. I beg, therefore, to offer the following remarks; not, however, as a complete answer to the question propounded in the invitation, but rather as setting forth the results of my own experience in this field of research.

Ointments and ointment bases have, it is true, already been much and ably commented upon; yet they are well worthy of further consideration and discussion; for although ointments have been called "barbarous" applications, and are, it must frankly be confessed, the reverse of pleasant or agreeable remedies, yet it is undeniable that they afford relief—and often great and curative relief—in some of the most painful and distressing maladies known to medical science. That an endeavour should be made, under these circumstances, to impart to such preparations the best qualifications for successful remedial use, together with the highest pharmaceutical perfection, seems sufficiently obvious. There are, perhaps, no remedies whether external or internal, which, pharmaceutically, will better repay any extra time or attention devoted to them; and yet, practically, there are none which, until within a comparatively recent date, have been so systematically neglected. To meet with an ointment entirely free from rancidity, and not discoloured or otherwise injured by age or keeping, was formerly rather the exception than the rule; but, happily, this is no longer the case, as, now, the best means are unceasingly sought for securing the very desirable qualities of efficiency and stability.

What, it may be asked, are the special points which commend themselves to our notice in a properly prepared unguent? They are chiefly the following:—colour, consistence, smoothness, neutrality, and freedom from rancidity, or from liability to acquire that condition. A word or two with reference to each of these may not be out of place.

Colour.—In the majority of instances the colour of a recognized official ointment is determined by the active ingredient with which it is mixed, and from which it takes its name. Thus, one ointment is red, a second yellow, a third black or brown, and so on, these colours indicating to some extent correctness of character and condition. On the other hand, there are ointments which are without colour (*i.e.*, distinctive colour), and where this is the case, it cannot be denied that an appreciative predilection finds its expression in the term "beautifully white."

As a point in connection with this much desired whiteness, we are directed by the British Pharmacopœia in nearly every case where the melting process is adopted in the preparation of an ointment, to stir constantly until cold, or until the mixture solidifies. This constant stirring is undoubtedly important, although, perhaps, on account of its tediousness it is seldom strictly carried out. It is well known, that by the beating, whipping, or stirring of colourless mixtures of fatty substances, more or less whiteness and lightness are secured, the effect being produced by what has been called "the molecular interposition of the atmospheric air." By this means also smoothness and softness are promoted, and the "beauty of the product" is correspondingly enhanced.

Consistence.—In practice the consistence of an ointment is essential to its proper application. If too soft it is not well adapted for surgical use, and if too firm it lacks the quality necessary for the anointing of inflamed surfaces, etc. It is desirable, therefore, to have at command one or more bases fulfilling each of these conditions, so that the requirements of both surgical and medical practice may be fully met.

Smoothness.—The quality of smoothness in an ointment scarcely needs comment. All will agree with Professor Redwood, that the presence of hard particles therein is very objectionable, and indicates want of skill or of careful attention in the dispenser.

Neutrality.—By neutrality is indicated that condition in the basis which leaves it without medicinal action of any kind. This condition is of essential importance, whether such basis be employed for the conveyance of active agents, or simply as a means of excluding the air. What is required is a non-irritant in the strictest sense of the term.

Freedom from Rancidity.—That ointments should be free from rancidity is a self-evident proposition, and one, moreover, which is conceded by all. Any substance, therefore, which is not liable to change by keeping must perforce possess a special value for the pharmacist, and it is simply stating a truism to say, that in all recommenda-

* "Subjects for Papers."

tions of particular substances to be used as ointment bases this quality of resistance to oxidation is more or less enforced: it is, perhaps, the standard by which we may best estimate the relative value of the several bases which from time to time have been, and are, employed in the making of this useful class of preparations.* The tables given in this paper are directed more especially to this end.

To meet the several requirements thus enumerated, we have in reality but few substances known as bases, either simple or compound. These may really be said to be but three in number, viz., lard, oil and wax, and the mineral hydrocarbons. Many "substitutes" of value and merit have been proposed, such as glycerine in combination with starch, and with fuller's earth; pigmentum album, honey, glycelæum, shea butter, the oleates and oleo-palmitates, and so forth; but as none of these, although well meriting the fullest attention, have come into extensive use, they need not in this contribution be further referred to.†

Of the three above-named bases, lard has hitherto been the most generally available, and though it may be thought an advantage if, on account of its proneness to change, it could be dispensed with entirely in connection with pharmacy, it is evident that in view of our present requirements this cannot be done.

It will be my endeavour, therefore, to show the relative value of this substance as compared with that of oil and wax, and the petroleum residues, and this, I think, will be most clearly made manifest by stating results in the form of a series of tables which for the most part will speak for themselves. It may be premised, that as regards the therapeutic action, if any, of these three bases, there is, in reality, nothing to choose between them. Given pure and well-conditioned products, and all are equally applicable for external medication.* At the same time to ensure this result careful preparation in each instance will be found necessary. How is this best to be accomplished in the case of lard, the basis which we have first to consider?

The simple plan is, of course, melting and straining; but, besides this, two processes of a somewhat special character have been introduced. One, that of the Pharmacopœia, which may be described as a process of washing and straining, and the other that of Mr. Edward Smith, which, in addition to washing, insists upon *filtering* as a *sine quâ non*.† Both these processes are excellent in theory, but, truth to say, possess no advantage in practice. The washing on the one hand and the filtration on the other, involve conditions which appear to counterbalance any advantages which may result from their adoption. Much decomposable matter, it is true, is removed in the process of washing as directed by the Pharmacopœia;‡ but the heat required subsequently to get rid of the water is prejudicial to the stability of the product. In Mr. Smith's process, also, the sustained temperature necessary for filtration, though not greatly above 100° F., seems detrimental to the keeping properties of the lard so treated;§ whilst the removal of all traces of water by the plan proposed by that gentleman, is scarcely so easy of accomplishment as his description would seem to imply. It must, indeed, be conceded, that both processes give unexceptionable products as prepared specimens; but it still remains, that the pure article of commerce, which may be purchased in any quantity, is sold, not as "Pharmacopœia" lard, or as "filtered" lard, but simply as a "clarified" preparation.‖

The following statement will show the extent of stability of lard when subjected to different methods of treatment:¶—

ADEPS PRÆPARATUS.

No. 1. Bladder lard	Rancid within 18 months.	
No. 2. Ewens's "pharmaceutical"		
No. 3. Ewens's "pharmaceutical," filtered		
No. 4. Ewens's "pharmaceutical," benzoated	Rancid within 5 years.	
No. 5. "Flare" melted and strained	13 months.	Good.
No. 6. "Flare" melted and filtered		Good.
No. 7. "Flare" washed and strained (B.P. process)		Rancid.
No. 8. "Flare" washed and filtered (Mr. Smith's process)		Slightly rancid.

Taking now Nos. 5, 6, 7 and 8 as having been under observation *ab initio*, and testing them in the form of ointments, two of which are of all others the most liable to rapid deterioration (and for this reason frequently used in these experiments as a test of stability in the basis), we find results of a corresponding character to the above. See Table at top of p. 332.

It would appear, therefore, that washing and straining, or washing and filtering, necessitating, as they do, a more or less sustained temperature of 100° to 212° F., are without advantage in the preparation of lard for use as an unguent basis. On the contrary the best results seem to rest with the simple process of melting and straining. But, in any case, the condition of rancidity in lard is soon developed. This, however, is obviated to a very large extent by the use of benzoin, and from the marked preference given to "benzoinated lard" in the United States Pharmacopœia (the new edition), to the entire exclusion in the ointment series of the mineral hydrocarbons, as well also as from its adoption by our own authorities, it may be assumed that this well-tried basis (viz., lard), whether plain or benzoated, is still considered by physicians and pharmaciens of the day an essentially valuable ingredient in pharmaceutical manipulation. In a tabular statement presently to be given,

* "One of the most, if not the most, important points in the making of ointments is that they should be so prepared as to keep as long as possible without becoming rancid."—A. F. Haselden, *Pharm. Journal*, December 1, 1863.

† A specimen of Mr. Schacht's "Plasma" (Glycerinum Amyli) prepared February 27, 1879, and preserved in a stoppered bottle, is, at the present date, absolutely perfect.

* A suspicion, not altogether groundless, exists with regard to the petroleum residues, that they are the source of considerable mischief in a certain percentage of severe cases. As a question of preference there could not, perhaps, be a better unguent basis than *oil and wax*; and regarded as a soothing admixture of this character, the "unguentum cetacei" of the London Pharmacopœia, composed of olive oil, wax, and spermaceti, may be said to be wholly unsurpassed.

† 'Proceedings of the British Pharmaceutical Conference,' 1869, p. 26.

‡ As an experiment portions of the water so used were *filtered quite bright* and set aside. Within four days decomposition had commenced, and at the completion of a week, all the specimens were in a thoroughly bad and offensive condition.

§ "I believe the secret of making good sweet lard depends upon the small quantity of heat employed in the melting."—A. F. Haselden, *Pharm. Journ.*, December 1, 1863.

‖ Mr. Ewens informs me, that his "clarified" lard is invariably *washed*, and certainly, like the Pharmacopœia product, it is a white, smooth, and most excellent preparation; but the question remains, is prepared lard, in consequence of washing, less liable to rancidity than that which has simply been melted and strained? My experience seems clearly to indicate that it is not.

¶ Owing to the pressure of other work, more detailed observation could not be made. This applies also to the remaining tabular statements, which, in consequence thereof, are not given in quite so complete a manner as could be wished.

Unguent.		Adeps Præparatus. No. 5. Strained.	No. 6. Filtered.	No. 7. Washed and strained.	No. 8. Washed and filtered.
Hyd. ox. rub.	1 mo.	Good.	Slightly rancid.	Rancid.	Rancid.
	3 mo.	Rancid, dark colour.	Rancid, dark colour.	Rancid, dark colour.	Rancid, dark colour.
	13 mo.	,, ,, ,,	,, ,, ,,	,, ,, ,,	,, ,, ,,
Plumb. carb.	1 mo.	Good.	Rancid.	Rancid.	Rancid.
	3 mo.	Rancid.	,,	,,	,,
	13 mo.	,,	,,	Badly rancid.	Badly rancid.
Zinc. . . .	1 mo.	Good.	Good.	Good.	Good.
	3 mo.	,,	,,	Slightly rancid.	Indifferent, mouldy smell.
	13 mo.	,,	,,	Rancid.	Badly rancid.

further reference is made to the "adeps benzoatus" of the British Pharmacopœia.

OIL AND WAX.*

The ointment basis formed by the combination of oil and wax may be considered to include all those artificial mixtures of fatty substances of which the "simple ointment" of the British Pharmacopœia is the representative. The advantage of such a basis is, that any consistence can be obtained, from the firmness of a cerate to the softness and thinness of oil itself. As a simple application for wounds or inflamed surfaces, this very useful combination possesses a purely negative, though essentially protective effect. The one objection is, as in the case of lard, the liability to become rancid, though, if yellow or unbleached wax be used, a very permanent condition is secured. A careful review of the following statement will show this to be the case:—

CERATES AND OINTMENTS (SIMPLE).

(G = good. R = rancid. B.R. = badly rancid.)

Cerates.

	Two years.	Four years.
Cera alb., 1; Ol. amygd., 1	R.	
Cera alb., 1; Ol. olivæ 1†	G.	R.
Cera flav., 1: Ol. amygd., 1	G.	G.
Cera flav., 1; Ol. olivæ, 1	G.	G.
Cera alb., 4; Ol. olivæ, 10; Cetaceum 1‡	G.	B.R.

Ointments.

	Two years.	Four years.
Cera alb., 3; Ol. amygd., 5	R.	
Cera alb., 3; Ol. olivæ, 5	G.	R.
Cera flav., 3; Ol. amygd., 5	G.	G.
Cera flav., 3; Ol. olivæ, 5	G.	G.
Cera alb., 2; Ol. olivæ, 20; Cetaceum, 5 .§	G.	R.
Cera alb., 2; Ol. amygd., 20; Cetaceum, 5‖	G.(?)	B.R.
Cera alb., 1; Adeps præp., 6; Cetaceum, 2¶	B.R.	
Cera alb., 2; Adeps præp., 3; Ol. amygd. 3**	B.R.	
Cera alb., 1; Adeps præp., 12; Vaseline, 3	B.R.	
Cera alb., 3; Ol. amygd., 4; Vaseline, 1 .	R.	
Sevum præp., 6; Ol. amygd., 3; Vaseline, 1	B.R.	

* "I believe there is no better basis for ointments than the linimentum simplex of the Edinburgh Pharmacopœia, which consists of white wax and olive oil."—Squire, in *Pharmaceutical Journal*, December 1, 1863.

Note.—For Mr. Squire's present views on this point see his valuable 'Companion.'

† Ceratum, P.L.
‡ Ceratum Cetacei, P.L.
§ Unguent. cetacei, P.L.
‖ Unguent. cetacei, B.P.
¶ Unguent. cetacei, Ph.D., 1823.
** Unguent. simp., B.P.

The unbleached wax imparts colour, and also a pleasant odour, and hence, perhaps, its very stable character. If *whiteness* be an object, this substance in its unbleached state, cannot, of course, be used.* The behaviour of oil and wax as a basis for the official ointments is given a little further on.

THE MINERAL HYDROCARBONS.

The introduction of the mineral hydrocarbons for the purpose of external medication has brought with it many changes in some of our accustomed formulæ. These mineral substances are said to be antiseptic in their effect, and as a chief recommendation it is strongly claimed for them that they are free from the objection which obtains in the case of the two bases we have been considering, viz., liability to change by oxidation. The names given to these hydrocarbons are well known to us as cosmoline, fossiline, ozokerine, vaseline, etc., the "ine" being a popular and euphonious affix which has of late been somewhat indiscriminately applied. It is not my intention to determine the *inclusive* merits of these several substances, but I give in tabular form the results of my observation, the comparison showing quite an appreciative difference in their behaviour when time has been allowed to exercise full influence over them. One important drawback to vaseline, to which preference in practice has heretofore been given, is its liability to develop a strong petroleum-like odour, which is scarcely less objectionable than actual rancidity. Melted with paraffin, white wax, or spermaceti; and especially with paraffin, or in the presence of carbonate or acetate of lead, this odour is strongly developed. In combination, however, with *yellow* wax, it is entirely prevented.† On the other hand, the palm must be awarded to vaseline for the retention or preservation of its original colour.

Objections have been entertained to the above mineral products on the ground of their great softness. "We want," said a physician to the Hospital for Diseases of the Skin, "an ointment not a liniment." It is, of course, quite competent to add wax, paraffin, or spermaceti in any quantity that may be desired, but this may be thought both troublesome and inconvenient, as, in the absence of a certain requisite amount of physical labour, there may result a want of that smoothness which is so desirable in a basis of this character.

* The colour of yellow wax mixed to form a simple basis, remains unimpaired after many years.

† This pungency or rankness, which, in the absence of chemical examination, has been assumed to arise from the presence of traces of crude petroleum, and, hence, so described, is developed to some slight extent in ozokerine, but not at all, under any conditions, in either fossiline or "chrisma," a circumstance which imparts to these latter an advantage deserving of the fullest consideration.

VASELINE, FOSSILINE, OZOKERINE, AND CHRISMA.

(*Length of trial*, 2 *years*.)

Unguent.	Vaseline.	Fossiline.	Ozokerine Alb.	Chrisma.
Ung. plumb. acet.	Strong petroleum odour. Transparent oily separation on surface. Colour good.	Odourless. Soft. Dark mahogany colour. Opaque muddy appearance.	Slight odour of petroleum. Very soft and oily. Somewhat transparent in appearance.	Similar to fossiline, but decidedly the better of the two.
Ung. plumb. carb.	Powerful petroleum odour. Oily layer on surface. Colour light.	Free from odour. Orange yellow colour uniform throughout.	Colourless. Very soft. Entirely free from rock oil odour.	Colour a little lighter than fossiline. Slight separation of oily globules below surface.
Ung. hyd. ox. rub.			Colour bright. Very soft. Honey-combed appearance beneath surface.	

Note.—From whatever source fossiline and chrisma are derived, the two appear to undergo similar treatment in their production and preparation.

VASELINE,* WITH PARAFFIN, WAX, AND SPERMACETI.

(*Length of trial*, 3 *years*.)

Unguent.	Vaseline 2. Paraffin 1.	Vaseline 2. Cera Alb. 1.	Vaseline 2. Cera Flav. 1.	Vaseline 2. Cetaceum 1.
"Cerat. petrolei."	Very appreciable rock oil odour. Slightly granular appearance. No change of colour.	Waxy consistence. Opaque. Slight paraffin odour. Colour unchanged.	Pleasant smell of beeswax. Firm, good consistence. Smooth and uniform throughout.	
Ung. plumb. carb.	Rank, disagreeable odour. Dark on surface, light beneath. Good consistence. Smooth.	Similar to vaseline and paraffin, but of uniform light yellow colour.	Odour of beeswax. Good in all respects.	Similar to vaseline and cera alb., but preferable in appearance.
Ung. hyd. ox. rub.	Uniform bright colour. Granular appearance. Quite perceptible rank odour.			Similar to vaseline and paraffin, but less granular in appearance. Soft consistence.

Whichever of the hydrocarbons or their respective "cerates" may be selected for adoption, it is at least a fair opinion, that they cannot be credited with improving the appearance of the pharmacist's stock. Not unfrequently they produce granular, greenish-looking, oily compounds, which have nothing about them calling for a just appreciation of their real merits. If "a good appearance is the first letter of recommendation," we certainly do not find here the full value which the trite sentiment conveys.

I must here specially notice a particular preparation of this class known as "white ozokerine," or ordinary ozokerine "made absolutely white," on the very plausible assumption that it would be "more appropriate to its purity and suggestive of its virtues." It is described as "a pure hydrocarbon, with formula $C_{85}H_{13}$, or thereabouts, obtained in the distillation of the solid paraffin ozokerite, and analogous to the new American substance vaseline." My attention was enlisted on behalf of this speciality by the following letter from Professor Bloxam, of King's College:—

"Dear Sir,—Will you kindly allow me to introduce to you my friend Mr. Edmund Field, who desires to submit for your consideration a new preparation, white ozokerine, which is, from a chemical point of view, all that could be desired as a simple cerate or unguent.

"Very faithfully yours,
"C. L. Bloxam,
"*Professor of Chemistry*, K.C.L."

In accordance with this request I subjected the sample left in my hands to a sufficiently severe test in the form of the red oxide of mercury, and carbonate and acetate of lead ointments, and the result, so far as the comparatively short period at my command would allow, was satisfactory. As against vaseline it fairly held its own, and, like vaseline, far out-distanced in durability of condition the mixed basis of oil and wax. This result is clearly shown in the following table:—

* Vaseline is here used as being the most familiar of this class of preparations.

VASELINE, OZOKERINE, AND OLIVE OIL, WITH CERA ALB. AND CERA FLAV.*

(*Length of trial, eight months*).

Unguent.	Vaseline and Wax.		Ozoker. Alb. and Wax.		Olive Oil and Wax.	
	Vaseline 5. Cera alb. 1.	Vaseline 5. Cera flav. 1.	Ozok. alb. 5. Cera alb. 1.	Ozoker. alb. 5. Cera flav. 1.	Ol. Olivæ 5. Cera alb. 1.	Ol. Olivæ 5. Cera flav. 1.
Ung. simp.	Slight petroleum odour; otherwise good.	Good in all respects. Pleasant smell of beeswax.	Odourless. Uniform bluish-white tinge.	Similar to vaseline and cera flav.	Good. Better in appearance than the petroleum specimens.	Similar to ol. olivæ and cera alb.
Ung. plumb. acet. .	Strong rock oil odour. Colour light below surface. Smooth and transparent.	Colour indifferent. Pleasant odour of beeswax.	Indifferent. Dirty bluish tinge. Odourless.	Similar to vaseline and cera flav., but lighter in colour and less transparent.	Badly rancid after six months, the change commencing within five weeks.	Similar to ol. olivæ and cera alb. Dark, dirty appearance.
Ung. plumb. carb. .	Paraffin odour. Slight separation of oily globules. Smooth. Colour not uniform.	Similar to vaseline and cera alb., but free from paraffin odour.	Odourless, and in all respects good.	Good in all respects. Pleasant odour suggestive of perfume.	Rancid within six months. Clean and white throughout.	Fairly good after six months, but rancid within eight months. All colour lost.
Ung. hyd. ox. rub. .	Colour good. Odourless.	Good in all respects.	Colour good. Odourless.	Good. Faint hay-like odour, suggestive of perfume.	Rancid. Colour changed on surface.	Similar to ol. olivæ and cera alb.

White ozokerine has the merit of being free from colour; but it is too soft for general use without the admixture of some solid fatty substance, such as wax or paraffin. In this form I shall have occasion to speak of it again before concluding my paper.

As a fair test of the stability, and, therefore, to this extent, of the relative value of the three bases herein adopted for consideration (which, as we have seen, are those readily available for use and now commonly employed in practical pharmacy), six of the official ointments were each carefully prepared with different varieties or sub-classes of such bases (making forty-eight specimens in all), and on examination at irregular, and, through pressure of work, sometimes long intervals, gave the results shown in the table on the opposite page. I may add, that the process of oxidation in fatty substances being slow and insidious in its progress, the change is not easy of detection at its commencement.

The prominent feature in this table is the great superiority of unbleached wax and olive oil, and the permanence of the mineral hydrocarbon vaseline, always excepting the development of the objectionable odour peculiar to it, which appears to be due to the particular process employed in its preparation; a process which is claimed as being exclusively applied to this variety of the petroleum residues.

It will be observed, that in these trials all the lards gave way early, with the exception of the "benzoated," which, in the presence of lead and mercury (a severe test), retained its soundness for something like twelve months; whilst ung. zinci and ung. gallæ when benzoated were found in an almost perfect condition at the end of four years. Benzoin, though a powerful preservative of fatty substances, should, perhaps, be introduced into these preparations as sparingly as possible, since in special, though it may be exceptional, cases, owing to the local irritation which might possibly be set up, the intended good may be counterbalanced by more or less avoidable mischief.

Attempts to mix the petroleum residues with lard and oil of almonds, etc., on the ground of the supposed antiseptic properties of the former, were not successful. Equal parts of lard and vaseline became badly rancid within two years; and, similarly, different proportions of oil of almonds with white wax and ozokerine, or vaseline, all gave way either sooner or later. A largely preponderating proportion of the hydrocarbon would be required to prevent all change in semi-solid, oleaginous mixtures of this description. When these mixtures contain lead or mercury decomposition sets in very quickly. A few examples may here be given:—

Ung. Plumb. Carb.

Bases.	Ozokerin 3.	Cera alb. 2.	Ol. amygd. 1	All rancid within four months.
	Ozokerin 3.	Cera alb. 2.	Adeps 3	
	Ozokerin 1.	Adeps 3.		
	Vaselin 1.	Adeps 3.		
	Paraffin 2.	Adeps 3.	Ozokerine 3	

Substituting mercury for lead, the above experiment was repeated with precisely similar results, rancidity commencing in both instances within three or four weeks from the date of preparation. In the single specimen of the second group in which lard was absent, the colour of the red oxide (the preparation used) was found bright and perfect at the end of fifteen months.

These "remarks" would scarcely be complete without a brief allusion to three specially prominent ointments which have proved very troublesome, and, it may be added, unsatisfactory, to the working pharmacist. The first of these is the diachylon ointment of Hebra. It might be quite worth while to consider the exact conditions of success in the process of boiling together water, oil, and oxide of lead, if it were not that we have in the petroleum hydrocarbons so good an agent for removing all difficulties out of the way, and insuring the most complete success. Made with

* Vernacular terms and medical Latinity are used in all cases arbitrarily as suggested by convenience.

EXPERIMENTS WITH OFFICIAL OINTMENTS.

Explanation.—Where there is no rancidity the term "good" is used; whilst *degrees* of rancidity are, as far as possible, indicated by the terms "slightly," "quite," "very," and so on.

Unguent.	Intervals of Observation.	Lard. Ordinary.	Lard. "Pharmaceutical."	Lard. Filtered.	Lard. Benzoated.	Oil and Wax. Ol. amygd. ....2, Cera alb. 1	Oil and Wax. Ol. olivæ ....3, Cera flav. 1	Oil and Wax. Ol. amygd. ....6, Cera alb. ....4, Vaseline 2	Petroleum. Vaseline.
Ung. gallæ	1 mo.	Good.	Good.	Good.	Good.	Good.	Good.	Good.	Good.
	6 "	"	"	"	"	"	"	"	"
	14 "	Slightly rancid.	Slightly rancid.	Slightly rancid.	"	Doubtful.	"	Doubtful.	"
	2 yrs.	"	"	"	"	"	"	Slightly rancid.	"
	4 "	"	"	Distinctly rancid.	"	Distinctly rancid.	"	Distinctly rancid.	"
Ung. hyd. ox. rub.	1 mo.	Rancid.	Rancid.	Rancid.	Good.	Good.	Good.	Good.	Good.
	6 "	"	"	"	"	Rancid.	"	Rancid.	"
	14 "	"	"	"	Rancid.	"	Slightly rancid.	"	"
	2 yrs.	"	"	"	"	"	Quite rancid.	"	"
	4 "	"	"	"	"	"	Very rancid.	"	Rank odour. Colour good.
Ung. plumb. acet.	1 mo.	Rancid.	Rancid.	Rancid.	Good.	Good.	Good.	Good.	Good.
	6 "	"	"	"	"	Doubtful.	"	Rancid.	Rank odour.
	14 "	"	"	"	Rancid.	Slightly rancid.	"	"	"
	2 yrs.	"	"	"	"	Quite rancid.	"	"	"
	4 "	"	"	"	"	Badly rancid.	Rancid.	"	"
Ung. plumb. carb.	1 mo.	Rancid.	Rancid.	Rancid.	Good.	Good.	Good.	Good.	Good.
	6 "	"	"	"	Slightly rancid.	Rancid.	"	Rancid.	Rank odour.
	14 "	"	"	"	Quite rancid.	"	Rancid.	"	"
	2 yrs.	"	"	"	"	"	"	"	"
	4 "	"	"	"	"	"	"	"	"
Ung. sulphur.	1 mo.	Good.	Good.	Good.	Good.	Good.	Good.	Good.	Good.
	6 "	Rancid.	Rancid.	Rancid.	"	"	"	"	"
	14 "	"	"	"	"	Rancid.	"	Rancid.	"
	2 yrs.	"	"	"	Doubtful.	"	Doubtful.	"	"
	4 "	"	"	"	Rancid.	"	Rancid.	"	"
Ung. zinci	1 mo.	Good.	Good.	Good.	Good.	Good.	Good.	Good.	Good.
	6 "	Doubtful.	Doubtful.	Doubtful.	"	"	"	"	"
	14 "	Rancid.	Rancid.	Rancid.	"	Slightly rancid.	"	Rancid.	"
	2 yrs.	"	"	"	"	Quite rancid.	"	"	"
	4 "	"	"	"	"	Strongly rancid.	Rancid.	"	"

N.B.—In all cases rancidity goes from bad to worse; so also the rank odour developed in vaseline.

Note.—The exact condition, as regards soundness, of Ung. Gallæ in the above, was very difficult to determine.

equal parts of one of these prepared petroleum residues and lead plaster, the result is satisfactory in every way, and an excellent unguent is certainly, and in the easiest possible manner, obtained. The plaster should be recently prepared, and the minimum of heat employed in melting it down. Very little stirring will be needed while the mixture is cooling. I have had under observation three specimens of this ointment which were prepared on June 20, 1879, *i.e.*, more than four years ago. No 1 was made with vaseline; No. 2 with chrisma; and No. 3 with ozokerine. As a result the colour is best maintained by the vaseline—a property of this substance already referred to—the fine odour of the oil of lavender is by far the best preserved by the chrisma (formerly called ung. petrolei); whilst the ozokerine specimen, without being very bad, is decidedly inferior in both these respects to the other two. All are more or less granular and lumpy; the chrisma preparation, however, being the least so of the three. Made with *olive oil* and lead plaster ung. diachyli becomes rancid within a few months.

The second of the three ointments claiming a brief notice is that of boracic acid, frequently called "boric ointment." This, as is well known, was introduced by Professor Lister, of King's College Hospital. The original formula for the full strength runs precisely as follows:—

℞ Acidi boraci,
Ceræ albæ . . . . āā ℥j.
Paraffin,
Ol. amygdalæ. . . . . āā ℥ij.

Melt the paraffin and white wax together, add the almond oil, and mix well; then add the boric acid finely levigated and *stir well till cool.*

Divide the mass into small pieces and then bruise and mix well in a mortar.

Sig. Boric ointment full strength.

When well managed *secundum artem* this formula yields a "beautifully white" product, both smooth and firm. It was a special favourite in the practice of the late Dr. Tilbury Fox, and was the more appreciated as it left no glistening layer of oil or grease on the surfaces to which it was applied. It was found, however, that its proper condition could not be depended upon for more than a few months, and this being so, a new basis composed of vaseline and paraffin, for which we are indebted to Mr. Martindale, was submitted for authoritative approval, and, having received full assent, was thenceforward substituted for the wax and oil. This basis, "cerat. petrolei," except that it sacrifices appearance to utility, successfully resists all change for a considerable time; not, be it said, indefinitely, for ultimately (*e.g.* within three years) the rank odour peculiar to vaseline, and already fully commented upon, becomes freely developed. If, being a mineral product, it is necessary to use solid paraffin to the exclusion of yellow wax, probably chrisma or white ozokerine may be advantageously substituted for the vaseline; though, here, it will be necessary to give full consideration to any difference in effect resulting from their use which experience may point to as a possible or probable contingency. It will be noted that in the above formula we are especially instructed to "stir till cool." The subsequent labour, however, of reducing to smoothness will be considerably lightened (*i.e.*, in the case of the basis itself which might be first completed) by allowing the mixture to cool *without* stirring; and, obviously so, as in such a case the paraffin, regardless of its high melting point, will be uniformly and perfectly distributed through the mass, and thus made easily manageable under an ordinary palette-knife. I may say, that for the smoothing process the pestle and mortar is of very little use; what is required is a large marble slab presided over by a zealous operator not sparing of his labour. Prepared thus boric ointment forms a very efficient application, and is largely prescribed both in private and hospital practice.

Lastly, then, I have to notice the almost played-out, but ever-diversified and perplexing unguentum hydrargyri nitratis. I refer to this chiefly because a new theory of its early deterioration has been propounded by Mr. Maben namely, that the reduction of the mercury is caused (and, we must presume, solely caused) by the action of some foreign oil added to the olive oil as an adulterant.* There can be no doubt, I think, that the oil is the chief agent in the production of this change when consideration is had to the quantity of nitric acid with which it is in part combination; but I should prefer to regard it rather as a question of degree between the olive oil on the one hand, and the foreign oil on the other, than as a question of change with the latter, and no change at all with the former. It will be convenient to adopt the hypothesis, that various oils possess in different degrees, in the presence of heat, the power of breaking up the nitric acid, and that this power is possessed by olive oil to a comparatively small extent only. A larger proportion of acid being thus retained in its normal condition, the reduction of the mercury is for the time being prevented.† But still less is this power possessed by lard alone, for here, so far as my observation extends, there is no subsequent deterioration in point of colour whatever, and to this extent, perhaps, the U. S. formula is a step in the right direction. It must not be overlooked that Mr. Maben's position is strengthened, or apparently so, by the circumstance that in heating a specimen of ointment prepared with pure olive oil to 300° F., he found no change of colour. This test, however, is scarcely sufficient. A better one would be to take a somewhat lower, though increasing, temperature, and prolong it for fully half an hour. If this be done, I think it will be found, that in spite of the pure olive oil the ointment will change to a deep brown, and an unmistakable layer of mercurous oxide will be deposited in the containing vessel. I have spoken of the quantity of nitric acid ordered for use. It is well worth noting that if this be increased to three-fifths of the weight of the oil and lard combined, all change is prevented, a circumstance which is very significant as regards the prominent influence exercised respectively by the acid and the oil. Allowing full weight to the latter, the conclusions arrived at by Mr. Schacht, from able experiments conducted many years ago, appear to retain their validity to the present time.

A word as to temperature. Mr. Maben reflects on the authors of the Pharmacopœia for their indefiniteness on this point, whilst he himself is sufficiently obscure in the same direction. The expression "heated to" is clear enough, but "prepared at" is, here, not quite so obvious. What does Mr. Maben mean by the ointment being "prepared at" 180°, 212° and 300° F.? The truth is, this ointment cannot be *prepared* (which, of course, includes the entire process) at any given temperature. What really occurs (and I am not aware that any writer has yet drawn attention to the point) is this:—Supposing the temperature to be kept below 180° F., there is no frothing, but the process proceeds very slowly for several days, and the ointment so prepared is of soft consistence and very light in colour. If the mercurial solution be added to the oil and lard heated in a water-bath to

* Vide *Pharm. Journ.*, April 21, 1883.

† In reproducing Mr. Maben's experiments, I did not get precisely similar results; for instance, the 10 per cent. rape oi admixtures produced excellent ointments at both temperatures, the bright yellow colour being fully retained to the present time. Using *rape oil alone* with the acid solution mixed at 212° F., the colour was also good, but changed to greenish yellow within three weeks. In this latter case the action was more energetic and the temperature attained slightly higher than when pure olive oil was used. This would seem to indicate greater disturbance of the nitric acid, and, as already intimated, may furnish a sufficient reason for its being more readily parted with. The rape oil specimen was soluble in ether similar to Mr. Maben's "B" experiment with the pure oil.

180° F., there is but little change for the moment; but when the temperature reaches 200° F., or a degree or two higher, frothing commences, and the heat then rises with comparative rapidity to 255°–65° F., as the highest frothing point. Assuming now that the solution is added to the oil and lard at 212° F., the effervescence begins at once, and the mercury then runs up, as in the former instance, to 265°–70° F., a difference only of about 5 degrees in the two cases. With the acid solution mixed in at 300° F., the action is so energetic that the heated liquid is thrown violently out of the vessel, and all around, to the dismay and very probable discomfort of the operator. Under these circumstances, the directions of the Pharmacopœia appear to be sufficiently definite, inasmuch as they secure the frothing up of the mixture, and its consequent exposure to the influence—whatever that may be—which at least 250 degrees of Fahrenheit may have upon it.

Whilst on the subject of "citrine ointment," it may be useful to refer to a troublesome feature in connexion with its admixture with lard to form the Ung. Hyd. Nit. Mitius of the London Pharmacopœia. It is well known that "citrine ointment," especially when recently prepared, cannot be so mixed without quickly acquiring a leaden hue, owing to the rapid reduction of the mercury. To the pharmacist who is attached to his work, and who conducts his processes *con amore*, this is simply intolerable. The difficulty, however, may be met by adding to each ounce of the lard from 10 to 30 minims of peroxide of hydrogen, or ozonized ether. This is both harmless and efficient, but it has the disadvantage of developing in the ointment a sharp pungent odour something approaching to rancidity. Fortunately a still better remedy is at hand, viz., the mixture, before referred to, of ozokerine. alb. and white wax. This appears to be the only substance which successfully resists the change alluded to. Paraffin cannot be used, vaseline is altogether unsuitable, and yellow wax of course imparts colour; but white ozokerine and white wax—2 parts of the former and 1 of the latter—prepared *s. a.* and reduced to perfect smoothness on a marble slab, together form a basis applicable not only to the above, but to a number of small things in the pharmacy of a similar description where the absence of colour and the presence of permanence and stability are especially to be desired.

It remains only to state that I have endeavoured in this contribution to avoid all needless technicality, and to confine my remarks to a simple and unvarnished statement of personally observed facts, as viewed from a pharmaceutical standpoint of present and progressive utility.

The PRESIDENT said a special vote of thanks was due to Mr. Willmott for his intelligent and patient work, now extending over several years, and for this paper, which was full of interest to every pharmacist.

Mr. WILLIAMS asked whether the white wax referred to was that usually employed in pharmacy, or what he should call white wax, because they were very different things. The white wax of pharmacy was understood to contain about two parts to one of spermaceti.

Mr. WILLMOTT said he endeavoured as far as possible to carry out his experiments with the materials usually used in the pharmacy. There were very few cases where special kinds of wax would be obtained, and, therefore, he used the ordinary ingredients.

Mr. MASON said he presumed he referred to the ordinary round cakes of commercial white wax.

Mr. WILLMOTT replied in the affirmative.

Mr. WARD (Leeds) asked if Mr. Willmott had made any examination of the different kinds of hydrocarbons known under different names in order to prove their identity or otherwise. There were several of these articles presented under different names, and if it could be determined that they were substantially all of the same composition it was very desirable that that should be known.

Mr. WALTER HILLS asked if Mr. Willmott had made any experiments in the bleaching of white wax, or did he consider that the somewhat unpleasant odour which attached to white wax was unavoidable. He had often thought that if white wax could be obtained as pleasant in odour as yellow wax it would be very important. The vaseline basis and the lard basis might be used for very distinct purposes, as had been shown by Mr. Martindale, vaseline being more suitable for external application as a kind of shield, whilst lard was more suitable where absorption was required.

Mr. MOSS wished to express his obligation to Mr Willmott for the extremely useful manner in which he had handled this subject. He should have been glad if Mr. Willmott's conclusions had been somewhat different, because they combated some conclusions of his own, particularly with reference to vaseline. Mr. Willmott's main conclusion appeared to be that vaseline was not so unalterable as it had been stated to be, and not so good as several other ointment bases to which he had referred. Some few years ago, being then somewhat identified with vaseline, he (Mr. Moss) had made experiments, embracing all the ointments in the Pharmacopœia, and in no one instance did he find the petroleum odour become developed. He should like to ask whether Mr. Willmott made all his experiments with the same sample of vaseline, because it was just possible that one specimen might not be so thoroughly purified from those paraffins which were associated with it originally. With regard to the composition of vaseline and ozokerine, they were both hydrocarbons, but differed physically to a considerable extent, which he was quite unable to explain, save that they came from different parts of the world, and had stamped on them certain impresses which were not recognizable by chemical means.

Mr. NAYLOR asked in what manner the initial stage of rancidity was ascertained. He also was a little disappointed with the conclusions arrived at, his own experiments being quite confirmatory of the results just stated by Mr. Moss. That might be accounted for by the fact that his experiments were all made at the same time as those of Mr. Moss, and he believed from the same specimen of vaseline. With reference to the composition of these hydrocarbons, he had examined five or six, and the only real difference between them was that while they all contained hydrocarbons of the same series they belonged to different parts of the series.

Dr. SYMES said he could to some extent confirm the statement made by Mr. Willmott, that vaseline did not always retain after keeping the freedom from odour which it possessed in the first instance. Some seven years ago, when vaseline was not so well known, he put up a glass jar containing a specimen of it in his pharmacy, where it could be seen by medical men. A gentleman present at that meeting, happening to come in, took the lid off and remarked that it smelt quite acid. He forgot to remove it, and the specimen remained, until one day the representative of the proprietors of vaseline entered his pharmacy, and it occurred to him to call his attention to it. Had it not been that the specimen came from a highly respectable house the genuineness of the specimen would have been doubted by Mr. Chesebrough, and, in fact, he did express doubts about it. It was not so much the smell of petroleum as of some acid, and he thought probably in the treatment with nitric acid in the process of purification some decomposition product had remained. His experience differed somewhat from that mentioned, that these hydrocarbons did not tend to preserve substances like lard. He found, as a matter of experience, that the admixture would keep better than lard, or a mixture of oil and wax alone. There appeared to be two classes of these bodies in the market, one, petroleum jelly obtained in purifying crude petroleum, holding a place between lubricating oil and paraffin wax, which had never been in a crystalline condition, and was, therefore, soft and emollient in character, and another, being that which was prepared by dissolving a soft paraffin having a low melting point in lubricating oil. These would possess different characteristics; one, being more or less crystalline, and although harder in the first instance, when broken up was quite as soft as the jelly-like body, but the two would always have distinct characteristics. He had hoped that Mr. Willmott would have made some experiments with the process recently proposed for preparing a substitute for ointments, by a solution of gelatine containing a small quantity of glycerine. He had tried it in the preparation of active remedies, such as chrysarobin, and it answered very well, retaining its consistency when painted on the skin. He thought a compound of that kind might usefully replace some of the ointments which were likely to change.

Mr. Pickard asked if Mr. Willmott had made any experiments with the white vaseline lately introduced. The presumption would be that the white would be the purer of the two. The yellow, when heated, certainly gave off a petroleum odour; but he did not think the original samples did so much as those he had seen since. He should also like to ask Mr. Williams if what was commercially known as white wax was not in large blocks.

Mr. Williams said the wax he alluded to as pure was not known as block wax, which he believed contained other materials. It was wax which was largely used by dentists, who required to have it free from spermaceti; it was also used by photographers, and it professed to be pure beeswax, bleached.

Mr. Frazer said he had used the wax referred to for some years, and it was known as dentists' wax. It was made by Field and Co. and other large houses, and was quite different from the ordinary white wax.

Mr. A. H. Mason remarked that what was referred to as block wax was known in the trade as Madras wax. It was not at all necessary to use manufactured or bleached wax in the preparation of ointments. Those who were in the habit of manufacturing furniture polish were aware that ordinary white wax in cakes was not at all suitable for the purpose, the Madras wax being far preferable. He should like to ask if Mr. Willmott had made experiments relative to the colouring properties which vaseline and other hydrocarbons seemed to possess. Complaints were often heard that pomades or ointments made with them stained the skin or the linen, and he wished to know whether it might be due to a difference in the hydrocarbons, or in the case of pomades to physiological action, the colouring matter in the hair yielding to them and the pillows becoming stained. He knew a case of a lady in Paris who had used some pomade prepared with one of these bases; she had white silken hair, of which she was very proud, but after using this pomade for a few days her hair became a disagreeable yellow colour.

Mr. Conroy said, that his experience of the preparation of lard totally differed from Mr. Willmott's; he found that by filtration he got a most excellent product which would keep good and sweet. He did not consider washing to be of much use, but careful filtration was necessary to separate decomposable matter, and he had never found any difficulty in separating water after washing, because by allowing the lard to rest a few minutes, the water would sink to the bottom. There was no necessity for any length of time to be occupied in the filtration, as at a temperature of about 200° F. it would easily run through filtering paper. With regard to the petroleum odour developed by hydrocarbons, though he had prepared a great many ointments with these bases, he never noticed any development of this odour, though they certainly all developed what might be called a rancid smell, and that was developed more quickly when they were exposed to strong sunlight. He was not surprised to hear that when peroxide of hydrogen was added to an ointment it became rancid, for if he wanted to produce such a result it was just what he should do. One frequent complaint with regard to vaseline and other hydrocarbons was that they produced irritation of the skin, and he had seen children's arms in a very bad state, arising as stated by the medical man attending the case from the application of hydrocarbon jelly.

Mr. Holmes trusted that Mr. Willmott would continue his researches until he had arrived at the means of making a white ointment which would not turn rancid. He had recently seen a vegetable fat sent from Singapore, which was called vegetable tallow, and it was said never to turn acid. When it was obtained white, which was not very often, he understood, it made a very good ointment simply with the addition of a little olive oil, and if there were any demand for it, he thought there would be no difficulty in obtaining a supply. He had seen some of the seeds from which it was obtained, and as they were not recognized either at Kew or the British Museum, it was obvious they were not yet known to commerce. He had a small quantity of the fat which he could place at the disposal of Mr. Willmott if he would like to experiment with it.

Mr. Conroy asked if shea butter was the same thing as vegetable tallow, and if Mr. Willmott could give any information about it, particularly as to whether it had any medicinal properties of its own.

Mr. A. C. Abraham wished to dispel an idea which might arise from what had been said, that pure white wax was only used in Scotland; it was easily obtained by anybody who wished to get it. He had always used it and believed that the firm to which he belonged had used it for as long a period as had been named (forty years). With regard to Mr. Williams's suggestion that the difference noted by Mr. Willmott was possibly due to the quality of the wax rather than to its having been bleached, his results, working with pure wax, quite bore out what Mr. Willmott had said, and the fact that white wax was oxidized by exposure to the air would lead one to expect such a result.

Mr. Ward said it would be well if it were explained whether English or foreign yellow wax was referred to.

Mr. Woolley said it was very desirable that Mr. Willmott should continue this investigation, especially with regard to the wax question, as if he had used round cakes probably his results would require reconsideration. As regards Madras wax, the purity of a great deal of that was open to considerable doubt. The whole question of the wax to be used in ointment making might with considerable advantage be investigated further. It was rather surprising to him that one very simple thing was omitted in Mr. Willmott's paper, namely, the first preparation of the lard. He had mentioned bladder lard, but it was a very simple process to take the flake lard, and having properly bruised it so that all the vesicles were broken up, in which condition it could be rendered at the lowest possible temperature, when the lard produced would be found to be very different from that generally used.

Mr. Whitley Williams thought the preparation to which Mr. Holmes had referred was very likely to be of great use indeed. He remembered some time ago being at Price's Candle Works when Mr. Hatcher, the chemist there, showed him a quantity of a fat which he believed to be the same thing; it was imported under the name of kokum oil. He said that though freely exposed to the weather it kept almost absolutely without change; it was a dense white fat, something between lard or spermaceti and white wax, and in composition was almost pure stearine, in fact it formed about the best material from which to prepare pure stearic acid.

Mr. Holmes said the material he referred to was not kokum butter, and the seeds from which it came were quite different.

Mr. Willmott said he feared he should be compelled to overlook some of the remarks, whilst many of the criticisms which had been made would be found to be dealt with in portions of the paper which he omitted in reading. He had made no examination chemically of the different hydrocarbons, except such as were involved in the experiments he had narrated; but he thought there was very little difference between them chemically. Vaseline seemed to be prepared by a different process altogether; in fact Messrs. Chesebrough's patent claimed a particular process which did not apply to the other hydrocarbons. That might account for the circumstance that in vaseline alone and not appreciably in the others, the odour complained of became developed. It was claimed that vaseline was not a product of distillation, and thus possibly some of the benzoline oil remained in the preparation, and became developed in the course of time. A good deal had been said about wax, which was a subject well worthy of investigation, but he had not gone beyond the ordinary wax of commerce, which he had always found sufficiently good for the purpose intended. The wax mentioned by Mr. Williams was a special preparation, which he did not think was generally used in pharmacy. He was obliged to Mr. Moss for his experience with regard to vaseline. It was only after a long time in the case of vaseline itself, or after a shorter time when mixed with acetate or carbonate of lead, that the odour became developed; in the latter case he could state that with almost certainty the change would occur within six months. He had used different samples of vaseline, extending over a long time. He had not tested the stage of rancidity chemically as time would not permit; but had simply judged by the physical properties of the ointment. Dr. Symes's suggestion with regard to glycerine was a valuable one, and he would bear it in mind. As far as he knew, white ozokerine, except in its freedom from colour, had no advantage over the yellow kind, and he did not know that Messrs. Field recommended it in preference. He presumed the colour was got rid of by filtration through animal charcoal. Mr. Conroy referred to peroxide of hydrogen producing rancidity; it was simply added to the milder nitrate of mercury ointment to prevent reduction of the mercury. The effect on the lard was no doubt prejudicial. The new substance mentioned by Mr. Holmes was well worth consideration, and in all these cases it was very desirable that sufficient time should be given, and that those ingredients should be mixed with the bases which would test them in the severest manner, otherwise misleading conclusions might be arrived at.

The President said the Conference would no doubt appreciate the discussion which had taken place. There must be room for future research in connection with the material which separated when fats were filtered. He believed the following question would have to be reconsidered: What was the nature of and extent of the action of the material which separated from fats by filtration? He hoped this would be investigated.

(*To be continued.*)

Parliamentary and Law Proceedings.

Poisoning by White Precipitate.

On Tuesday, Mr. F. Price, district coroner, held an inquest on the body of Annie Jane Wood, twenty-five years of age, daughter of Amos Wood, sawyer, residing at Salford. The deceased bought some seidlitz powders on Saturday the 13th inst., at the shop of Mr. G. S. Butcher, chemist, Chapel Street, Salford, and on the following Monday took one of them. She became ill almost immediately, and showed symptoms of poisoning. An emetic was administered, and she was attended by a medical man, but died on Saturday morning.

Mr. B. Cobbett watched the inquiry on behalf of the relatives of the deceased, and Mr. Northgreaves represented Mr. Butcher.

Rachel Wood, mother of the deceased, said that on the 13th inst., her daughter went out to make some purchases, and said that she would call at Mr. Butcher's for some tea on her way back. She also said that she would get some seidlitz powders at the same shop. She had been in the habit of taking seidlitz powders. She brought two powders from Mr. Butcher's shop, and they were put away until Monday. Early on Monday morning witness heard her daughter vomiting. She asked what was the matter, and her daughter said that she had taken one of the seidlitz powders, at the same time showing the witness the cup in which she mixed it. The cup was on the table, and had a sediment in the bottom. As the deceased did not get any better, Dr. Bradley, of Chapel Street, was called in, and that gentleman administered remedies. The deceased, however, grew worse, and died about half-past five o'clock on Sunday morning.—In reply to Mr. Northgreaves, witness said that her daughter was not in the habit of taking powders regularly. She did not see any paper such as seidlitz powders are generally wrapped in anywhere about the room. Deceased told her that the powder did not effervesce.

Dr. Bradley said that on Monday morning, the 15th inst., he attended the deceased and found her suffering apparently from an irritant poison. He sent her as an antidote a powder composed of sulphate of zinc. He visited her again the same morning about eight o'clock. She was lying on the sofa vomiting, and her feet, hands and face were unusually cold. Her pulse was very quick and feeble. She continued in that state for five or six hours, and vomited blood before her death. When he first saw her she told him that she had taken a seidlitz powder from a cup (produced) which was shown to him. He took possession of the cup, and in conjunction with Dr. Clark analysed a portion of the contents. They found a powder called white precipitate. On Monday, with the assistance of Dr. Stocks and Dr. Clark, he made a *post-mortem* examination of the body. From all other internal appearances he was of opinion that death resulted from inflammation of the stomach and intestines produced by some irritant poison. White precipitate was such a poison as would produce such inflammation. He found a small package in the cupboard with the name "G. S. Butcher" on the label. He afterwards went to Mr. Butcher's shop, and after relating to him the circumstances, said: "What did you give the girl?" and showed Mr. Butcher the contents of the cup. Mr. Butcher replied that the deceased purchased at his shop two seidlitz powders in separate packets, and added: "If she has taken any poison it could not possibly have come from here, as these powders are made up in large numbers, and I should say if there was poison in one there was poison in all." Mr. Butcher then, at witness's request, opened the powder which he (Dr. Bradley) brought with him from Wood's house, and put the contents in a measure containing water. It effervesced, the same as an ordinary seidlitz powder. They both drank of the mixture, and he (Dr. Bradley) felt no ill effects. Mr. Butcher showed him a drawer containing at least one hundred of these powders, but he did not remember making any examination of them.—By Mr. Cobbett: The deceased was present when I took the packet out of the cupboard. I carried the cup to Mr. Butcher's, and no one interfered with it afterwards.—In answer to Mr. Northgreaves, witness said the deceased might have taken any irritant poison, besides white precipitate, according to the appearance of the stomach. He was not told by the mother or anybody else that the deceased had had an emetic on the morning of the day she was taken ill. He did not say to the deceased, when she said she had had a seidlitz powder, "But you must have had something else." Deceased was at that time in a very weak state. White precipitate would not effervesce, but it was not a very deadly poison. Deceased was not a very strong girl.—By a Juryman: Witness did not find any traces of seidlitz powder in the contents of the cup he analysed.

Frederick Elsby, assistant to Mr. Butcher (after being cautioned by the Coroner), said he had been with Mr. Butcher for ten weeks. He had had to make up seidlitz powders on more than one occasion. No one else that he knew of had made up any of these powders at Mr. Butcher's shop since he had been there. He made up about nine dozen some days ago, and the ingredients were 4 parts of rochelle salts and one part of carbonate of soda. They were wrapped in blue paper (such as those produced), and a white paper which contained tartaric acid. They were then put away in a drawer in the shop, and he had sold a great many of them since. He could not account for one or any of the powders containing white precipitate. The carbonate of soda was kept in a drawer and the salts in a brown-paper parcel in a cupboard in the shop, and the tartaric acid was also kept in the cupboard. He made up some white precipitate on October 6, but did not use any white precipitate at the time he was making up the powders.—By Mr. Cobbett: Mr. Butcher has an apprentice and he may have wrapped up the powders in blue paper and labelled them without my seeing him.—By Mr. Northgreaves: I never put white precipitate close to the seidlitz powder drawer. On the day I made up the white precipitate I wrapped up and labelled each packet as I made it up.

At this point the inquiry was adjourned until Wednesday. Upon the inquest being resumed,—

Josiah E. Taylor, apprentice to Mr. J. F. Smith, chemist and druggist, Broad Street, Pendleton, said he recollected that one Tuesday, about four weeks ago, Mr. Frederick Elsby, assistant to Mr. Butcher, came to take charge of the shop during Mr. Smith's absence. He came about nine o'clock in the morning, and remained till about ten minutes past nine at night. During the day Elsby measured some of the materials for some seidlitz powders, which he put in blue paper and took away with him when he left. His (witness's) employer sold white precipitate in small penny packets. Mr. Elsby did not use any white precipitate that day, for he did not know where it was kept. Witness did not remember selling any white precipitate that day, and if any got among the material which Mr. Elsby was measuring he could not account for it.—By Mr. Cobbett: I was there all day, and did not see Mr. Elsby make up anything else besides the seidlitz powders. The white precipitate which we make up is placed in white paper and a label is put upon it stating that it is poison.—By Mr. Northgreaves: Mr. Elsby brought the material used for the seidlitz powders in a piece of brown paper.

Mr. G. S. Butcher, chemist and druggist, Chapel Street, Salford, stated that he knew the deceased, who had been a customer at his shop for some years past. She last came on Saturday the 13th inst., and asked for some tea and two seidlitz powders. Witness supplied her, and obtained the seidlitz powders which he gave to her from the drawer in which they were always kept. He heard nothing more of the deceased or of the powders until Monday morning last, when Dr. Bradley called at his shop, having with him a spoon and also a cup, the latter of which, he said, contained the dregs of a seidlitz powder which had been bought there. Witness looked in the cup, and said that was not a deposit likely to come from a seidlitz powder. Dr. Bradley then produced a seidlitz powder which bore his (Mr. Butcher's) label, and stated that he was informed that was also purchased by the deceased at the time she bought the powder which was supposed to have caused her death. Witness put that powder into a tumbler, into which he poured a quantity of water, which caused effervescence. He and Dr. Bradley then tasted the liquid, and Dr. Bradley pronounced it to be all right. Witness afterwards showed the drawer in which the seidlitz powders were kept to Dr. Bradley, and asked him to examine any he liked. He expressed himself satisfied, and did not take any away with him. There was no reason to doubt that the powder in the cup which Dr. Bradley brought with him was white precipitate, but he (Mr. Butcher) could offer no suggestion whatever as to how it came there.—By Mr. Cobbett: I do not remember selling to the deceased or any of her family white precipitate.—By Mr. Northgreaves: As soon as I heard of the death of the deceased, I put the drawer containing the seidlitz powders on one side in order that the powders might all be preserved and analysed if that was thought desirable. Since the last quantity of seidlitz powders was made up I have sold about fifty, and have received no complaint with regard to them.

Dr. Bradley, who was recalled, said there was an absence of pain from the deceased which he could not account for if she had taken any irritant poison.

Mrs. Wood, mother of the deceased, stated that her daughter had not been subjected to any disappointments recently, nor had she been depressed at all.

Alfred Wood and Richard S. Wood, brothers of the deceased, gave corroborative evidence, and stated that they had not been able to find any piece of paper in the house which appeared likely to have contained the seidlitz powder or any kind of poison.

The Coroner, in summing up, said that the case was unprecedented in his experience as coroner and deputy coroner, which extended over twenty years. He had had to inquire into many cases of poisoning, but never one involved in such mystery. It seemed impossible to obtain any definite evidence as to whether the poison really was purchased in mistake for a seidlitz powder.

After the Jury had consulted together in private, the Coroner said that, before the verdict at which they had arrived at was formally recorded, the Jury desired him to express their regret, in which he joined, that the medical gentleman who attended upon the deceased did not communicate with the police in order that the dying declaration of the deceased might be obtained. If that had been done, a very great deal of doubt and difficulty which the Jury had had to contend against would in all probability have been removed.

The verdict at which the Jury had arrived was to this effect:—"That the deceased died on the 21st October from inflammation of her stomach and intestines, caused by having on the 15th inst. swallowed a certain irritant poison called white precipitate; there is, however, no evidence to show how she became possessed of or took the poison."—*Manchester Guardian.*

Prosecution under the Pharmacy Act, Ireland.

At the Armagh Petty Sessions, on Thursday, October 4, a summons was heard in which the Pharmaceutical Society for Ireland charged Wm. Gray and John Gray for that the defendants did within six months last past, to wit, in or about the months of April or May, 1883, and since, sell or keep open shop for retailing, dispensing, or compounding poisons within the meaning of the Act 33 and 34 Vict., c. 26, or medical prescriptions, without having been previously registered as pharmaceutical chemists or chemists and druggist under the Pharmacy (Ireland) Act, 1875, at English Street, Armagh.

A person employed in the establishment of the defendants was called to give evidence respecting the dispensing of certain prescriptions, who displayed considerable perseverance in evading giving a direct answer to the questions put to him. Other evidence was given, however, and eventually the magistrates held that the offence was proved and imposed a fine of £2, with £1 costs.

A second charge against the same defendants of unlawfully assuming a title protected by the Act was then proceeded with and resulted in the imposition of another fine of £2 and £1 costs.

H. E. B. is recommended to examine the precipitate.

J. C. Wiggin.—See a paper on "Boracic Acid as a Preservative," in *Pharm. Journ.*, [3], x., 836.

M. C. Sumners.—The official work is published in only one size.

Communications, Letters, etc., have been received from Messrs. Proctor, Saul, Ince, Bowie, Husband, Kemble, Modlen, Davies, Crowden, Siebold, Hick, Dott, Wilkinson, Swinn, Smith, Parry, D. Cinchon., T. P. J.

NOTES ON TRAUMATICINE.

BY R. MODLEN.

On page 63 of the present volume of the *Pharmaceutical Journal*, appears a notice of the use of medicated gelatine as an application in skin diseases. This is a very good idea, but it is open to two objections which greatly diminish its chance of general use.

The first is, that before use it requires to be melted, a process not always convenient. The second is, that, when applied, it becomes very hard and dry, causing a painful contraction of the skin. True, this may be obviated by painting glycerine over the dry film, but what is wanted is a preparation which will not require so much manipulation. This idea was introduced by Professor Pick, of Prague.

Professor Auspitz, of Vienna, has improved upon it by using a preparation which he calls "Traumaticine," consisting of a solution of 1 part of gutta percha in 10 parts of chloroform. This forms an admirable adhesive, and continues unchanged and adherent to the skin for some days. It produces a very thin, delicate film, causes neither tension nor pain, as gelatine does, is very readily applied, and, as may be inferred from its composition, is quite permanent, whereas the gelatine becomes mouldy. Here, at the Radcliffe Infirmary, Oxford, it has been used by Mr. H. P. Symonds with great success in psoriasis. In making it, I use the gutta percha tissue, which answers the purpose quite as well as the purified gutta percha. In appearance it is a thick fluid, of a purplish colour. In preparing it with any medicament, *e.g.*, acidum chrysophanicum, I dissolve the acid, etc., in the chloroform, before adding the gutta percha.

I submit these notes in the hope that they may be useful to any brother pharmacist who may have "traumaticine" ordered.

THE INDICATION OF ALKALINITY IN THE ESTIMATION OF HYDROCYANIC ACID.

BY PETER MACEWAN.

In the estimation of hydrocyanic acid by Liebig's process there is sometimes difficulty in ascertaining that the acid has become completely saturated with the alkali used, owing to the sodium cyanide formed being alkaline to litmus, even in presence of free hydrocyanic acid. The indication thus given is misleading, and is calculated to impair the results of the titration. In Dr. Senier's method for overcoming the difficulty soda solution is added to a strong alkaline reaction, indicated by litmus tincture, and should the solution become acid during titration more soda is added, so that the whole may be alkaline at the final reaction. This plan is generally adopted and it gives good results, but it does not obviate loss of hydrocyanic acid by exposure.

By substituting phenolphthalein for litmus alkalinity is indicated with certainty, so that the titration may be carried through without interruption.

This new indicator is not affected by sodium cyanide, and if a single drop of its solution be added to the hydrocyanic acid previous to the addition of soda solution, no change occurs until the acid is wholly converted into sodium cyanide and the solution has become slightly alkaline, at which point a pale crimson colour appears and no more soda is required. Titration may then be proceeded with.

I have no doubt that others may have used phenolphthalein for this purpose, but this suggestion may be useful to those who have not. The solution which I use contains 4 grains in an ounce of proof spirit. It may be proper to add that the indicator is of no use in presence of ammonia.

THE NEW PHARMACOPŒIAS FOR THE UNITED STATES AND GERMANY.

(*Continued from p.* 302.)

Quinidinæ Sulphas, U.S.P.—"The neutral sulphate of an alkaloid prepared from different species of *Cinchona*, chiefly *Cinchona Pitayensis*." In white silky crystals, permanent in the air, odourless, having a very bitter taste and neutral or faintly alkaline reaction. Soluble in 100 parts of water at 15° C. or 8 parts of alcohol; in 7 parts of boiling water and very soluble in boiling alcohol; in 20 parts of chloroform, but almost insoluble in ether. It parts with its water of crystallization (4·3 per cent., equal to two molecules at 120° C.). An aqueous solution, acidulated with sulphuric acid is fluorescent, and when treated with fresh chlorine water and then with slight excess of solution of ammonia the salt gives an emerald green colour like quinine.

Quinine, U.S.P. (new).—The official quinine is the form crystallizing with three molecules of water, occurring as "a white, flaky, amorphous or minutely crystalline powder." It is described as soluble in 1600 parts of water or 6 of alcohol at 15° C., in 700 parts of boiling water, in 2 parts of boiling alcohol, about 25 parts of ether, 5 of chloroform, 200 of glycerine, and also in benzin, benzol, water of ammonia or dilute acids, which it neutralizes. It melts at 57° C., loses 2 molecules of water in the water-bath, and the remainder at 125° C. The vivid blue fluorescence with dilute sulphuric acid and the thalleioquin reaction are given as characters of the alkaloid and of its salts, as are the requirements that they shall not be coloured or rendered more than a pale yellow by strong sulphuric acid (absence of foreign organic matters) or reddened by nitric acid (difference from morphine). But the principal test is a modification of Kerner's test, which is also modified to adapt it to the official salts of quinine. A gram of quinine is mixed with 0·5 gram of ammonium sulphate and 5 c.c. of distilled water, the mixture thoroughly dried on a water-bath, the residue (which should be neutral to test paper) agitated with 10 c.c. of distilled water, the mixture macerated for half an hour at 13° C., and filtered. Upon adding to 5 c.c. of the filtrate in a test-tube, 7 c.c. of solution of ammonia, sp. gr. 0·960, and gently turning the tube until the two are intermixed, a clear liquid should be obtained, which it is stated would indicate the absence of more than 1 per cent. of cinchonidine and quinidine, and of more than traces of cinchonine. The proportions of the saturated solution and of ammonia are those indicated by Kerner for pure sulphate of quinine, but in this case, as an excess of ammonium sulphate is ordered, which is very soluble in water, some of this salt would be present also in the saturated solution to which the ammonia is added.

Quininæ Bisulphas, U.S.P. (new); *Chininum bisulfuricum*, P.G.—This soluble salt of quinine is described in the U.S.P. as in colourless clear orthorhombic crystals or small needles, efflorescing and becoming opaque on exposure to the air, having a very bitter taste and a strongly acid reaction, and represented by the formula, $C_{20}H_{24}N_2O_2H_2SO_4 \cdot 7\,H_2O$. Soluble in about 10 parts of water, with vivid blue fluorescence, and in 32 parts of alcohol at 15° C., and very soluble in boiling water or alcohol. The description in the P.G. is practically the same, and the statement that the residue from 100 parts dried at 100° C. should weigh 77 parts, points to the same amount of water of crystallization. In both works a modification of Kerner's process is used as a test for the absence of other alkaloids, the bisulphate being first converted into neutral sulphate by the addition of ammonia, the only difference being that in the P.G. a mixture of 2 grams of bisulphate and one of solution of ammonia is evaporatad to dryness and the residue examined, whilst in the U.S.P. a solution of bisulphate is carefully neutralized with ammonia, and then made up to the proper quantity with water.

Quininæ Hydrobromas ($C_{20}H_{24}N_2O_2HBr \cdot 2H_2O$), U.S.P. (new).—Coloured lustrous needles, permanent in ordinary air, but readily efflorescing at a gentle heat, odourless, having a very bitter taste and neutral or slightly alkaline reaction. Soluble in about 16 parts of water or 3 of alcohol at 15° C., in 1 part of boiling water or alcohol, in 16 parts of ether, 12 parts of chloroform, and moderately in glycerine. Besides the tests that are common to the other quinine salts, an aqueous solution of the hydrobromate should not be rendered turbid by test solution of barium chloride, showing the limit of sulphate. In order to apply Kerner's test, 1·5 grams of this salt is dissolved in 15 c.c. of hot distilled water, the solution stirred with 0·6 gram of crystallized sodium sulphate in powder, the mixture maintained at 15° C. for half an hour, and then drained through a filter only large enough to contain it until the 5 c.c. required is obtained. Dried on a water-bath it should not lose more than 8·2 per cent. (2 molecules) of water.

Quininæ Hydrochloras, U.S.P. (new); *Chininum hydrochloricum*, P.G.—According to the U.S.P., occurring in white lustrous needles, forming tufts, permanent in ordinary air, but readily efflorescing at a gentle heat, odourless, having a very bitter taste and a neutral or faintly alkaline reaction. Soluble in 34 parts of water at 15° C., or 3 parts of alcohol, in 1 part of boiling water, and very soluble in boiling alcohol; when rendered anhydrous (by which it should not lose more than 9 per cent. in weight) it is soluble in 1 part of chloroform. An aqueous solution does not show any blue fluorescence and should not be rendered turbid by test solution of barium chloride. In applying Kerner's test in the U.S.P. 1·5 gram is ordered to be dissolved in 15 c.c. of hot distilled water, the solution stirred with 0·75 gram of crystallized sulphate of sodium in powder, the mixture maintained at 15° C. for half an hour, and then drained through a filter only large enough to contain it until 5 c.c. of filtrate is obtained. The P.G. orders 2 grams of the salt, with 1 gram of sodium sulphate and 20 grams of water, to be evaporated to dryness, the residuum boiled with 12 grams of spirit, filtered and evaporated, and the resulting "chininum sulfuricum" examined. According to Schlickum (*Ph. Zeit.*) complete decomposition does not take place under the P.G. conditions, and the salt removed by the alcohol from the dried mixture is principally unaltered hydrochlorate. It will be remembered that the use of hydrochlorate of quinine instead of sulphate in the preparation of tincture of quinine, on account of its greater solubility, has been several times recommended in this Journal (see *Pharm. Journ.*, [3], xii., 1068).

Quininæ Sulphas, U.S.P.; *Chininum sulfuricum*, P.G.—The U.S.P. formula for this salt represents it with seven molecules of water of crystallization, but one of the tests allows it to lose when heated to 100° C. for three hours as much as 16·8 per cent. of water, or equal to eight molecules. The P.G. requires that after drying 100 parts at 100° C. the residue should weigh at least 85. Both Pharmacopœias give Kerner's test amongst others, and the P.G. also gives Hesse's chloroform-alcohol test, according to which 1 gram of quinine sulphate when heated for a short time at a temperature of 40° to 50° in 700 c.c. of a mixture of two volumes of chloroform and one of absolute alcohol is completely dissolved and the solution remains quite clear when cool.

Quininæ Valerianas, U.S.P.—White or nearly white pearly lustrous, triclinic crystals, permanent in the air, and having a slight odour of valerianic acid, a bitter taste and a neutral reaction. Soluble in 100 parts of water at 15° C., and 5 of alcohol; in 40 of boiling water and 1 of boiling alcohol and slightly soluble in ether. Melts at about 90° C. This salt was in P.G. 1870, but has been omitted from the new edition.

Salicinum, U.S.P. (new).—"A neutral principle prepared from the bark of *Salix Helix*, L., and of other species of *Salix*." In recognition of the place which this glucoside has now attained amongst therapeutic agents, especially in the treatment of rheumatic fever, it has been included in the U.S.P., though not in the more conservative P.G. It is described as occurring in colourless or white silky crystals, permanent in the air, odourless, having a very bitter taste and a neutral reaction. Its solubility in water at 15° C. is given as 1 in 28, which corresponds with the results arrived at independently by Mr. Parker and Mr. Dott (*Pharm. Journ.* [3], xii., 378 and 615). Soluble in 30 parts of alcohol at the same temperature; in 0·7 part of boiling water; and in 2 parts of boiling alcohol; insoluble in ether or chloroform. It melts to a colourless liquid at about 198° C., and on ignition emits vapour having the odour of salicylous acid and is finally wholly dissipated. One part of salicin shaken with 20 parts of water and 5 parts of solution of potash gives a clear colourless solution. Cold concentrated sulphuric acid dissolves it with a red colour, and this solution after the addition of water becomes colourless and deposits a dark red powder insoluble in water or alcohol. Salicin is distinguished from alkaloids in not being precipitated from an aqueous solution by tannic or picric acid, or by iodide of mercury and potassium.

Santoninum, U.S.P.; P.G.—The reports several times repeated during recent years of accidents having happened through the contamination of santonin with strychnine appear to have led to the introduction into both Pharmacopœias of a test to guard against the presence of that alkaloid. In the U.S.P. the supernatant liquid after precipitating the santonin from a solution in sulphuric acid by the addition of water, and in the P.G. the clear liquid obtained by boiling santonin in 100 parts of water and 5 parts of sulphuric acid, slowly cooling and filtering, should not be altered on the addition of solution of bichromate of potassium, the yellow chromate of strychnine being formed if the alkaloid be present.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 3, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, *17, Bloomsbury Square.*

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

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

A GERMAN EDICT AS TO THE KEEPING AND SALE OF POISONOUS SUBSTANCES.

PERHAPS the greatest of the difficulties in connection with the subject of the regulation of the sale of poisons in this country is experienced in attempting to deal with two widely differing moods of the public mind, the one manifest, when, under the influence of temporary panic provoked by some untoward occurrence, a cry is raised for extreme restrictions concerning the keeping and sale of every substance that can be regarded as poisonous, and the other when the inconvenience resulting from restraint in manufacturing and trading operations is recognized as a sufficient reason for allowing dealings in indefinite quantities of virulent poisons to remain free from any control. Thus, when in consequence of repeated and influential representations the Council of the Pharmaceutical Society sought to exercise its statutory powers by including certain widely used poisons in the second part of the schedule its experience was hardly a happy one, and certainly the portion of the draft Bill to amend the Pharmacy Acts that has met with the largest amount of opposition is that which proposes to meet the difficulty by instituting a class of "poisonous" substances that might be sold by unregistered persons, but only under certain restrictions as to labelling. It is quite possible that in this country conflicting interests may long preclude a settlement of this question; but in Germany, where—we do not say whether fortunately or unfortunately—the form of government is more paternal, the public and the pharmaceutical community are liable to have the question settled for it in a somewhat more summary manner. This indeed has recently occurred in the Prussian district of Königsberg, where a police regulation has been issued respecting the sale and keeping of poisons and poisonous substances, which, as will be seen, is not wanting in stringency.

In the first place, concerning what are to be deemed poisons and who are to be allowed to sell them, it may be stated that as a basis of the police regulation referred to, a large number of poisonous substances used for other than medicinal purposes are grouped in two classes: the first, entitled "direct poisons," which are to be kept in poison chambers, as afterwards described, and the second, called "indirect poisons," which are to be kept separately from other substances. Class I. includes (*a*) all arsenical substances, such as arsenious acid, vermin killers, fly papers and similar preparations containing arsenic, arsenical pigments and colours, aniline colours containing arsenic, and all preparations and substances which contain arsenious or arsenic acid, or a compound of either; (*b*) all mercurical preparations; (*c*) all cyanides and compounds containing hydrocyanic acid, such as essential oil of bitter almonds, and (*d*) phosphorus and its preparations. In Class II. are placed (*a*) all poisonous and powerfully acting drugs and chemicals, including all those enumerated in Table C. in the German Pharmacopœia, so far as the sale of these is allowed, and especially carbolic, chromic, hydrochloric, nitric, nitrous, nitro-hydrochloric and sulphuric acids, oxalic acid and oxalates, caustic potash and soda and caustic leys, butter of antimony, lunar caustic and other silver salts, soluble salts of barium, cadmium and copper, salts of tin, sugar of lead, iodine and iodide of sodium, nitrobenzol, coculus indicus, mezereon seeds, and poppy heads; and (*b*) poisonous pigments, especially those containing lead, chromium, copper or zinc, under whatever name they may pass. The police regulation prohibits absolutely the keeping or sale of any of the foregoing articles, or poisons or poisonous substances of any kind, by any person who is not a pharmacist, unless he holds a special licence, such licences being obtainable in towns from the police authorities and in country districts from the provincial courts. A pharmacist does not require a licence, and in respect to the foregoing poisons and those contained in Tables B. and C. of the German Pharmacopœia he remains in exactly the same position as before the issue of the order. Subject to the possession of a licence, however, and with the exception of certain substances which were the subject of a previous order that limited dealing in them by wholesale to merchants and by retail to pharmacists, the sale of poisons not intended for medicinal use may be carried on by other traders than pharmacists, provided that certain stringent conditions as to keeping and delivering them are complied with.

All the poisons and poisonous pigments included in Class I., with the exception of phosphorus and its preparations, are to be stored by dealers in special poison chambers, used only for this purpose and separated from the ordinary business apartments. These chambers are to be kept always locked except during the time in which they are being used; moreover they are to be accessible only to the principals of the establishment and adult assistants, and are to be well lighted by daylight and kept clean and tidy. The poisons are to be placed in strong, durable, well-closed vessels, distinctly labelled with oil colours in white letters upon a black ground, and so arranged that the poisons in the different categories do not stand beside or under one another, but the arsenical, the mercurial, and the cyanogen groups and the other "direct poisons" are each placed in a separately locked compartment bearing the corresponding label. Each of these compartments must be provided with its own set of the necessary scales, mortars, scoops, etc. Phosphorus is to be preserved under water in a glass vessel surrounded by sand, enclosed in a metal case, and this, together with preparations of phosphorus, is to be placed in a fire-proof cellar that can be locked. As to poisonous substances in Class II., the boxes or other containing vessels used for them are both in the store and the sale-room to be kept entirely separate from all other goods. In the store, if not kept in special chests they are at least to be separated from other wares by a lattice-work partition and especially from articles of food and medicine. In the sale-room these poisons are never to be placed near articles of food. All boxes or vessels containing poisons of this class are to be labelled in red letters upon a white ground, and there is to be a special set of scales, etc., to be labelled "poison," and used for nothing else. After the poisons in either class have passed from the dealers to persons requiring them for technical purposes they are still to be stored under lock and key, separately from all other articles, and in vessels that are each to be labelled with the name of the substance, the word "poison," and three distinct crosses on the vessel and on its lid.

With respect to the act of selling the provisions are equally specific. No poison in Class I. is to be sold in any quantity except upon a "poison order," which must be signed and sealed by the buyer, and state the date of the purchase, the name of the buyer, the name of the messenger, the kind of poison wanted and the quantity, and the purpose for which it is required. The seller has to number the poison orders consecutively and preserve them so as to be able to produce them if called upon by the authorities and has also to make a corresponding entry of the particulars in a "poison book." These "direct poisons" are, moreover, only to be sold for technical purposes to artists or to persons carrying on a business in which they are required or who are engaged in the destruction of vermin, and only then when the buyer is personally known to the seller or is able to prove his identity by a certificate specially issued for the purpose by the police authorities of his district. White arsenic is only to be supplied for the destruction of vermin after being coloured, and the same is the case with poisoned wheat, whilst fly-papers are to be stamped with the word "poison" and three conspicuous crosses. The packing and labelling of these substances is to be completed in the "poison chamber," and particular instructions are given as to the way in which these operations are to be carried out. Some of the poisonous substances in Class II. also—the strong mineral acids and caustic ley—are only to be supplied upon a poison order, whilst the others may be delivered without one to a person known to the seller; but all are to be packed and labelled according to instructions. Rat catchers and similar useful persons who obtain poisons for the purpose of their business are prohibited from supplying them, and are required to lay the poisonous bait themselves, and in such a manner and so distinguished in colour or smell as not to be likely to be mistaken by human beings or domestic animals. Finally, the sale and use of arsenical pigments for the colouring of papers, tapestries, tarlatans, cloths, etc., and the dealing in and keeping of all fabrics coloured by means of arsenical pigments, are forbidden, unless special permission has been granted.

It would therefore appear that if the people of Königsberg are not in future exempt from cases of accidental and criminal poisoning it will not be because they are not legislated for. Indeed, to English eyes the whole scheme will probably appear to be one of those specimens of over-regulation which defeat the objects they are intended to serve. But as in the administration of the order the members of the district medical board are associated with the police authorities, it may be assumed that they, at least, have been consulted upon the subject. At any rate whilst the order remains in force offences against its provisions are to be punishable by a fine of thirty shillings or a proportionate imprisonment, except in cases where a higher penalty had been already provided for under existing laws.

At the Evening Meeting of the Pharmaceutical Society on Wednesday next, two papers will be read, one on "The Preparation of Lard for Use in Pharmacy," by Professor Redwood, and the other on "The Classification and Properties of Red Resins known under the name of Dragon's Blood," by Messrs. Dobbie and Henderson. In connection with the latter paper Professor Bailey Balfour has promised to exhibit specimens of dragon's blood resin and the tree brought by him from Socotra, and to make some remarks upon the plant and its affinities. The chair will be taken at half-past eight, but in accordance with the arrangement recently announced the Lecture Theatre will be opened at half-past seven in order to give visitors an opportunity before the meeting begins of examining the donations to the Museum received during the past six months and various other articles of interest that will be exhibited.

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On Monday evening next, at 9 p.m., a meeting is to be held at 17, Bloomsbury Square, for the purpose of making preliminary arrangements for the usual Chemists' Ball, at which all gentlemen interested in the subject are invited to attend.

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Referring to the suggestion that a recent supposed case of poisoning was possibly due to the substitution of a packet containing white precipitate for one containing a portion of a seidlitz powder, Mr. F. W. Bates, of Manchester, suggests that such accidents might be prevented to some extent by always wrapping poisonous powders in paper of a peculiar pattern; for instance, white paper with distinct red bars printed across it. The suggestion seems worthy of consideration, since the use of a special paper for poisonous solids would not be subject to one important drawback attending the use of special bottles for poisonous liquids, that they are sometimes afterwards used for harmless liquids and so lead to confusion.

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The report of the Local Government Board shows that the provisions in the Sale of Food and Drugs Act for the analysis of samples purchased by private persons are not much used. Out of 19,439 samples analysed during 1882, there were only 429 that were not obtained by the local officials. But it is significant that 242 of these were submitted for examination in the three boroughs of Salford, Bristol and Brighton, in the two former of which the fee to be paid by private individuals has been fixed as low as 2*s.* 6*d.* for each analysis.

* * *

A report has recently been issued as to the proceedings at the Municipal Laboratory which was established about two years since in Paris, for the examination of articles of food and drink suspected to be adulterated. In Paris there is a single official laboratory for the whole city, with a staff of six analysts and assistants, kept up at an expenditure annually of a little over £3000. Attached to this staff there are thirty-two inspectors, whose duty it is to visit the markets and shops and procure samples for analysis. The samples are reported upon as "good," "tolerable," "bad, but not injurious," or "bad and injurious," about half the number examined hitherto having fallen under the last category. Any member of the public is entitled, on taking a sample to the laboratory and giving particulars as to its origin, to be furnished gratuitously with the results of a qualitative analysis specifying approximately its character; but for a quantitative analysis a sum ranging from five to twenty francs has to be paid. If, however, a sample brought in this way is found to be adulterated, an inspector is at once sent to the alleged place of purchase to obtain another sample, upon the result of the analysis of which, if adulteration is detected, legal proceedings are based. There appears to be no arrangement like that by which, in this country, the seller is enabled to check the public analyst's results by an independent analysis.

* * *

A correspondent writes:—"It may interest some of your readers to hear, as illustrating the mildness of the season, that a chestnut tree, a few doors east of the Vestry Hall, in the Peckham Road, is now in blossom. I cannot state precisely the number of blooms, but there must certainly be between eighty and a hundred; they are of course stunted in growth, but surrounded as they are with a whorl of leaves, they give the otherwise naked tree a very singular appearance."

* * *

In accordance with a custom that obtains with the American Pharmaceutical Association the first proceeding at the recent meeting was to listen to an address of welcome from a local official, who on this occasion was one of the commissioners of the District of Columbia. This gentleman expressed on behalf of his colleagues admiration for the efforts of the Association to elevate the standard of the pharmaceutical profession, and told the assembled pharmacists that "the labours of its members, their analysis and research, co-operating with and aided by kindred societies in other lands, are perfecting step by step the grand work of evolving from the myth of credulity and the terrors of superstition a science that cares for and relieves suffering humanity with a skill and intelligence that few outside the ranks of its devotees have any conception of." They were also assured that "this bringing together of the men from Maine and the men from Texas, of the dwellers on the Atlantic coast and those from the far off shore where rolls the Oregon, gathering to their ranks members of commingling localities as they verge towards the nation's centre, should have as salutary an effect upon the body politic as their deliberations and intercourse shall promote the welfare and health of the body physical." There was also a reception given by President Arthur at the White House on the afternoon of the third day of the meeting. After this our United States *confrères* can hardly complain that their countrymen are wanting in appreciation of their virtues—at any rate as far as this can be manifested in words.

* * *

We are glad to observe, too, that there was evidence of satisfaction amongst the pharmacists themselves at the position they have attained. Speaking of the earlier days of the Association, Mr. President Heinitsh said, "The sentinels of the dawn are answered by the ranks of the day. The cry of the first decade was, 'We may be!'; the decade now opening gives reply, 'We are!'" Referring to the production of three successive pharmacopœias by conventions sitting in Washington, and the fact that three-fifths of the members of the present Pharmacopœia Convention are members of the American Pharmaceutical Association, Mr. Heinitsh said that results have shown each later edition to be far in advance of its predecessors, and the last revision to be "a promontory of solid worth, a beacon light and guide."

* * *

By the way, this praise notwithstanding, the members of the Pharmacopœia Convention themselves do not appear inclined to "rest and be thankful." The presence of many of the members in Washington was taken advantage of for a meeting, at which it was resolved that correction should be made of all the recognized errors, and that some desiderata, among them some tables and some approved and commonly used remedies and preparations, but no other new remedy, should be included in an "Appendix," to be issued as soon as possible.

* * *

The managers of the Berlin Chemical Manufacturing Company state in a circular that in a competing "tannic acid they have found 10 to 15 per cent. of substance insoluble in alcohol, besides regularly 6 to 8 per cent., and in one instance 25 per cent. of potato starch. The 10 to 15 per cent. of insoluble substance might be referred to the use of too weak an alcohol in extracting the galls, but the presence of the starch needs no commentary.

* * *

We are glad to learn that Mr. D. Morris has a work in the press on the colony of British Honduras, with particular reference to its indigenous plants and economic productions, which it is understood will give valuable information concerning the flora and resources of that colony, and we look forward with interest to what he may have to reveal concerning its medicinal products.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The first general meeting of the thirty-fifth session of the above Association was held at the Royal Institution on Thursday, October 11; the President, Mr. E. Davies, F.C.S., F.I.C., in the chair.

The minutes of the last meeting were read and confirmed, and the following donations announced:—The current numbers of the *Pharmaceutical Journal*; the 'Nineteenth Annual Report of the Alumni Association of Philadelphia;' 'Proceedings of the Second Annual Meeting of the Massachusetts State Pharmaceutical Association;' 'The Organic Constituents of Plants and Vegetable Substances, and their Chemical Analysis,' by G. C. Wittstein, from the Government of Victoria; 'A Treatise on Olive Culture,' by Ellwood Cooper, from the same; the Annual Report of the Liverpool Science Students' Association.

Dr. Symes mentioned that Mr. E. M. Holmes, Curator of the Pharmaceutical Society's Museum, had recently, when in Liverpool, given some valuable information and advice respecting the Association's museum.

The President then asked the Honorary Secretary to give the names of the officers elected at the last Council meeting. They were as follows:—Vice-President, A. H. Mason (re-appointed); Treasurer, R. M. Sumner (re-appointed); Honorary Secretary, Albert H. Samuel, *vice* A. C. Abraham (resigned); Librarian, E. Dowling.

The President then read his

Introductory Address.

After a lapse of ten years, I have again been called to preside over your meetings. When one's attention is thus called to the swift course of time, it seems only natural to survey the period which has gone and see what it has carried away, and what still remains with us. So far as the members of the Society are concerned, at least with regard to those who take a prominent part in its proceedings, there has not been much change; of the members of Council then existing only one has been removed by death, and although advancing years may compel some of our older friends to diminish their active exertions in aid of the objects of our Association, their hearts are still with us, and the sons are taking the place of the fathers. During these ten years we have not been asleep; there have been lively discussions, alterations of laws, efforts to enlarge the bounds and increase the usefulness of the society, and I trust that whatever may be needed to keep the Association in vigorous and healthy life will not be wanting. I think no one will find fault with one change, with which my own name is to some extent associated, namely, the election of President by the whole body of members instead of by the Council, and the additional time for the preparation of an address afforded by the election taking place before the recess; and personally, I find it a great advantage not to have to lay before you a hurriedly compiled address. If from our little portion of the great field of knowledge we look abroad, we see that the progress has neither been slow nor small. If we first take into consideration advances in practical chemistry, there can be no doubt that the artificial production of indigotine, in a manner to be commercially applicable, must take the first place, whether we look upon it as a triumph of chemical science, the importance of it commercially, or the greater range of indigo tints which may be obtained; in all these respects it is a discovery which stands prominently forward in the history of chemistry. Although artificial indigotine cannot yet be produced at a price which will drive natural indigo out of the field, yet looking at the allied case of alizarine, one cannot doubt that as the initial difficulties have been surmounted, improved and cheaper means of carrying out the process will be discovered, until we need not look beyond our own country to supply us with all the indigo we require. It is true that it is to our German neighbours we owe this new advance, as we do in so many other cases, but if a greater impetus be given to the encouragement of scientific research by the revelation of the materially valuable results which flow from it, we may indirectly be spurred on until our own land be second to none in that science in which she was at one time pre-eminent.

Salicylic acid, as an article of commerce made artificially, is also a product of the last decade. A scientific curiosity ten years ago, it is now a recognized remedy of great value, and has applications as a preservative and antiseptic which are continually increasing. In last year's examinations in technology, of the City and Guilds of London Institute, it is stated to improve yeast, and the student is asked how much he would use for a quarter of malt. Truly our beer is becoming a chemical compound indeed.

Paraconine is another wonderful result of the endeavours to artificially reproduce organic bodies. Though not identical with the conine of the hemlock it is an isomeride of it, and if its physical properties exhibit some slight differences its physiological effects seem to be almost identical.

Turning to inorganic chemistry, the decade has been marked by the introduction of the ammonia soda process into England.

In a paper read before the Society of Chemical Industry by Mr. Walter Weldon, the enormous influence of this new industry on the manufacture of soda ash by the Leblanc process is powerfully set forth. Already the chemical industries dependent on the Leblanc process are carried on for the smallest profits, and but for the fact that hitherto no practical means of utilizing the chlorine in the salt has been found out in connection with the ammonia process, the days of Leblanc's process would seem to be numbered. As a instance of the manner in which progress in one direction entails progress in others, I think that there are few more striking than the response to the demand for ammonia in Solvay's process. With prodigal hand have we been throwing away ammonia and tar by the ton, whilst we carefully saved it by the hundredweight. Gas manufacture was practically the only source of these products, ever increasing in value; the ammonia for fertilizing our land, the tar as a source of colouring matters, disinfectants, explosives, etc. Yet all the while, in the manufacture of coke, far greater quantities were destroyed or sent almost uselessly into the atmosphere. It was supposed that the manufacture of good coke rendered the loss of these an inevitable necessity, but "inevitable" like "impossible" should be erased from the chemist's dictionary. Now more than one process has been perfected, whereby, without injuring the coke, these products may be collected profitably. Now let us trace the probable results in the future. If other valuable products than coke can be got from coal, coke will become cheaper, and will largely affect the iron manufacture, besides providing a smokeless fuel for other purposes. We may hope that the smoke nuisance may thus be moderated, and waste of fuel, a matter of national importance, diminished. Again, the introduction of electric lighting, in the opinion of many, threatens the use of gas with extinction. Without necessarily holding this view, for gas, as a heating agent and motive power, has an undeveloped future before it; if we do not hold gas shares we may look philosophically upon the banishment of gas retorts and gas holders from our midst. Ammonia and tar will still be found, and will probably be cheaper than ever. If ammonia salts can be obtained at a lower rate, the unfortunate British farmer may still be able, by artificial fertilizers, to compete with foreign competition, and we are brought to the region of political economy, into which our Association luckily has no business to stray.

I have no intention to wander farther in the field of imagination; possibly, starting with Solvay's process, we might land in Utopia; but enough has been said to show how inextricably linked is the chain of research, and how the chemist, in his laboratory, may, more fortunate than Archimedes, find a fulcrum for a lever to move the world onward.

Not only in the practical applications of chemical science has progress been made. In the department of pure chemical science men whose aim is only to extend the knowledge of the laws of nature have been engaged in their noble work. It is in these studies, to the outsider so utterly useless, that principles are evolved whose far reaching results none can foretell. The true character of the elementary bodies, whether they are indeed truly distinct forms of matter, or whether there is an underlying unity, has long perplexed the inquirer, and still there is no decisive reply. No element has yet been decomposed into simpler forms, yet we seem on the verge of some such discovery. When a whisper was heard that chlorine had been decomposed, no chemist felt surprised that it should be so, and although the anticipation proved erroneous, V. Meyer's researches have advanced us a long stride on the way. The molecules of bromine and iodine, and probably chlorine have been resolved into their constituent atoms by heat alone, and we are thus set face to face with matter in an atomic form, instead of the more complex molecule. Attacking the same question from a different side, Mr. Norman Lockyer has, in the varying spectra of elements exposed to successively increasing degrees of heat, seen reason to believe that evidence was obtained of successive decompositions. Though his deductions from his observations have not been accepted as proved, a new field for research has been opened, and we may hope that it will yield fruit in the not far distant future. Now that the production of electricity by mechanical means has placed this enormously powerful agent at the service of the physicist in a more readily available form, we may hope that it will be made use of to a greater extent than hitherto, and this should give a means of decomposition greater than mere heat, or any known chemical reactions.

In support of direct attacks upon the elements, the theoretical arguments as to their possibly compound nature have been strengthened by the remarkable observations of M. Mendeleff. Extending the investigations of former workers in this direction, he has tabulated the elements in the order of their atomic weights in such a manner as to show that they follow one another at small distances, and where the gap is too large he has boldly predicted the existence of missing members. These predictions have met with one striking verification. The element gallium comes in the place of one of the gaps, and has the properties which an element in that place should have. Until these researches were made the discovery of new elements was a matter of chance, the prediction of their properties would have been considered ridiculous, but now M. Mendeleff has pointed out the directions in which research should go and has greatly facilitated the detection of new elements. By his classification of the elements, those whose properties present common characters, as chlorine, bromine and iodine, fall into regular order. and the suggestion is almost irresistible, that there is an underlying unity, notwithstanding the surface differences, linking all the elementary forms of matter. Whether we shall ever discover the nature of the unity, or the cause of the differences, is of course purely speculative; still more so, whether we shall ever be able to realize the dream of the alchemists and transmute one form of matter into another, but we have not now to work in the total darkness of the old chemists, but are aided by stray gleams of light.

The nature of chemical force has also received a large amount of attention. Having recently treated on this subject before another society in this city, I shall now only refer to some experiments by Dr. Spring. The close connection of chemical force with that known as cohesion has long been suspected. Some compounds are so loosely held together that slight mechanical agitation is sufficient to unlock their bonds, as iodide of nitrogen, which is resolved into its component elements by the mere touch of a feather. Faraday, in his lectures on the forces of nature, heads the chapters on chemical force with "Chemical Force—Cohesion," showing that he considered that the force which holds the elements in a compound in a state of union, was at least analogous to that by which the atoms of a single element are joined so as to form a coherent mass. M. Spring began by showing that lead filings powerfully compressed united to form a solid mass similar to that obtained by fusion. This was also the case with bismuth, tin, copper, sulphur, etc. He then mixed copper filings and sulphur, and at a pressure of 500 atmospheres obtained the compound copper sulphide. Zinc and sulphur gave sulphide of zinc, presenting the appearance of native blende. Iron and sulphur gave sulphide of iron, which evolved sulphuretted hydrogen with acid. On heating the sulphide of iron thus made, it fused without any evolution of light and heat such as would be presented by a mixture of sulphur and iron. The artificially made sulphide of copper showed the same absence of luminous phenomenon on heating. Subsequently, compounds of arsenic with metals were produced at a pressure of 6500 atmospheres, possessing crystalline structure and forming definite chemical compounds. Most striking of all, a mixture of iodide of potassium and chloride of mercury subjected to pressure brought about soluble decomposition with production of iodide of mercury and chloride of potassium. It is true that we are ignorant of the nature of the force which holds together the particles of an element in a coherent mass, but it is a distinct gain to know that chemical force is not a force *sui generis*, but is probably identical with one with which we are familiar, and so an approach to the greater simplicity of our conception of force is gained. It is to be hoped that these important experiments will be continued and subjected to a thorough investigation, as, in my opinion, they are amongst the most important of modern times.

So far I have endeavoured to point out a few recent advances in the directions of applied and pure chemistry, and now I wish to consider the bearing of this part of my address on the object and state of our Association.

In the report recently laid before you it was stated that a society of a more purely scientific character had robbed us of some of our members. This is the case with reference to those who have a more direct interest in the applications of chemistry to some of our great manufacturing industries. But surely in these days in which science interpenetrates all branches of human industry, those, whose name of chemist is legally indefeasible, although the division of labour has narrowed the materials on which their attention is mainly concentrated to those which are used for medicinal purposes, should not be insensible to the importance of a knowledge of the chemical principles involved in the manufacture and compounding of those important substances with which they deal. If, thirty-five years ago, when no legislative authority compelled the pharmacist to have a knowledge of chemistry and allied sciences, such as he must now possess in order to take the title of chemist and druggist, men were found in this city who were impelled by the love of knowledge to found this Association, now the need must be greater for association with one another. The objects set out then were "the advancement of chemical and pharmaceutical science." Not content with merely making themselves acquainted with what other men had done, the founders of this Association laid down as their clearly defined aim, the adding of original matter to the sum of human knowledge. No one can look over the reports of the Association without seeing plentiful evidence that those objects have been kept in view, and carried out in an effectual manner. These memories of past labours should incite us to rivalry with our predecessors, and make us resolve that in our hands the Association shall suffer no deterioration.

The report goes on to say that the Council have had under consideration the admission of what are known as "trade questions" for discussion at our ordinary meetings. Here I may be allowed to make some personal allusions, as some years ago, when some members, myself among them, had a vision of a "Liverpool Chemical Society," to be developed by a more exclusive attention to purely scientific chemistry, not excluding scientific pharmacy, I did then take a very distinct position in opposition to the introduction of trade questions. Knowing what I did then you have elected me as your President now, and as I wish that there shall be no doubt as to my views, I trust you will excuse me if I fairly lay them before you. The dream of past years has faded; I recognize that the Liverpool Chemists' Association must now look to pharmacists, wholesale and retail, for its principal support, and that, in fact, it has reverted to the exact conditions which existed at its first formation. I hope that running my head against stone walls is not a weakness to which I am very liable, and in whatever way the best interests of the Association may now seem to lead, I shall be happy to go. The question is, what are trade questions? The business of a pharmacist, as distinguished from the profession of pharmacy, has now become of a rather miscellaneous character. In all but a few cases, and those confined to our large towns, necessity has compelled the pharmacist to deal in many things, not strictly, and sometimes not at all, of a medicinal character. With regard to these he must be considered as an ordinary trader, and so far as these are concerned must take his chance in the keen struggle which competition has produced. No question relating to these matters can be thought to have any relation to the objects of our Association. Then comes a debatable ground in which medicinal substances, in the preparation of which the pharmacist has no part, and the very composition of which he may not know, are included. The claim of the pharmacist to the exclusive right of dealing in these bodies is one which I fear the Government will be slow to acknowledge. I refrain from entering into the question of the relation of the Government to patent medicines, though it is one on which I have a strong opinion. I consider it as one within the province of this Association to discuss. One thing I do hold, that, as the only justification for governmental interference in any branch of industry is the prevention of injury to the subjects of that Government, it is for those who ask for such interference with regard to the sale of any article, to show that by making them responsible for injury done by careless or improper dealing, a safeguard against such injury will be provided. The point is, would they like to be so responsible for articles of the exact nature of which they are ignorant?

The case is different with the profession of pharmacy. The compounding and sale of legitimate medicines are matters which the Legislature has declared should be in the hands of properly qualified persons, and in these respects, I hold that Government should afford the most absolute protection to such persons. I would make no distinction between poisonous and non-poisonous substances. No such distinction can be made any more than, for example, between animal and vegetable life. The only line is that any drugs mentioned in the Pharmacopœia shall be sold, or any compound of them directed by a medical man shall be made up, only by a person possessing the qualifications which the Government has considered sufficient. This, I think, pharmacists have a right to ask, and more I do not think that they will get.

Then with regard to the relations of pharmacists to one another. I fear that I may not be quite in accord with the opinions of some of you when I say that I would deprecate attempts to make a trade union of this Association. You must give liberty to each one to carry on his business as seems best to himself. You cannot enforce uniformity of prices or times of closing, and all attempts to do either have, in my experience, whether among pharmacists or others, been utterly futile. Men will be found, who, under the pressure of pecuniary needs, will break any agreement, and it must be left for the slow advancement of public feeling, and the bold example of those who are strong enough, to bring about reform. Much may be done by private agreement; but after all, the service of the public will regulate the arrangements of those who live by it, and the higher education of the public will bring about a more thorough appreciation of the chemist's services and a more generous recognition of his claims. But for this the chemist must keep up a high standard. The more he becomes a mere trader the more he will be treated as such, whilst a men whose knowledge and skill have become known will be looked upon as one who must be judged by another rule. People do not object to pay a clever doctor a high fee, and if I may judge from my own experience, they are willing to pay something extra to a chemist of standing and ability. So I must urge the necessity of higher training for the chemist, more complete knowledge of all that relates to his calling, and of things that have any reference to it, that men may recognize in him something superior to a mere trader and feel that he is a member of the profession of medicine.

This may seem transcendental advice, too high and sublime for common things, and not fitted for the requirements of everyday life, but I may remind you that analytical chemists have very much the same difficulties to struggle with as their pharmaceutical brethren. We are not as yet afflicted by having analyses made at stores, but some of our branch of chemistry think that to offer to do analyses at half-a-crown is a shorter way to success than the acquirement of a thorough acquaintance with the science of chemistry and of everything which can be pressed into its service. I think differently, and have no desire for any outside aid, being satisfied to leave the issue to the decision of a public which is daily becoming more enlightened.

But to leave these matters of money and money-making, important as they are, because I do not think this Association can do much directly to affect them, I would rather rest my invitation to those outside to join us and to those who are members to take a more active part in its proceedings, on the ground of the pleasure which the acquisition of knowledge gives to its possessor, and on that of the duty of him who has to impart to others who have not. This is a giving which does not impoverish the giver, but, on the contrary, increases his store.

The increase of our knowledge, especially of those matters which come within our own department, is a duty which we owe to our higher nature. To starve the intellect for want of daily food is as suicidal to our best interests as to starve the body is for our natural body. Neither can thrive without constant supplies from without, and in each case suitability of food is as important as abundance. Each man knows his own need, and the aim of our Association is to provide such mental food as chemists require, in the first place. Still, variety is almost as important in mental food as in material, and we shall welcome occasional papers on subjects allied to, though not directly bearing on, our main object. We must never forget that we are an Association, and that we need the aid of all. I fear that some of our members neglect the assembling of themselves together, and make, as an excuse for non-attendance, that they can read the papers when they appear in the *Pharmaceutical Journal.* But this is not all the benefit that might be derived from them; the discussions often languish for want of members, and the reader is discouraged by the absence of sympathetic auditors.

Another reason why I hope that our numbers may increase is, that pharmaceutical education may be made a reality in Liverpool. I do not think Liverpool will have done its duty in this respect until it shall be possible for a student to qualify himself to pass the Minor examination without going to London. In many cases, pecuniary reasons render a prolonged residence in the metropolis an impossibility, and young men are forced into the crammer's arms. I commend to the members the attentive study of the address of Mr. Michael Foster at the late distribution of prizes. If his views are correct, more rigid regulations will naturally be instituted with regard to regular courses of instruction. It is no use to say that pharmacy will not be worth the trouble of all the study and labour. There must be pharmacists, and in these days when the question of "What must we do with our boys?" is so prominently brought before us, there will be candidates found for any and every means of getting a living. The matter for us to decide is, in what way can we aid in smoothing the way to the requisite knowledge by diminishing the expense and increasing the facilities for its acquirement? A School of Pharmacy of some kind has been on adjunct of the Association from its early days, and we must try to make it such a reality, that when attendance at regular courses of instruction becomes imperative, we may be able to point to our school as one worthy to be reckoned among those whose curriculum is as extensive as the requirements of the examination, and whose teachers will command the acceptance of the central authority. I may remind you that the Pharmaceutical Society has formulated its views on this point in a recommendation that candidates for the Minor examination shall have attended courses of lectures on chemistry, botany, and materia medica, and also a course of practical chemistry. Further, that the Council shall at its discretion recognize and accept certificates from certain public schools of science, and second, "other schools in which it shall have been proved to the satisfaction of the Council that the teaching is of sufficient excellence in kind, and of the scope indicated in the syllabuses."

Since writing the above, I find in the *Pharmaceutical Journal* of October 6, 1883, that the Council has taken a further step in the direction of carrying out its resolutions in favour of a definite curriculum of study by appointing a committee to frame bye-laws with reference to them.

Another reason why all our members should endeavour to induce others to join their ranks is that the efficiency of the library may be kept up and increased. We possess a library which contains many most valuable books on chemistry and botany, such as cannot be met with in any other lending library in town. Even the Free Public Library does not place before its readers many such works, and to the student it is most important that he should not be restricted to the study of such books of reference at one building in defined hours, but that he should be able to take them away with him to his home and there thoroughly make their contents his own. But of all books scientific works are soonest out of date, new editions should be got, and the possession of sufficient funds is all that your Council asks to keep the library up to the present position of science.

If we leave our own sphere and look at the world around us, the revision of the Pharmacopœia is one which has attracted much interest. Whether the pharmacists should be associated with medical men in the preparation of the new book, as is the case in America, is a question which it seems to me admits of only one answer. The President of the Pharmaceutical Society has expressed his opinion that that answer will be given, and that pharmacists will be represented. As an outsider I may be forgiven if I make one suggestion, namely, that as every student is expected to know his Pharmacopœia by heart, it will be well to remove all useless matter and to limit it to the absolutely needful. I mean that the preparation of such things as quinine, morphine, strychnine, etc., is not matter with which a pharmaceutical student will ever have to deal. These things cannot be made on the small scale, and it is hardly likely that the exact processes by which these bodies are commercially obtained in such beauty and purity will be revealed by their manufacturers. The student has quite enough to learn in regard to indispensable subjects, and a thorough knowledge of those things which he will have to deal with is far better than a partial acquaintance with those of which he will never think again when the examination is over.

I must now conclude this address with my most earnest appeal to all to do what in them lies to make this session a successful one, and this Association a real benefit to all in any way connected with it. Your Council will hail with gratitude any suggestions for its improvement, and what I can do shall be done. Remember what pharmacists have done in the past; in your ranks were Scheele and Pelletier, and now there are names which will be familiar to you as those of men who have shown that the highest attainments in science have not been antagonistic to the diligent and successful prosecution of their calling. Emulating their example, do not limit your ambition to the attainment of money, but resolve that your titles to respect shall include your reputation for knowledge, first of your own calling in all its aspects, scientific and practical, and then of whatsoever departments of the world of mind or matter you may have chosen for a bye-study, that so you may justify your claim to be considered members of a liberal profession, and enlarge your powers for usefulness and aid to your fellow-men.

Mr. A. H. Mason, in moving a vote of thanks to the President, expressed his appreciation of the views enunciated.

In this he was joined by Dr. C. Symes, who seconded the vote of thanks, and by Messrs. Woodcock, T. Fell Abraham and Conroy, who supported it cordially.

The motion was put to the meeting by the Vice-President; Mr. A. H. Mason, and carried by acclamation.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The first meeting of the sixth session was held in the Pharmaceutical Society's rooms, 119a, George Street, Edinburgh, on Wednesday evening, October 17, at 9.15, Mr. C. F. Henry, President of the Association, in the chair.

There was a large attendance of members and others, including Messrs. Ainslie, Nesbit and Stephenson, members of the Council of the North British Branch of the Pharmaceutical Society.

The minutes of the last meeting of the previous session and those of a special meeting held during the recess having been read and confirmed, the President then proceeded to deliver the Inaugural Address.

After some preliminary personal remarks, Mr. Henry proceeded to say that trade rather than scientific questions were at the present time prominent, and referred to the fact that at the last meeting of the British Pharmaceutical Conference, Professor Attfield had departed from the usual course and devoted the whole of his presidential address to the consideration of a political subject. Mr. Henry thought he could not do better than follow so worthy an example, and draw attention to that address and the criticisms it had evoked. He then proceeded to give an epitome of Professor Attfield's address, interspersed with a running commentary, and at the close raised the question as to who should be blamed for the condition of affairs disclosed in it. Excluding from blame the pharmacists and the State, he came to the conclusion that the whole blame lies with the public. He said, "the public demands cheap drugs and therein lies the reason why so many miscellaneous tradesmen deal in drugs. What the public demands, the public will always find some one ready to supply. If the public, or rather those members of the public who support the trade in these cheap drugs, would do justice to themselves and act as they ought to act by purchasing their drugs only from those qualified to determine their purity and value, there would be no necessity for any extension of the Pharmacy Act at all." In the actual state of affairs, however, Mr. Henry endorsed Professor Attfield's opinion as to the remedy to be found in securing further legislation and referring to the draft Pharmacy Bill, he said, "Great hopes were entertained of it, but, alas, these have been sadly disappointed, and unless next session it receives better treatment pharmacists will require to agitate for a change amongst some of the workmen and an introduction of new machinery into the Parliamentary mill. It is to be noted, however, that that Bill comes far short of the requirements of the case made out by Professor Attfield, and a new Bill embodying the provision that not only the sale of poisons, but of all drugs used internally, at any rate, shall be restricted to registered and qualified chemists," should be drawn up. In the meantime he thought that chemists themselves might do something by the establishment of committees to regulate the prices in different districts. This would, he believed, act in the interest of the public by tending to foster a competition as to quality rather than as to price. In conclusion, Mr. Henry passed in review the various criticisms upon Professor Attfield's address that have appeared in the public press.

Mr. W. S. Turnbull, Vice-President, moved a hearty vote of thanks to Mr. Henry for the manner in which he had addressed the Association, and hoped that the address would be fully considered and discussed by the members, not only at this, but at future meetings of the Association, as it was a subject in which they were all materially interested. Referring to the presence of the President, and other well-known members of the North British Branch, to whom they were greatly indebted for their kindness, he had much pleasure in calling upon them for a few words of counsel and advice.

Mr. Nesbit congratulated the Association on the very able address to which they had just listened. He was pleased to see that the members turned out in such large numbers, and hoped they would continue to do so during a session which promised to be one of great interest. He would not attempt to criticize the address. Professor Attfield had treated the subject in a manner which could not fail to exercise great influence. He referred to the position in which the pharmacist was placed in being compelled by Government to undergo examination and registration, and getting so little in return. He believed that the duty of the pharmacist at the present time was to try to show the public what was its real interest in the matter.

Mr. Ainslie expressed his pleasure at being present at such a large and successful meeting. He believed that by taking advantage of this Association, assistants and apprentices would derive great benefit. He was glad to see from the syllabus that papers of so much interest were promised, and those who entered heartily into the work could not fail to find that they had greatly improved themselves by the end of the session. He could assure them of his deep interest in the Association and wished them every prosperity.

Mr. J. B. Stephenson said that this was not the first time that he had attended the meetings of the Association; he had been a frequent visitor and he knew that they were having much success and doing good work. He could assure them that anything he could do to further its interests he would do with the greatest pleasure. It was a happy thought on the part of Mr. Henry to choose Professor Attfield's address as the groundwork of his paper. He had had the pleasure of listening to the address at Southport, and much that he had heard that night had tended to revive and quicken many deep impressions which it had made.

Mr. Henry proposed that a hearty vote of thanks be given to those members of the North British Branch who had favoured the Association with their presence.

Mr. Hills seconded the motion. In speaking of the position of a pharmacist, he said it was not generally understood what a profession really meant; every calling was a profession, but what the chemist claimed was, that he had undergone a scientific training which entitled him to rank among the learned professions.

The discussion was continued by Messrs. Dunlop, Low, McEwan and Simpson.

The vote of thanks was passed unanimously.

The President having made some remarks regarding the subject of the papers promised during the session and intimated that the next meeting would be held on November 7, the meeting adjourned.

ABERDEEN CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The inaugural address of the ensuing session of this Association was delivered on Friday, October 19, by the President, Mr. Patrick C. Smith.

The subject treated of was "The Present of Pharmacy: What it teaches of its Future." The lecturer expressed his opinion that pharmacy was at present in a state of transition, and that at no distant date it will take a very different position from the one it now occupies.

At the close a vote of thanks was accorded to the lecturer.

The office-bearers for the session are:—President, Mr. Patrick C. Smith; Vice-President, Mr. J. C. Kidd; Secretary, Mr. G. D. Bowie; Treasurer, Mr. W. C. Angus; Members of Committee, Messrs. Anderson, Craig, Mathieson, McKenzie, Moir, Paterson, and J. Smith.

The syllabus for the session includes a variety of interesting items, including a lecture from Professor Brazier, of Aberdeen University.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Continued from page* 339.)

The next paper was on—

Note on the Processes of the British and United States Pharmacopœias for the Determination of Hydrocyanic Acid.

BY LOUIS SIEBOLD.

The members of this Conference will be aware that the two processes to which the title of this paper refers differ in two essential points. In the first place, the conversion of the acid into a cyanide is effected in the B.P. process by means of sodium hydrate, while the United States Pharmacopœia directs magnesia suspended in water to be used for the same purpose. The second and chief point of difference consists in the manner in which the decinormal solution of silver nitrate is applied. According to the B.P., this solution is to be added until a permanent precipitate of silver cyanide just begins to form, or in other words until the whole of the sodium cyanide has been converted into the soluble double salt $NaAgCy_2$. The process of the United States Pharmacopœia does not stop at this point, but directs the addition of the silver nitrate solution to be continued until the soluble double cyanide (in this case $MgAg_2Cy_4$) is again completely decomposed, or until the whole of the cyanogen present has been precipitated as silver cyanide. As this process is conducted in the presence of a small quantity of neutral potassium chromate, the end of the reaction is distinctly indicated by a red coloration due to the formation of silver chromate. A mere glance at the equations illustrating this process suffices to show that it requires exactly twice the volume of silver nitrate solution required by that of the British Pharmacopœia; but, strange to say, this fact seems to have been overlooked by the compilers of the United States Pharmacopœia. This serious error in its statement of the volume of silver solution required for a given weight of the acid to be tested has been already pointed out by Mr. R. A. Cripps, in a paper read before the School of Pharmacy Students' Association; and I can, therefore, at once pass on to the main object of this note, viz., the discussion of the question whether this process is in itself a good one, and whether or not it compares favourably with that of the British Pharmacopœia. Mr. Cripps, in the paper alluded to, speaks of it as less satisfactory; but gives no reason for his unfavourable opinion, except the fact that the process requires a larger quantity of silver solution. But this feature seems to me an advantage rather than otherwise, for the larger the volume of a test solution required for the analysis of the same weight of substance, the greater must be the accuracy in the result, provided the method itself is free from inherent defects and is not inferior in the delicacy of its reactions. I have therefore tested this method for its accuracy and can report to this meeting that, if properly conducted, it is thoroughly reliable, and certainly in nowise inferior to the process commonly used in this country. Indeed, in the hands of inexperienced manipulators, it appears to me the preferable one of the two. It does, however, require certain precautions, to which I desire to draw attention.

(1) Care must be taken that a sufficient amount of magnesia be used, for otherwise the results will be too low and entirely untrustworthy. The cause of the inaccuracy in this case is the same as that which renders the British official process fallacious in the presence of an insufficient amount of soda, as pointed out in my paper read before the Conference meeting at London ('Year-Book of Pharmacy,' 1874, p. 565). An excess of magnesia, however, is less injurious than an excess of soda in the other method and does not appreciably affect the accuracy of the result.

(2) The magnesia used must be free from chlorides, and the hydrocyanic acid free from hydrochloric acid; otherwise the results will be too high. Both should, therefore, be tested for these impurities. It will be remembered that hydrochloric or other mineral acids are sometimes added to hydrocyanic acid with the idea of increasing the stability of the latter. The simplest mode of detecting such an admixture would be to boil some of the hydrocyanic acid for some time until this volatile acid is completely expelled and then to test with silver nitrate.

If these precautions be duly observed, the results of the process are all that can be desired.

At the conclusion of the paper,

Mr. Siebold added—In a paper on the estimation of hydrocyanic acid by Liebig's method, read at the Dublin meeting of the Conference, I pointed out that the same process might be advantageously employed for alkalimetric purposes, inasmuch as the volume of silver nitrate solution used in the titration indicates the proportion of alkaline cyanide present, but not a particle of any free hydrocyanic acid that may occur in the solution in consequence of the use of an insufficient amount of alkali. In the presence of such an excess of hydrocyanic acid, only the portion actually combined with alkali is indicated, and hence the proportion of alkali which has entered into combination with the acid may be as readily calculated from the volume of the silver solution required as that of the cyanogen. In the paper alluded to I explained the various advantages of this process over the usual methods of alkalimetry, and showed that alkaline carbonates can thus be accurately determined at an ordinary temperature with the same ease and precision as caustic alkalies. It is a noteworthy fact that, whereas, hydrocyanic acid is incapable of decomposing alkaline carbonates, the decomposition is brought about in a most complete manner and without the aid of heat in the presence of silver nitrate, owing to the great tendency of hydrocyanic acid to form soluble and perfectly neutral double cyanides of silver and alkalies. While engaged in my recent experiments with the United States Pharmacopœia process for determining the strength of hydrocyanic acid, the use of magnesia in the place of soda, as directed in that process, suggested to me the probability that even the carbonates of the alkaline earths may be decomposed by hydrocyanic acid in the presence of nitrate of silver, and that this titration might perhaps also with advantage be extended to their determination. Experiments in this direction are now in progress, and the results will be communicated in due course.

The President said, considering the importance of hydrocyanic acid as a remedy, and its highly poisonous character, every contribution to existing knowledge respecting tests for this substance must be welcome, and the Conference would, therefore, appreciate Mr. Siebold's work in that direction. Mr. Cripps had stated that it was only his impression that the one process for estimating the strength of hydrocyanic acid was preferable to the other, and that he intended to continue his work. He had no doubt he would do so, unless he saw that the matter was already in excellent hands. He was very glad to know that Mr. Siebold was carrying on his researches into these reactions in the direction he had indicated, and the result of those researches, whatever it might be, would be most welcome.

A vote of thanks was passed to the author.

Mr. John Williams said he had for a great many years paid some attention to this question of hydrocyanic acid testing, and had always looked upon it that Liebig's test, at present recognized by the British Pharmacopœia, was a very great advance over any previous test, because neither hydrochloric acid nor any other mineral acid interfered with it. He considered that the process now given in the American Pharmacopœia, in which magnesia was used, was a distinct retrogression, going back to the days before Liebig's genius had discovered the beautiful test which had been applied so successfully to hydrocyanic acid. The truth was that the hydrocyanic acid of commerce always did and must contain a preservative of some kind, and that preservative was generally hydrochloric acid. If prepared without that it would change so rapidly and continuously that it would never be reliable after being kept for a very short time. The cause was easily explained: there was ammonia in the atmosphere and alkali in the glass of the bottle, and any alkaline condition whatever rapidly caused this change and the destruction of the hydrocyanic acid; therefore, the addition of a small quantity of a mineral acid ought not to be looked upon as in any way an adulteration, but simply as a preservative, and as such it was most valuable; but it was most important that there should be a test by which the hydrocyanic acid itself and its strength could be determined without reference to this mineral acid put in as a preservative. That was done in the present B.P. process, and would not be done by the new American test. Therefore, he entirely contended against the adoption of the American test in preference to that now used. It might be contended that hydrochloric acid ought not to be put into hydrocyanic acid; but that was another question altogether, and his experience was that it was necessary to add either that or glycerine, or some other substance to act as a preservative.

Mr. Dott thought it was unnecessary to boil off the hydrocyanic acid in order to test for hydrochloric, because cyanide of silver was soluble in nitric acid, whilst chloride was not.

Mr. Naylor had always felt extremely nervous in using Liebig's method for the determination of hydrocyanic acid, and for the last two or three years had entirely abandoned the method for the one suggested by Dr. Hannay. In that process mercuric chloride was used, the only objection to which was the instability of the volumetric solution of mercuric chloride.

Mr. SCHACHT said he had hoped to hear further explained the exact reason why Mr. Cripps found the United States Pharmacopœia process objectionable, and that the reason would have been the comparative difficulty of determining the moment at which the chromate of silver began to fall. His own experience he did not profess to be equal to that of the scientific chemists around him, but was merely that of a pharmacist who systematically endeavoured, before allowing his dispensing bottle to be filled with dilute hydrocyanic acid, to be quite sure it was of the proper strength, but so far as he had tried it he had been perfectly satisfied with the British Pharmacopœia process. The smallest particle of a drop of the nitrate of silver solution would certainly show the moment at which the operation must cease, and the most delicate determination of the strength of the solution was in that way easily arrived at. On the other hand, when he had attempted to estimate with chromate he had found that that exact particle of a drop in the experiment he could not arrive at nearly so easily. The first deposit of chromate of silver he generally found required a little time. He would not say the process was not accurate, but it was certainly not so instantaneous. He had always to give a little repose to the solution before the first evidence of the chromate of silver appeared, so that in his hands the process never arrived at that beautiful delicacy which was obtained by the British Pharmacopœia process.

The PRESIDENT asked Mr. Schacht if he had found it necessary not only to render the mixture alkaline, but to maintain its alkalinity.

Mr. SCHACHT said he had observed that point most carefully since attention was directed to it by Mr. Siebold, who pointed out that it should be just in excess of the quantity which was ultimately found necessary to convert the whole hydrocyanic acid into alkaline cyanide.

Mr. TANNER said he could corroborate what Mr. Schacht had stated with regard to the difficulty of determining the end of the reaction when chromate of potassium was used. It appeared to him absolutely necessary that a considerable time should be allowed to satisfy oneself that the reaction was perfect; not so with regard to Liebig's process. The determination there was sharp and decided, and there was no doubt left in the mind of the operator when the end of the process was arrived at. It was very necessary to take the precaution that the solution should remain alkaline, but it was also necessary that it should not contain too great an excess of alkali.

Mr. A. C. ABRAHAM said, some few years ago a paper appeared in the *Pharmaceutical Journal*, in which it was stated that the quantity of alkali was of great importance. Liquor sodæ was a cheap thing, and there was no fear of not using enough if they knew it was necessary; but if one got false results by using too much it was of great importance. The next time, therefore, he had occasion to test this preparation he made several experiments; he used 10 cubic centimetres of hydrochloric acid, 10 cubic centimetres of liquor sodæ, and got a certain result; then he used double and treble the quantity of liquor sodæ, and the results were practically absolutely identical, showing that there was no fear of getting false results by using anything like moderate excess. Ten cubic centimetres were considerably more than was required, but that was the quantity he used to the best of his recollection. One objection to the Pharmacopœia process had not been alluded to, which was common to all the volumetric tests of the Pharmacopœia; the quantities used were directed to be taken by weight, and those quantities were inconvenient. It would be much more convenient if the direction was to take, say 10 cubic centimetres of a liquid requiring so many cubic centimetres of a volumetric solution, and would save an immense amount of trouble. He had calculated out the quantities in this way for the Pharmacopœia estimations, and found it amply repaid him for the trouble.

Mr. WHITLEY WILLIAMS said, in making titrations with a nitrate of silver solution in which chromate of potassium was used as the indicator, he had usually found that the degree of neutralization of the fluid mattered very little if the alkali present happened to be bicarbonate. The ordinary alkaline bicarbonate of soda or potash might be in any reasonable excess whatever, in fact in excess far beyond what any one would think of using, without danger. He thought the use of magnesia in the American process was quite a chimerical advantage.

Dr. SYMES thought there was some little contradiction between the statement of Mr. Tanner that an excess of alkali was prejudicial to the result, and that just made by Mr. Abraham, but he thought Mr. Abraham must have started with a large excess, and having done so his results would probably correspond when he had a little larger excess. If he had prepared it with the bare quantity necessary, and then with the soda in very large excess, he was inclined to think the results would be different.

Mr. A. C. ABRAHAM said he had used smaller quantities, but still the results were the same.

Mr. SIEBOLD said he perfectly agreed with Mr. Williams in everything he had said; and if that gentleman's remarks seemed to contradict some of the statements in his (Mr. Siebold's) paper, such contradiction was only an apparent and not a real one. He did not wish by anything he had said to replace the B.P. process by that of the United States Pharmacopœia; he had simply tested the relative accuracy of the two methods and had arrived at the conclusion that, if the precautions he had named were properly observed, the results of the U.S.P. process were at least as accurate and trustworthy as that of the British Pharmacopœia. It was certainly an advantage in the latter that the presence of chlorides did not interfere; but on the other hand the larger volume of silver solution and the use of magnesia in the place of soda might fairly be considered as compensating advantages. How greatly the use of an insufficient proportion of soda impaired the result he had amply shown in a previous paper, as well as the extent of the inaccuracy brought about by an undue excess of alkali. Having the injurious effect due to both causes in his mind, Mr. Naylor said he had always used the B.P. process with a certain amount of nervousness; but he (Mr. Siebold) did not think there was any real cause for that, since mere testing with litmus paper at the end of the titration would at once settle the question whether or not an insufficient amount of alkali had been used, and as regards an excess of the latter, the inaccuracy of the result due to this cause was so trifling that, for all practical purposes, it might be ignored, unless the excess of the alkali used was unreasonably large. The use of magnesia, however, in the place of soda, as directed in the American process, would entirely remove this last-named source of error. Mr. Dott remarked that it was unnecessary to boil off the hydrocyanic acid in order to test this acid for hydrochloric acid, as the silver precipitates of the two acids behaved differently towards nitric acid. But as silver cyanide was only soluble in strong boiling and not at all in cold dilute nitric acid, he (Mr. Siebold) did not consider this difference as affording a satisfactory means of detecting hydrochloric in hydrocyanic acid. The difficulty of observing the first change from yellow to red, which Mr. Schacht had experienced in titrations with silver nitrate where potassium chromate was used as an indicator, had never given him any trouble; but he knew of others who had the same difficulty. This might be accounted for by the difference in the degree of sensibility towards slight colour changes in the eyes of different observers.

Mr. A. C. ABRAHAM asked whether cyanide and other impurities were not liable to be found in commercial soda, which might have produced the discrepancy some people noticed.

Mr. SIEBOLD said he had performed all his experiments with pure sodium hydrate and did not know to what extent commercial caustic soda might be contaminated with cyanide, the presence of which would certainly impair the result.

A paper was then read entitled—

Iodine in Cod Liver Oil.

BY EDWARD C. C. STANFORD, F.C.S.

"It is proposed to verify the statement in Garrod's 'Materia Medica' that cod liver oil contains 0·06 per cent. of iodine." See "Blue List."

If this statement were true cod liver oil would be one of the richest sources of iodine with which we are acquainted. At present the marine algæ form the only commercial European source of iodine. The largest quantity of iodine found in the deep sea tangle or stems of *Laminaria digitata* amounts in the fresh plants to about 0·1 per cent. The quantity obtained when this plant is burned into kelp seldom reaches 0·05 per cent. The average yield from laminaria drift on the large scale is 0·025 per cent., but many thousands of tons of seaweed have been made into kelp and worked for iodine, which have not yielded more than 0·005 per cent., and some even less than this, so that we have to deal on the large scale with a material, and constantly to test samples, containing very small percentages of iodine. I mention this in connection with the process daily employed for many years in estimating small amounts of iodine in our laboratory, and which has also been employed in obtaining the results from cod liver oil to be published in this paper.

Much difference of opinion has arisen amongst former observers with regard to iodine in cod liver oil, and the statements of results are extremely conflicting, some chemists having failed to find iodine at all, others only in some specimens of this oil. Other chemists again have estimated the proportion of iodine as much higher than the quantity above indicated; and it has been assumed that this element represents an important factor in its medicinal value.

In a well known work on materia medica the editors remark that the state of combination in cod liver oil "may, perhaps, tend to develop a peculiar action of iodine and bromine, and endow them with an efficacy not otherwise attainable."

The following results have been published at various times by the authorities quoted:—

	Iodine per cent.
Dorvault found in cod liver oil . . .	0·150
Kaie found in cod liver oil	0·180
Joseph found nearly ½ per cent. . . .	0·487
Machenroden found	0·162 to 0·324
Grager found in light brown oil . . .	0·0846
Dr. de Jongh found in pale oil . . .	0·0374
„ „ pale brown . . .	0·0406
„ „ brown	0·0295

All these are extremely high and improbable.

Mr. Mitchell Bird (*Pharm. Journ.*, [2], i., p. 546) gives results of analyses of six varieties of cod liver oil, which are much nearer what I believe to be the truth. The method and the results differ considerably from mine, although we are both agreed in the fact that we have found iodine in all the specimens examined.

The percentage results are as follows, the iodine being calculated as potassium iodide:—

	As KI		As Iodine.
1. Cod liver oil, Norway . .	·0021		
2. Cod liver oil, Norway . .	·0018	average	
3. Cod liver oil, Norway . .	·0016	·001775	·001355
4. Cod liver oil, Norway . .	·0016		
5. Cod liver oil, Newfoundland	·0012	average.	
6. Cod liver oil, Newfoundland	·0014	·0013	·000993

He used 5000 grs. of the oil for each experiment and saponified with alcoholic solution of caustic potash, burned the soap formed and dissolved out the salts; after saturating the solution with sulphuric acid and separating the potassium sulphate deposited, he employed the starch test, setting free the iodine with nitrite of potassium and sulphuric acid, and comparing the colour with standard solutions of potassium iodide. My method is different; it is a delicate process of very general application and one that I adopted some years ago, having discarded all others in its favour. I will describe it here as applied to kelp, one of the most troublesome and various of all commercial substances to sample and test.

To insure an accurate sample about 100 lbs. are carefully picked from a cargo of say 100 tons, and ground up. Of this 100 grains are taken to estimate the moisture, and another 100 grains to estimate the soluble matter, the potash and the iodine. The kelp is treated with about 4 ounces of hot water, which dissolves little or none of the oxysulphides; this operation is repeated, the residue washed, and the solution made up to 5000 grains measure. Of this one-tenth part or 500 grains measure, equal to 10 grains of kelp, is taken for estimating the iodine, so that we never operate on more than one-tenth of a grain of iodine, generally one-twentieth, often one-hundredth. In fact, if the amount present exceeds one-tenth of a grain, we always dilute the solution. One hundred grains measure of bisulphide of carbon are added, and a few drops (1 to 3) of nitrosulphuric acid* dropped in. The testings are performed in large even tubes and compared with graduated standard solutions of potassium iodide treated in the same manner. By this method $\frac{1}{2500000}$th part is easily detected and measured, and up to $\frac{1}{1000000}$th part the estimation is very accurate. If the iodine in a seaweed or other organic substance is to be determined, it is carbonized in a small iron retort or crucible, and the charcoal treated in the same way. Burning to ash, however carefully done, involves a considerable loss of iodine, more than is generally supposed. For instance, a sample of seaweed ash exposed for twenty-four hours in an open crucible over an ordinary Bunsen burner will not retain a trace of iodine at the end of that time. We invariably carbonize the material in preference to burning to ash, in order to retain all the iodine and to easily extract the salts. Some of these specimens are extremely difficult, indeed, almost impossible, to burn to complete ash, on account of the large proportion of fusible salts present. In estimating the small quantities of iodine necessary in our analyses we are really limited to colour tests. I have long discarded starch, as it introduces an organic substance very liable to change, and in many circumstances unreliable. Moreover, in my hands it is not so sensitive as that with bisulphide of carbon. The solution is not perfectly transparent, and the indications not so sharp. The colour is spread over the whole liquid, and when dilute can only be seen by looking down the length of the tube, whereas in the bisulphide of carbon test it is removed out of the solution and concentrated in a sixth of the volume at the bottom of the tube. The comparison of the two methods is very marked. In testing a solution of potassium iodide containing only $\frac{1}{2500000}$th part of iodine, the maximum effect is immediate, and another advantage is that the iodine can be easily separated from its solution in bisulphide of carbon. We usually recover the latter by treating it with zinc in the presence of water. The specimens of cod liver oil experimented on, for which I am indebted to our mutual friend and former President, Mr. Reynolds, were taken in quantities of 5000 grains each, saponified with 1000 grains of caustic soda, pure and free from iodine, then carbonized in a large porcelain crucible; the resulting charcoal was treated with hot water and made up to 5000 grains measure. One-tenth of this or 500 grains was found quite sufficient to detect the presence of iodine and to estimate it. Three experiments were made, taking 500 grains, 2500 grains and 1000 grains respectively, with pretty concordant results. The mean results are appended.

In the first experiment the solution was tested at once in the manner indicated. In the second the solution

* The nitrosulphuric acid is made by treating starch with nitric acid, and passing the nitrous fumes into sulphuric acid, 1·843 sp. gr. to saturation. The mixture keeps very well.

was neutralized with hydrochloric acid in the presence of the carbon bisulphide, no iodine was eliminated until the nitrosulphuric acid was added. In the third the solution was neutralized with hydrochloric acid before the addition of the test solutions. Little difference was noticed. The following six specimens were selected:—

No. 1. Cod liver oil, pale.
No. 2. Cod liver oil, Norway.
No. 3. Cod liver oil, manufactured by Carr and Sons, Berwick-on-Tweed.
No. 4. Cod liver oil, English.
No. 5. Cod liver oil, Newfoundland.
No. 6. Light brown cod liver oil.

The mean proportions of iodine found were per cent.—

No. 1.	0·000410	Mean percentage of iodine. 0·000322.
No. 2.	0·000434	
No. 3.	0·000276	
No. 4.	0·000138	
No. 5.	0·000315	
No. 6.	0·000360	

I also estimated the iodine in fresh cod liver; the fishmonger informed me that it is not yet in season, but the result is here appended. Five thousand grains were treated in the same manner as the oil. Having stated on a former occasion (B. Pharm. Conference, Liverpool) that the oil vomited by the fulmar (*Fulmaris glacialis*)* of St. Kilda, and which, though obtained from a bird, has the reactions of a fish liver oil, contains iodine, I have also estimated this amount. Five thousand grains were treated in the same way as the cod liver oil.

Cod liver oil dragées are stated to be made of cod liver from which the oil has been removed; an analysis of these is also appended. One thousand grains or 173 of the dragées were employed saponified and with 200 grains of caustic soda. These are extremely rich in iodine, and would form a valuable source of that element if they can be procured cheap enough to contend with the present low prices. I notice, however, that a box of 250 dragées sells at 5*s*., and is considered (by the maker) to be equal to 6 pints of oil, so that the quantity employed would be equal to 83 ounces or 36,312 grains, or about seven times the quantity of oil used in the other experiments. It contains one hundred and eighty seven times the proportion of iodine.

	Per cent.
Fulmar oil contains iodine	0·000095
Cod liver fresh contains iodine . .	0·000817
Cod liver oil dragées contain iodine .	0·056366†

It will be noticed that the fresh cod liver contains more than double as much iodine as the mean percentage in the oil. Mr. Gate has kindly sent me an estimate of the yield from his experience of ten years' average of oil from cod liver; it is about 45 per cent., taking the best time, December. The inference is that the liver without the oil would contain a much higher percentage of iodine, as shown indeed in the dry dragées. And I shall not be surprised to find as much in the fish. This point is under investigation.

Scotch herring has been said by "Jonas" to contain iodine, and this is also under investigation.

This morning I have received the results of the analysis of fresh cod, herring, and herring brine.

5000 grains of fresh cod were treated with .	500 grains caustic soda.
‡5000 grains of salt herrings were treated with	" "
‡5000 grains of herring brine were treated with	" "

Fresh cod fish contained ·00016 per cent. iodine dry = ·000829.
Scotch herring salted contained ·00065 per cent. iodine.
" brine " ·00012 " "
The cod fish contained 80·7 per cent. water.

In the fresh cod fish the analyst for the first time in these experiments was troubled with a large quantity of sulphides, and in this case only was not satisfied with the indication from 500 grains measure, and was obliged to use the larger quantity.

It will be seen that the herring contains four times the amount of iodine contained in the cod fish, and more than in any of the samples of cod liver oil; if, therefore, the iodine be the medicinal element, you should recommend Scotch herring salted; it is very cheap at present.

I find the subject becoming interesting, and, indeed, alarming to the iodine maker, and intend examining other varieties of fresh fish, for I expect to find iodine in all, and, if so, every man who eats fish will become his own iodine eliminator. Specimens of true genuine unmixed whale, seal, and bottlenose oil have been sent me by my friend, Captain John Gray, a celebrated Peterhead whaler, to whom the Arctic regions are a kind of "Winter Garden," and these are under examination, but I cannot yet report the results.

Since the publication of the paper, the following results have been obtained, the respective oils having been treated in the same manner as the cod liver oil:—

	Per cent.
Whale oil, cold drawn, contains iodine	·00001
Bottle-nose " "	·00010
Seal " "	·00005

The PRESIDENT, in proposing a vote of thanks to Mr. Stanford, said it was very satisfactory that so great an authority on iodine should have attacked this subject, and handled it so thoroughly.

The vote of thanks was passed unanimously.

Mr. EKIN did not think the experiments Mr. Stanford referred to were necessarily antagonistic to the results of his experience with regard to the delicacy of the starch test, the conditions being so distinctly modified that they would more than account for any difference in result. It would be remembered that his experiments were directed to the detection of very minute quantities of nitrites in potable water, and the reverse conditions under which Mr. Stanford searched for iodine were very different. He (Mr. Ekin) found time an important element in the delicacy of the test.

Mr. STANFORD said he had no doubt that testing for nitrites with iodide of starch was an extremely delicate indication, but that was not so with the solutions he had to do with, the solutions for cod-liver oil being not unlike those ordinarily dealt with. No doubt in iodide of starch it was necessary to give some time, whereas in his experiments the results were immediate—in fact, they were rather tied up to immediate results.

A paper was next read on—

THE TREES YIELDING BENZOIN.

BY E. M. HOLMES, F.L.S.

The benzoin which enters into English commerce includes four varieties, named respectively Sumatra, Palembang, Penang and Siam benzoin. These exhibit certain characteristic appearances by which they are easily recognized, and three of them, namely, Sumatra, Penang and Siam benzoin, are probably derived from three distinct plants. The botanical source of Sumatra benzoin was determined by Dryander, and an account and figure of the plant were published by him in the *Philosophical Transactions*, for the year 1787, lxxvii., p. 303, but the trees which yield the other varieties have as yet never been identified with certainty. The Penang benzoin is similar in appearance to the Sumatra kind, but it has an odour which is quite distinct and resembles

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* *Pharmaceutical Journal*, Nov. 1870.

† In the published analysis of these by Professor Garreau the iodine is estimated at 0·154 per cent., *i.e.*, richer than any other known organic substance.

‡ Two determinations were made, one with 500 grains and another with 4500 grains, and the mean taken.

that of storax. It is in all probability not produced by *Styrax benzoin*; but we have as yet no accurate information concerning the botanical source of Penang benzoin. The authors of 'Pharmacographia' point out that it may perhaps be the produce of *Styrax subdenticulata*, Miq., since this tree, which occurs in West Sumatra, has the same name, "Kajoe Kéminjan," as *S. benzoin*, and Miquel remarks of it *an etiam benzoiferum*? That these two species should receive the same native name in Sumatra is not surprising since the leaves are very similar in shape and appearance and the fruit of *S. subdenticulata* apparently only differs from that of *S. benzoin* in being obovate instead of globular and depressed.

Palembang benzoin resembles the Sumatra sort in odour and differs from it chiefly in its much greater transparency and in yielding, as I am informed, a larger percentage of benzoic acid. It frequently contains moisture and if recently imported specimens are placed in a bottle they soon become mouldy. Concerning the tree which yields Siam benzoin, nothing definite has hitherto been ascertained, although as long ago as 1859, Mr. D. Hanbury wrote to Sir R. H. Schomburgh, asking him to investigate the origin of the resin, and to find out whether the tree which yielded it was really *Styrax benzoin*. Nor have subsequent inquiries been more successful. The only account extant of the mode of collection of Siam benzoin is that given by Sir R. H. Schomburgh, who was British Consul for some years at Bangkok. He, however, never visited the region producing benzoin and could therefore only give information at second-hand. He represents that the bark is gashed all over and that the resin which exudes collects and hardens between it and the wood, the former of which is then stripped off. The authors of 'Pharmacographia,' remark that it is evident that all Siam benzoin is not thus obtained. Schomburgh adds that the resin is much injured and broken during its conveyance in small baskets on bullocks' heads to the navigable parts of the Menam river, whence it is brought down to Bangkok.

The state of our knowledge of Siam benzoin being thus imperfect, it occurred to me to write to Mr. R. Jamie, of Singapore, to ask him for information on the subject. This gentleman takes great interest in all that relates to pharmacy, and has, I believe, been a liberal contributor to the Museum of the North British Branch. A few weeks ago I received from him a box of specimens for the Museum of the Pharmaceutical Society, containing amongst other interesting and valuable donations some sections of the trunk of the Siam benzoin tree, and herbarium specimens of the leaves, but unfortunately neither flowers nor fruit; also specimens of the Sumatra benzoin tree with leaves, flowers and fruit. In addition to these specimens he has contributed some interesting information, which I have taken this early opportunity of laying befere you. With regard to the Siam benzoin plants Mr. Jamie writes:—

"My friend, Captain Hicks, of Bangkok, kindly procured them after very great difficulty from his friend living in the district where the gum benzoin trees are found, and he writes as follows:—'According to your request I had fifteen gum benjamin plants brought over from Suang Rabang, one of the northern Laos states tributary to the King of Siam, but after a deal of shifting and removing baggage on bullocks, twelve of them withered up; however, I have succeeded in getting three of them brought to Chung-mai; these I now send you. The one in the flower pot seems to be thriving remarkably well, but the other two in bamboo joints I have my doubts about. I also send you some sections of wood with the bark attached, and here and there you will find the gum sticking on the wounds and incisions made by the natives. The flowers, I am sorry to say, I could not get, as the trees have already flowered. From reliable information the tree is indigenous in all the northern Laos states, but grows luxuriantly in Suang Rabang and all along the belt of mountains in this province.'

"In the months of April and May the leaves begin to wither and fall off, and the natives then make incisions in the bark, and after a short time a lot of milky substance exudes and soon hardens; the gum then dries on the incisions and falls to the ground, which is swept daily and watched so that no earthy matter gets mixed up with it.

"The tree attains from 3 to 6 feet in circumference, and has a long trunk throwing out branches on the top; after six years' growth it can be bled. The flowers are attached to the small branches close to the leaves and begin to flower in June. The tree throws out shoots from the roots, and can be propagated by cuttings. The natives also say that after the flowers fall off, in a short time a lot of young plants spring up.* The gum is a considerable article of traffic, in fact a monopoly, fetching a good price in the Bangkok market. It is used generally for fumigating sick rooms and making scented water. Large quantities generally find their way to Bangkok, being brought overland on oxen to Sawaryaloke, Pitchai, and other Siamese provinces, and are exported to Europe by several mercantile firms."

Of the three young plants above mentioned, one was given by Mr. Jamie to the Curator of the Singapore Botanical Gardens to forward to Kew, a second was planted in Mr. Jamie's own garden, and the third died.

The twig which I now exhibit was taken by Mr. Jamie from the young plant in his garden. The specimen sent to Kew is still living and seemed to be in a healthy state when I saw it a fortnight since. Judging from the appearance of the plant at Kew and from the leaves sent by Mr. Jamie, the Siamese benzoin tree is probably a distinct species, although nearly allied to *S. benzoin*, Dry. The leaves are rather thinner, the lateral veins are fewer in number and the veinlets more prominent beneath, but it is necessary to wait until flowers and fruit are obtained before the exact species to which it belongs can be ascertained. Mr. Jamie has now the two growing together in his garden, and remarks in his letter, "Judging from what I have seen of the two kinds growing together, they are different."

I have compared the specimens of the Styrax benzoin tree from Mr. Jamie's garden, with Dryander's original specimen in the British Museum, and they correspond exactly.

Concerning this tree Mr. Jamie writes:—"The Singapore grown tree is thought to be from Palembang,† it is about 30 feet in height, and the branches are all at the top. The circumference of the trunk is from 14 to 16 inches. It flowers in March and the fruit does not take long to mature, then it falls off, producing seedlings in abundance at the foot of the tree. How old this tree may be is rather difficult to determine, but it must be over thirty years at the least."

The tolerable certainty that in a short time flowers and fruit of the Siam benzoin tree will be obtainable, and that the source of the drug can then be definitely set at rest, must be my excuse for bringing incomplete information before you. I need none for bringing the admirable specimens presented by Mr. Jamie under your notice.

The President, in moving a vote of thanks to Mr. Holmes, said the Conference ought also to thank Mr. Jamie for the specimen which had enabled Mr. Holmes to contribute his paper.

The President drew attention to a curious specimen of adulteration of beeswax, in which a coating of good wax had been apparently cast round a core of inferior quality.

The Conference then adjourned for luncheon.

* This evidently means that the seeds quickly germinate, as is the case with those of the Sumatra benzoin tree.

† If so, then, it supports my supposition that Palembang and Sumatra benzoin are produced by the same tree.

On resuming, the following two papers were read—

SESAME OIL: REPORT ON ITS SUITABILITY FOR PHARMACEUTICAL PURPOSES.

BY MICHAEL CONROY, F.C.S.

This is one of the subjects suggested by the Executive Committee of the Conference for investigation, and a reference is given in the "Blue List" to Flückiger and Hanbury's 'Pharmacographia,' wherein we find it stated that "good sesame oil might be employed without disadvantage for all purposes for which olive oil is used;" and a footnote in the same work further states that "for pharmaceutical uses, the larger proportion of olein and consequent lesser tendency to solidify should be remembered." These recommendations, coupled with the fact that it is one of the least alterable of the fixed oils, being much superior to olive in this respect, seemed to me to entitle the subject to further consideration, and the trouble of a few experiments with the view of solving the question.

The chief point to be observed in experimental work is to ascertain that the article operated upon is genuine; and with this in view the sesame oil used in these experiments was obtained from a reliable source, and it was further carefully examined by the usual tests for impurities. It was a pale, yellowish-coloured oil of sp. gr. ·921, possessing a bland, sweet, nut-like taste, with neutral reaction. Concentrated sulphuric acid converted it into a deep brownish-red jelly. The addition of 2 per cent. of a cooled mixture, in equal parts, of strong nitric and sulphuric acids caused it to acquire a deep green colour, rapidly changing into deep brown; and to other well-known tests it answered equally satisfactorily.

The principal use of olive oil in pharmacy is in the preparation of plasters, liniments and ointments, and to test the suitability of sesame oil for these, the following experiments were put in hand, and samples of the results are on the table.

1st. A small batch of lead plaster was prepared by the usual process, using sesame instead of olive oil. Combination took place as with olive oil, and occupied about the same length of time, but towards the end the plaster considerably darkened in colour, although steam was reduced and ample water present. The plaster, however, became fairly white by "pulling," but all attempts to make and retain it in the form of rolls were futile; and although the sample before you was made more than a month ago, it is still quite soft, and is not likely ever to set firmly. In respect to adhesiveness it is quite equal to that prepared with olive oil.

2nd. Liniment of ammonia was next tried, the result being a combination quite equal to that prepared with olive oil, and though a little thinner in consistency, it did not show any séparation after standing several days.

3rd. Liniment of lime. Specimens were made with sesame and olive oil, both with the same lime water, freshly prepared, and of full strength; the result being, with sesame oil, a liniment much thinner than the one prepared with olive oil, and which separated considerably on standing, while that made with olive oil kept well.

4th. With the official ointments into the composition of which olive oil enters, excepting ointment of nitrate of mercury, no difference was observed in the substitution of sesame oil. In the case of the nitrate of mercury ointment, however, the result was an unsightly orange-coloured preparation that in a few days became still more unsightly by working up in the jar and further darkening in colour.

It is, therefore, very evident that this oil cannot replace olive for the chief pharmaceutical uses, since plaster made with it will not set sufficiently to be portable, either in the form of rolls or when spread for use; neither can it satisfactorily be used for lime liniment, because of its tendency to separate. These defects are undoubtedly due to the large amount of olein contained in this oil, and consequently lesser proportion of the more solid glycerides; and it is very singular that these defects are what chiefly recommended the oil to the authors of the 'Pharmacographia,' namely, the "larger proportion of olein and consequent lesser tendency to solidify."

Where, however, no chemical combination takes place, and where simply a bland sweet oil, possessing good keeping properties is required as an ointment basis, perhaps no better could be chosen, and on this account I consider it much more suitable as a substitute for almond oil in the preparation of ointments. Samples of the principal ones contained in the British Pharmacopœia have been prepared, and are on the table, which, to my mind, are quite equal in every respect to those prepared with almond oil.

SESAME OIL: ITS SUITABILITY FOR PHARMACEUTICAL PURPOSES.

BY THOMAS MABEN, PHARMACEUTICAL CHEMIST.

The literature relating to sesame oil is very meagre, and in 'Pharmacographia' alone do we find anything like a satisfactory description of the article and its uses. The learned authors of that work state that the oil "might be employed without disadvantage for all the purposes for which olive oil is used," and it is with the view of indicating the reliability or otherwise of this opinion, that I have, acting on the suggestion contained in the "Blue List," undertaken the preparation of this report.

Sesame oil differs little in its physical characters from either olive or almond oils. It has not the tinge of green which all but the finest specimens of the former process, and is of a rather more decided shade of yellow than the latter, but generally speaking the difference in colour is not very marked. The odour of a fine specimen of sesame oil is very slight, while the taste is at first sweetish and bland with a peculiar after-flavour. Olive oil becomes grainy through the deposit of a crystalline fatty body at 5° C., but the olein does not solidify till about −5° C. Sesame oil congeals at −5° C., and almond oil is liquid till −20° C. is reached. The difference in the congealing points is doubtless due to the percentage of olein, of which almond oil "consists almost wholly" ('Pharmacographia'), sesame oil contains 76 per cent. (*Ibid.*), and olive oil, 72 per cent. (Braconnot). According to the best authorities, however, the percentage of olein varies according to circumstances; and, in like manner, different samples of the same oil differ in density, as is evident from the fact that hardly two authors agree in giving the same specific gravity for any one oil. The following table shows at a glance the relative specific gravities:—

	'Pharmacographia.'	A. H. Allen.	Other Authorities.	The Author.
Sesame oil .	·919 (23° C).	·923 to ·924	·932 . . .	·923
Almond oil .	·920 . . .	·916 to ·920	·917 to ·920	·919
Olive oil. . .	·916 (17·5°C.)	·914 to ·917	·910 to ·917	·918

From these figures it will be seen that olive oil is the least dense, while sesame oil is the heaviest. 'Pharmacographia' gives a very low specific gravity for sesame oil; but this may probably be accounted for by the difference in the temperatures at which the observations were taken, and by the fact that the oil made use of by Flückiger was extracted with ether, whereas the sesame oil of commerce is obtained by expression. Taking into consideration the physical properties generally of the three oils, it seems on *à priori* grounds quite probable that sesame oil would make a good substitute for either olive or almond oil, and I have in this investigation taken account of most of the galenical preparations in which these are employed.

Let me remark in passing that this similarity in appearance has led, according to some authorities, to the extensive use of sesame oil as an adulterant of almond oil, and probably also of olive oil. This sophistication may be detected in the case of almond oil by the application of a test mentioned in 'Pharmacographia.' "The oil shaken with (a mixture of equal weights of) sulphuric and nitric acids takes a fine green hue, as shown in 1852, by Behrens, who at the same time pointed out that no other oil exhibits this reaction." This coloration may be made use of in testing almond oil for sesame with perfect success, provided we bear in mind a fact not mentioned by Flückiger, viz.: that the green rapidly changes to a red brown. Pure olive oil takes on, with the same reagent, a shade of green, which might easily be mistaken for the green produced by a mixture of almond with 5 or 10 per cent. of sesame, were it not that the former is permanent, while the latter almost immediately passes into the red brown referred to. In the case of suspected olive oil, this reaction may be supplemented by Mr. Conroy's nitric acid test. Nitric acid when heated with seed oils till the action ceases produces a distinct red colour. When heated with olive oil, its only effect is (apparently) to change the oleic acid to elaidic acid which solidifies on cooling. This is a valuable test, giving indications even with very small percentages of foreign seed oil; but unfortunately different shades of colour are produced by different oils, and unless we are certain of the presence of a particular adulteration the colour is almost sure to mislead, though probably not to a very great extent. As this report has reference more to the use of sesame oil for pharmaceutical purposes than to its abuse as an adulterant, it is unnecessary to go further into the question of tests.

The two classes of preparations in which oils are chiefly used are the plasters and the ointments. In preparing these it must be remembered that there is a larger percentage of olein in sesame than in olive oil, and the proportions of the different ingredients must be regulated accordingly, otherwise the particular plaster or ointment will be too soft.

Plasters.—*Emplastrum plumbi* being the basis of nearly all the plasters, it may be taken as the type of this class of preparation, Lead plaster is essentially a soap and is prepared by heating together plumbic oxide and oil in the presence of water, the result being that the glycerine separates while the fatty acids combine with the metal to form the oleomargarate of lead. This plaster can be successfully prepared with sesame oil, the only modification in the process being the allowance of a larger quantity of oxide of lead, as just referred to. Prepared with olive oil, lead plaster is nearly white, very friable, and only slightly adhesive; prepared with sesame oil, it is darker in colour, much less friable, and much more adhesive. By itself the former cannot be used for adhesive plaster, the requisite "stickiness" being obtained by mixing with it a small quantity of resin and also a little soap. This forms *Emplastrum resinæ* and when spread on calico is the sticking-plaster of the shops. Though very adhesive, this is somewhat irritating on inflamed surfaces and liable, in homely phraseology, to "canker" a wound, and if sesame lead plaster were used alone, or with a smaller proportion of resin, it would in my opinion prove an excellent substitute.

Most of the plasters of which *Emp. plumbi* is the basis are, like itself, apt to become brittle when kept for a time. Belladonna and other plasters which are frequently kept ready spread crack disagreeably, and are not so adhesive as when recently prepared. The use of sesame oil for these also is an advantage.

Ointments.—Sesame oil is perfectly applicable for most of the British Pharmacopœia ointments, whether it takes the place of olive or almond oil. Spermaceti, resin and simple ointments are as elegant alike as regards colour, odour or consistency, as any prepared according to the Pharmacopœia, and so far as I have been able to judge quite as durable.

Some ointments are apt to change and become unfit for use, such as those of acetate of lead, iodide of cadmium, oxide and iodide of mercury, etc., and it is hardly probable that the use of sesame oil will arrest the usual course in their case, but after the lapse of several months, I find each of them quite sweet and good.

An ointment somewhat difficult to prepare and also to keep is *Ungt. hydrargyri nitratis*. Seed oils do not usually make a good preparation, owing to the presence of some peculiar reducing agent, which tends to decompose the mercury salts in the ointment. This decomposition is accomplished much more rapidly by some oils than by others; rape oil, for example, acting quickly, while sesame oil acts somewhat slowly. The action also goes on more energetically at a high than at a low temperature. In the case of rape oil, ointment prepared at 80° C. will keep good for a few days, perhaps even a month, but sooner or later it will inevitably go wrong. If, however, the temperature at time of preparation be raised to 100° C., decomposition takes place at once. On the other hand, ointment prepared with sesame oil at 100° C. keeps good for several months, but ultimately it becomes decomposed; while if the initial temperature be 150° C., decomposition will be immediate. I am at a loss to account for the reaction which takes place. From what we know of the action of nitric acid on seed oils, we would naturally expect the ointment to be red. It is, however, of a greenish hue, so that probably the nitric acid is made use of in another direction. Whatever be the cause of the reaction it is evident that sesame oil is quite unsuitable for the preparation of this particular ointment.

On a general review, we may conclude that in the case of plasters a superior preparation may in some instances be obtained by the use of sesame oil in place of olive oil; and that there is no reason why it might not be employed as a substitute for both olive and almond oil in the preparation of the B.P. ointments, with the single exception of *Ungt. hydrargyri nitratis*.

The President, in proposing a vote of thanks to Mr. Conroy and Mr. Maben, said those two gentlemen did not come to quite the same conclusion, but probably Mr. Conroy's objection would be met by Mr. Maben's suggestion to use more base where chemical reactions took place, as in certain of the liniments and plasters. They also differed slightly in the specific gravity of the oils, but no doubt different samples would differ in that respect.

A vote of thanks to the authors was passed.

Mr. Willmott said he gathered from what had been read that the sesame oil, although preferable in some instances, was not recommended as being generally superior to olive oil, whilst in some cases it was evidently inferior. He would simply suggest that in those cases where it had been considered equal or superior to olive oil some further time should elapse before any conclusion was arrived at.

Mr. Tanner said he had worked somewhat in the same direction, and could fully confirm what Mr. Conroy said as to sesame oil in the preparation of emplastrum plumbi. It made the plaster too soft if made in the proportions given in the Pharmacopœia. That objection seemed to have been met by Mr. Maben by using a larger proportion of lead oxide, but his experience was that there were other objections. The lead plaster made with sesame oil not only had an entirely different odour, but the odour was very disagreeable, and when the plaster was spread rancidity took place in a few days. So rapid was this action that he had known large quantities of this plaster when spread become so heated in twenty-four to forty-eight hours that it was considered dangerous to pack it. With reference to ung. hyd. nit., Mr. Conroy appeared to have an ointment which became first an orange and then an objectionable brown colour. He had found that it turned orange at first, and in a few days changed to red, and remained that colour for three or four months. Sesame oil, therefore, was not calculated to take the place of olive oil in the most valuable of pharmacopœial preparations. In linimentum ammoniæ it certainly seemed preferable.

Mr. Conroy said he had tried the experiment of adding a further amount of base, but still found the plaster soft, and he could not see how the use of a larger percentage of base would make the difference. With regard to the specific gravity, the one he had given was from the sample on the table, which he had every reason to believe was perfectly genuine. He did not think that a further length of time was necessary in testing this oil as compared with olive oil, because that also became rancid. The difference of odour mentioned by Mr. Tanner would not be much objection, because he did not think people cared about that in a plaster. The rancidity he mentioned was very likely due to the softer nature of the plaster. He was surprised at the colour obtained by Mr. Tanner, which was probably due to some other seed oil being present.

(*To be continued.*)

Parliamentary and Law Proceedings.

Alleged Poisoning by "Oil of Amber and Juniper."

At Crediton, on October 17, an inquest was held, before Mr. F. Burrow, District Coroner, relative to the death of Robert Ware, a labourer, who was found dead in bed on the previous Sunday, at Folley, near Crediton. The son of the deceased said that his father was suffering from lumbago, and on the previous Saturday he took some medicine he had from Mr. Tanner, just before going to bed. Witness saw him with the bottle, and his father told him that he took five drops. Just before getting into bed he said "Good night," and nothing more. Witness woke up in the middle of the night, and, seeing the lamp burning, said to his father, "Aren't you going to put out the light?" He did not speak, and witness got out and put out the light. He did not awake until 10 a.m. on Sunday morning, when he found his father was dead.

Mr. J. A. Edwards, surgeon, said he was called, and went to the residence of the deceased. He examined the body, and found no marks of violence, but dark patches of congested matter. On learning that the deceased had taken some medicine, he examined the bottle produced, labelled "Oil of amber and juniper." He was informed that the deceased had been taking it since the Monday previously, in doses of 4 or 5 drops. Witness never heard of the internal application of amber, but knew it was used sometimes externally for paralysis or rheumatism. On referring to an old work he found it recorded as being used internally as a stimulant; it was generally used as an embrocation. Witness was informed by the son of the deceased that he took on Tuesday night 19 or 20 drops. He (witness) thought the cause of death was asphyxia, produced by overdoses.

Police Constable Burd said that Mr. Tanner, the chemist, told him that the deceased had only twopennyworth, and his instructions were that he was to take only 4 or 5 drops for a dose.

The Coroner said it was most extraordinary that the bottle was not labelled "Poison," and that no instructions were on the label.

The Jury returned a verdict that death ensued through misadventure, from the deceased having taken an overdose of oil of amber and oil of juniper.

The Coroner thought that the bottle should have been labelled.

Several of the Jury were of the same opinion, and considered that Mr. Tanner should have been more careful in sending out medicine, as well as in giving proper instructions as to how it was to be taken.—*Exeter and Plymouth Gazette.*

Poisoning by Sulphate of Copper.

An inquest was held on October 26, at the Leeds Town Hall, before Mr. J. C. Malcolm, the Borough Coroner, on the body of Sarah Wetherell (52), wife of a labourer.

The husband said he left home on Saturday night about eight o'clock, and returned at eleven. When he got into the house he found his wife lying on the floor apparently asleep. Thinking she was under the influence of drink, he merely lifted her into bed and went to bed himself. When he awoke on Sunday morning his wife told him that in the dark she had drunk a cupful of a solution of sulphate of copper, or blue vitriol, in mistake for water. Mr. Clayton, surgeon, was called in, but the woman gradually grew worse, and died on Thursday.

A verdict of "Died by misadventure" was returned.—*Leeds Mercury.*

Obituary.

BENJAMIN HUMPAGE.

Another "Founder" of the Pharmaceutical Society, and one whose face was familiar to many of its members, has passed away in Mr. Benjamin Humpage, of Turnham Green. The deceased gentleman was the fourth son of the late Mr. Edward Humpage, Surgeon, of Stroud, Gloucestershire, to whom he was apprenticed and served his time. He then went as assistant to a chemist in the City of Gloucester, and subsequently came to London, where he became assistant in the shop till lately owned by Mr. Pedler, near Temple Bar.

Mr. Humpage afterwards proceeded to Bristol and opened, in 1830, a shop for himself in North Street, which subsequently became the property of the late Mr. W. W. Stoddart. Failing health compelled him to leave Bristol, and he returned to London, where he became well known as a medical transfer agent and valuer, with offices in Chancery Lane, while at the same time he carried on business as a pharmacist in Judd Street, Brunswick Square. The demand for his services as medical agent increased as his uprightness of character and keenness of perception were recognized; but in 1867 his health again became affected and he then removed to Turnham Green (or, as it is now called, High Road, Chiswick), where he continued in business up to the time of his death at the ripe age of 76 years.

The above bare facts do not convey any idea of his useful, well-spent life. He lived and acted up to the maxim that "whatever is worth doing at all is worth doing well;" and his bright and happy-looking face and genial greeting were household words among his friends.

Mr. Humpage was one of the earliest to join the Pharmaceutical Society and on two occasions was elected an auditor. He always manifested a strong interest in the proceedings of the Society, and many who had not the privilege of personal friendship with him will retain pleasant memories of his appearances at the annual meetings, where his good natured presence and sensible though somewhat emphatic oratory always tended to soothe any acerbities that might have arisen in discussion.

Notice has also been received of the death of the following:—

On the 2nd of October, Mr. George Gilbert, Chemist and Druggist, Waterloo Ville. Aged 68 years.

On the 12th of October, Mr. John Bray, Pharmaceutical Chemist, High Street, Mile Town, Sheerness. Aged 43 years. Mr. Bray had been a Member of the Pharmaceutical Society since 1863.

BOOKS RECEIVED.

Plant Analysis, Qualitative and Quantitative. By G. Dragendorff, Ph. D. Translated from the German by Henry G. Greenish, F.I.C. London: Baillière, Tindall and Cox. 1884. From the Publishers.

A Manual of Chemistry. Vol. I.: Physical and Inorganic Chemistry. By Henry Watts, B.A., F.R.S. London: J. and A. Churchill. 1883. From the Publishers.

Correspondence.

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

Liquid Extract of Cinchona.

Sir,—I observe that Mr. Heathfield, in your issue of October 20, claims to have a knowledge of the method originally adopted by Mr. Richard Battley in the production of his Liquor Cinchonæ. After describing the method as consisting in the treatment of bark with cold water, not by mere "digestion and evaporation," but by a "process of manipulation and elimination," he says that "no spirit was added at the completion." He claims for Mr. Battley that he "attained the object in view, viz., that of separating and securing nearly the whole of the medicinal properties of the bark," and says "I have little doubt that if the successor of the late Richard Battley continues, as is presumable, the same process, the preparation will long hold its own against all comers." Not content, however, with thus commending this particular preparation, which is well known in commerce as a proprietary medicine, he does not hesitate, in terms which, taken alone, are somewhat equivocal, but considered with the context are unmistakable, to condemn the corresponding preparation of the British Pharmacopœia. He says, "in the year 1830 I was working with Mr. Battley in his laboratory, and I can certify that the extractum cinchonæ liquidum of the British Pharmacopœia has no more relation to the liquor cinchonæ introduced by Richard Battley, as then and there prepared, than has the extractum opii liquidum to the liquor opii sedativus of the same discoverer." He goes even further and says that the framers of the Pharmacopœia have much aided in bringing the pharmacy of the cinchona bark into a muddle, and suggests that this has arisen from their not having gone to the right source for their information. "In justice to another," he very properly observes, "it is not for me to recapitulate the operations" of the process, but "did they apply, before completing their work, to those who were acquainted with the matter in all its details?"

An answer to this question will be found, not only in a published statement by Dr. Farre, who for many years occupied a prominent official position in the London College of Physicians, but in a communication from Mr. Richard Battley, which appears in the tenth volume of the *Pharmaceutical Journal*, page 129. Dr. Farre, in his 'Abridgment of Pereira's Materia Medica,' distinctly says that the formula for liquid extract of cinchona was furnished by Mr. Battley himself to the London College. And Mr. Battley gives, for the benefit of all comers, a detailed description of his process. He says "I introduced in 1818 the form of liquor, or inspissated cold infusion, evaporating the cold infusion at a temperature not exceeding 160°, to the specific gravity of 1200, and afterwards, to preserve this liquid extract from decomposition, adding to it as much rectified spirit as will reduce the specific gravity to 1100." This is precisely the process given in the Pharmacopœia, and unless we credit Mr. Heathfield in preference to Mr. Battley, it is the process which the latter adopted.

The framers of the Pharmacopœia had, therefore, no occasion to apply to Mr. Battley's successor, or to his former assistant, for information which, as the former would naturally, and the latter very properly, say "in justice (to myself or) to another, it is not for me to recapitulate the operations."

This is one of the difficulties the framers of the Pharmacopœia have to contend with, that those who are most able to render assistance may have interests in an opposite direction. I should be sorry to suppose that such interests would be allowed to interfere with the exercise of a duty which devolves upon pharmacists throughout the country, to assist in the production of a good Pharmacopœia.

The liquid extract of cinchona of the British Pharmacopœia has been much criticized. I have no doubt it admits of improvement. If so, in what direction and how? This is one of many questions which pharmacists may assist in answering, and in doing so they would not only tend to justify their claim to the recognition and support they receive from the Legislature and the public, but at the same time they would be furnishing matter for professional and scientific discussion and publication, from which they individually, and all, would benefit.

T. Redwood.

Sir,—In the *Pharmaceutical Journal* for September, 1850, there is a paper by Mr. Battley detailing his method for making his liquors.

He says:—"I have been led to adopt as a rule for the maceration of most substances, twice their weight of cold distilled water, adding for each subsequent maceration as much additional distilled water as the amount of infusion drained off or expressed."

He says further on:—"I introduced in 1818 the form of liquor, or inspissated cold infusion, evaporating the cold infusion at a temperature not exceeding 160° to the specific gravity of 1200, and afterwards, to preserve this liquid extract from decomposition, adding to it as much rectified spirit as will reduce the specific gravity to 1100."

I trust this will disperse the mists hanging round the subject.

18, *Borough High Street, S.E.* C. D. Parry.

Sir,—I would like to draw attention to what appears to me to be an error on the label of a preparation which has recently elicited considerable attention and discussion, namely, Battley's Liq. Cinchonæ. It occurs in the first sentence, which reads thus:—"One fluid drachm is equivalent to 1 ounce of the finest bark or 12 ounces of the decoction." Since 1 ounce of bark is sufficient to make 16 of decoction, and 1 drachm of Battley's is equal to 1 ounce of bark, 1 fluid drachm ought to be equivalent to 16 (and not 12 ounces as stated) ounces of decoction. But for two reasons it should be equal to more than 16 ounces. The first is that in preparing the B.P. decoction, much of the alkaloids is left in the bark. The second is because much of the alkaloids is deposited upon the decoction cooling, and therefore 16 ounces of this preparation is not equivalent to 1 ounce of the bark. I think I have now made it clear that 1 drachm of Battley's preparation, if it is really equal to 1 ounce of bark, should make more than 16 ounces of decoction.

I see by the Journal of October 20, that Mr. Heathfield assisted the late Mr. Battley in his experiments. Perhaps that gentleman will show that Battley's label is right, or that I am wrong. Being familiar with the preparation he would be able to give the necessary explanation.

One more question and I have finished. In diluting Liq. Cinchonæ, Battley directs soft and distilled water. In what way does it differ from hard and distilled or simply distilled water?

D. Cinchon.

Hymenodictyon Excelsum.

Sir,—It would doubtless be very inconvenient if the discussions at the Pharmaceutical Conference were to be continued in your Journal; but if there is not too much danger of that, I should like to add a sentence to what was said with reference to Mr. Naylor's paper on the principles of *Hymenodictyon excelsum*.

It is quite conceivable that the formulæ given for the alkaloid and neutral principle are correct empirically, in the sense that they are the simplest expression of the composition of the substances, as CN is of cyanogen. We may wait a very long time before we know the constitutions of hymenodictionine, and what I object to is just this, that a formula should be given even provisionally, which contradicts one of the best established laws of chemistry. The difficulty might be overcome by doubling the formulæ, but I would suggest as a preferable process, that Mr. Naylor should add an atom of hydrogen to each of his compounds, which would satisfy me, and agree just about as well with his analyses.

I have no wish to say anything hypercritical regarding a research, the value of which I fully appreciate.

93, *Abbey Hill, Edinburgh.* D. B. Dott.

Ungt. Hydrargyri Nitratis.

Sir,—Pharmacists owe a debt of gratitude to Mr. Willmott for his most valuable contribution to the literature of the ointment bases, and I regret that I was unable to attend the Conference so that I might have expressed my thanks along with others, and at the same time replied to his remarks on my paper on "Ungt. Hydrargyri Nitratis." With your permission I desire to refer briefly to these remarks now, and in doing so shall follow the order adopted by Mr. Willmott in his criticism.

Referring to what Mr. Willmott calls my "theory," I think that if he re-reads my paper he will find that anything in the paragraph on deterioration of the nature of a theory is based on data given in the previous part of the paper; the conclusion I come to being that should the ointment deteriorate "within a few months," even though every care had been taken in its preparation and preservation, "the presumption is that the oil was not pure." The context clearly shows that this is no broad theory, and not even applicable to all cases of early deterioration, but that it is limited to certain conditions. I do not gather from Mr. Willmott's paper that any experiments which he may have made lead to a contrary opinion.

I am quite at one with Mr. Willmott in the opinion that olive oil will under certain circumstances reduce mercurous nitrate, and there is no necessity to reheat citrine ointment* to prove this, but these circumstances are not present in the preparation of ung. hydr. nit. So long as nitric acid is in the slightest excess olive oil will not reduce the mercury salts, whereas the action of seed oils goes on whether the acid is present in excess or not.

Mr. Willmott states that olive oil ointments do not deteriorate for the reason that "a larger proportion of the acid is retained in its normal condition." In my opinion this is certainly not the sole reason. The proportion of acid undoubtedly exerts some influence as between one pure olive oil ointment and another, but as between an olive oil ointment and a seed oil ointment the difference is due not so much to the acid as to some active principle in the seed oil. A simple experiment will prove this. Let an olive oil ointment be prepared at a temperature above the boiling point of nitric acid, when, surely all the acid in excess will be evaporated, and let a seed oil (or a 10 per cent. seed oil) ointment be prepared under the boiling point of the acid and note the result.

With reference to the nitric acid, I quite agree with Mr. Willmott that all change would be prevented by increasing the quantity, provided the added acid be not driven off by increasing the temperature at preparation; but I fear the ointment would differ from the B.P. article in its therapeutic value. There is, however, no necessity to increase the quantity of acid ordered by the B.P.; if the oil is pure, the ointment will keep unchanged for a very long time, and if the oil is impure increase of acid will not prevent reduction taking place.

Mr. Willmott, referring to lard, states that its reducing power is even lower than that of oil, for with lard alone "there is no subsequent deterioration in point of colour." But according to his own showing citrine ointment, especially when recently prepared, cannot be mixed with lard "without quickly acquiring a leaden hue, owing to the reduction of the mercury." If this is so, some explanation of the apparent contradiction is evidently necessary. But it is not always so, as one ointment may be mixed with lard and yet preserve its colour, while another cannot be so diluted. The difference is simply this, that the former has been prepared at a lower temperature, the mercury exists in combination with the fats, and there is also an excess of acid, while the latter has been prepared at a higher temperature, and the mercury exists as nitrate, with very little, if any, excess of acid. The remedy for this reduction may, therefore, be found in the addition of a few drops of nitric acid to the ointment before mixing in the lard.

The meaning of the expression "prepared at" say 212° F., is simply this, that the acid solution is to be added when the fats are at that temperature, the initial temperature being the most convenient as a guide and really the only one at all practical. I am well aware that the temperature rises as the action proceeds, but I was not prepared for the great rise noted by Mr. Willmott. If this rise takes place in every instance, it would be utterly impossible by starting at 180° F. to prepare an ointment entirely soluble in ether; yet we know that Mr. Schacht did prepare such an ointment, while I myself have done so repeatedly. That it does not always take place I proved no later than yesterday. Operating with 2 pounds of ointment, I began to add the acid solution when the fats were at 180° F. The temperature rapidly rose to 220° F., but fell before the process was half over to 208° F., at which point it was stationary even when the frothing was at its highest. With a second quantity of 2 pounds I begun at 212° F., the temperature rose to 240° F., and then gradually fell to 218° F., at which it remained till the action had ceased. With smaller quantities (2 ounces or thereby) such as those I worked with when preparing my paper the temperature does not run up so high in either case.

Mr. Willmott has failed to notice that the effect of different temperatures of preparation is to yield ointments of different composition. Probably this was outside the scope of his paper, but the composition is essentially related to the temperature and they should be considered together. It is, however, unnecessary for me to enter into this point, as I have already indicated in my paper the opinions I have formed regarding it; but I simply mention it to show that there really is some ground for asking that a definite temperature should be stated in the Pharmacopœia, as it is quite possible that abundant frothing may take place and the temperature be still a long way under 250° F. If, however, Mr. Willmott believes that this temperature is reached when the "frothing up of the mixture" takes place, he can surely have no objections to the ultimate, *i.e.* the highest, temperature being fixed at not less than 250° F., with which I for one would be quite satisfied, as then we could rely on always producing a uniform ointment and one which would really contain nitrate of mercury.

Hawick. THOS. MABEN.

* Mr. Willmott states that I heated a specimen of ointment to 300° F. This is not so. The expression "this pure ointment retains its colour though heated to over 300° F.," refers to the original heat of preparation, and not to reheating, the latter being an experiment I never dreamt of. The mercury in citrine ointment would be reduced long before 300° F. was reached if reheating were attempted.

Inquirer.—It would depend upon whether the person had any claim to use the designations referred to, and also the purpose for which he sought to use them.

J. C. Husband.—The tree is a poplar, and the "weedy stuff" which stopped up the drain consists of fine rootlets from it that have penetrated through the clay at the joints in search of moisture.

F. J. D.—We cannot give you any information, as the date of the publication of the next edition of the British Pharmacopœia belongs to the "future of pharmacy."

T. P. J.—We believe that unless a person had practised veterinary surgery continuously for five years before the passing of the Act it would be necessary for him in order to become entitled to registration to pass the statutory examinations, particulars concerning which may be obtained from the Registrar, 10, Red Lion Square, W.C.

A. L. Smith.—A solution of sp. gr. 1·750 would contain 20·4 per cent. of P_2O_5.

M. P. S.—We do not know of a published formula for Locock's lotion for the complexion.

F. J. P. S.—The flocculent precipitate in the liq. sodæ arsenitis was most probably one of the fungi commonly met with in arsenical solutions.

E. E. M.—The method of preparing dialysed iron will be found in back numbers of this Journal.

W. J. Barnes.—(1) Magnesiæ sulphas was doubtless intended in this prescription, which would give ʒj for a dose. (2) This requires the addition of ℥j of vaseline to combine the ingredients in an ointment.

Puzzled Chemist.—The answer to your question might be affected by the circumstances of the case: the actual composition of the pills and the persons to whom they are sold. Certainly it would not be affected by the fact that the label is small or otherwise occupied. Concerning the general question you are recommended to read the "case" submitted to the Privy Council for its opinion in 1869, and the reply thereto (*Pharm. Journ.*, [2], x., 566).

E. C. S.—Any good work on arithmetic.

E. Elsey.—The Prussian Pharmacopœia is no longer official, having given place to the German Pharmacopœia; but neither of these includes "Pulv. Sennæ Co." Probably "Pulv. Liquritiæ Co." is intended, which contains sulphur.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Mason, Ince, Bolton, Siebold, Thompson, Associate.

THE CLASSIFICATION AND PROPERTIES OF RED RESINS KNOWN UNDER THE NAME OF DRAGON'S BLOOD.*

BY J. J. DOBBIE, M.A., D.SC.,

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AND G. G. HENDERSON, B.SC.

Having recently, at the request of Professor Balfour, of Glasgow University, undertaken the investigation of a red resin brought by him from the island of Socotra, we were led for purposes of comparison to examine a large number of similar resins from various sources. One result of this investigation was to prove that several substances of distinct chemical properties have hitherto passed under the same name. Besides the red resins derived from *Pterocarpus Draco* and *Croton Draco* the existence of three different kinds of dragon's blood has long been recognized; one from the East Indies (*Calamus Draco*), one from the island of Socotra, and one from the Canary Islands (*Dracœna Draco*). While the first of these has been fully described, no essential characters are given by any of the authorities whereby the others can be distinguished from it or from one another.

Flückiger and Hanbury ('Pharmacographia') have evidently taken great care to obtain authentic specimens of the *Calamus* resin on which to determine its characters. The only point in which the specimens of resin undoubtedly from *Calamus* examined by us appear to differ from those examined by these authorities is the solubility in ether. According to Flückiger and Hanbury the *Calamus* resin is sparingly soluble in ether, whereas we found it freely soluble. But there is a marked discrepancy on this point in all the published accounts of the resin. Thus according to Wiesner it is difficultly soluble, Hager ('Handbuch der pharmaceutischen Praxis') partially soluble; Herberger, soluble, but not so easily as in alcohol; Hirschsohn (*Russ. Zeit. Pharm.*, xvi., 1, 33, 65, 97), completely soluble. This and numerous other discrepancies render it probable that different experimenters have not always worked with the same substance. And when we came to compare the published accounts of dragon's blood with the substances actually sold under that name or exhibited as such in our museums, we found still greater difficulty in reconciling the descriptions with the observed properties.

We resolved, therefore, to collect as many varieties as possible of resins passing under the name of dragon's blood and compare them closely with one another. Through the kindness of Professor Balfour, we obtained from Mr. Holmes of the Pharmaceutical Society's Museum, from the Kew collection, and from the Warrington collection a large number of specimens, of which it may be well before proceeding further to give a list together with a note of their appearance and a copy of the label attached to each.

From the Kew Collection.

1. "Dragon's blood. India Museum. No locality." In lumps; colour of powder, dingy brick-red.

2. "Dragon's blood. *Calamus Draco*, Bombay. India Museum." In lumps; colour of powder, dingy brick-red. Contains about 9·5 per cent. of insoluble matter.

3. "Heraduccan, Singapore. India Museum." In lumps; colour of powder, dingy brick-red.

4. "Dragon's blood, Penang. India Museum." In small fragments; colour of powder, dingy brick-red. Contains about 21 per cent. of insoluble matter.

5. "Dragon's blood, Punjab. India Museum." In lumps; colour of powder, dingy brick-red. Contains about 20 per cent. of insoluble matter.

6. "Resin called dragon's blood. Menier and Co." In lumps; colour of powder, light orange-brown (colour of limonite).

7. "Dragon's blood. *Calamus Draco*, Singapore." In lumps; colour of powder, brick-red (colour of hæmatite). Contains about 12 per cent. of insoluble matter.

8. "Dragon's blood, Sumatra. Exhibition, 1851." In lumps; colour of powder, brick-red (colour of hæmatite).

9. "Dragon's blood. Different qualities obtained from fruits of *Calamus sp.*, Djambi and Siak, Sumatra." In lumps; colour of powder, dingy brick-red.

From the Pharmaceutical Society's Museum.

10. "Portion of agglomerated sticks. Dutch East Indies. Paris Exhibition, 1878." In sticks; colour of powder, light carmine-red.

11. "Dragon's blood. India Museum. Labelled Sumatra." In lumps; colour of powder, brick-red.

12. "India Museum. No locality given. Probably *Calamus*." In lumps; colour of powder, dingy brick-red.

13. "Paris Exhibition, 1878. From Pontianak. Djernang Sanpit. Catalogue, No. 547. Probably *Calamus*." In sticks; colour of powder, carmine-red.

14. "Stick in palm-leaf from Pontianak, Dutch East Indies. Indian Department, Paris Exhibition, 1878. Catalogue, No. 547. Probably from *Calamus*." In sticks; colour of powder, carmine-red. Contains about 4 per cent. of insoluble matter.

24. "Dragon's blood from *Dracœna Draco*. Gerarde Jose de Nabrega, Funchal, Madeira." In small fragments; colour of powder, cinnabar-red. Contains about 6 per cent. of insoluble matter.

From the Warrington Collection.

15. "Lump dragon's blood." Colour of powder, brick-red.

16. "Dragon's blood, said to be *Calamus*." In lumps; colour of powder, brick-red.

17. "Stick dragon's blood, *Calamus*." Colour of powder, dull pink.

18. "Finer stick dragon's blood." Colour of powder, scarlet.

19. "Lump dragon's blood." Colour of powder, scarlet.

20. "Lump dragon's blood in palm leaf." Colour of powder, scarlet.

21. "*Croton erythrina*. Dragon's blood resin, Brazil. Dr. T. Peckolt, Rio." In small lumps; colour of powder, brick-red.

22. "Smaller stick of dragon's blood in palm leaf." Colour of powder, brick-red.

23. "Larger stick of dragon's blood in palm leaf." Colour of powder, brick-red.

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, November 7, 1883.

From Professor Balfour.

25. "Dragon's blood from *Dracæna Cinnabari*, Balf. fil., Socotra." In drops; colour of powder, cinnabar-red. Contains about 3·4 per cent. of insoluble matter.

On examining this list it will at once be evident that the resins known as dragon's blood differ widely from one another, not only in their degree of purity, but also in their appearance; and it will be seen from what follows that specimens labelled as having come from the same locality must, in reality, in some cases, have been derived from very different sources. It is even questionable if the term dragon's blood is properly applied to some of them, unless that term is to include all commercial varieties of red resins.

We first classified the specimens roughly according to their more prominent characters. They are all, with the exception of No. 21, which is derived from *Croton erythrina*, and is not usually described as a dragon's blood, freely soluble in alcohol, ether, oil of cloves and glacial acetic acid; the residue left in each case, which, as already mentioned, is very variable in amount, usually consists of vegetable tissue, sand, etc. There is, however, a marked difference as regards the solubility of the resins in other reagents, especially in chloroform, carbon bisulphide and benzene, and all the specimens admit readily of classification according to their behaviour when treated with these solvents. All the resins we have examined may be arranged in the four following groups. First, those which are entirely soluble in chloroform, carbon bisulphide and benzene; secondly, those which are soluble in chloroform, but insoluble in carbon bisulphide and benzene; thirdly, those which are soluble in chloroform and benzene, and *partially* soluble in carbon bisulphide; and fourthly, those which are insoluble in all three reagents. In the following table the specimens are arranged in the classes to which they belong:—

CLASS I. Resins soluble in chloroform, carbon bisulphide and benzene.*	CLASS II. Resins soluble in chloroform, insoluble in carbon bisulphide and benzene.	CLASS III. Resins soluble in chloroform and benzene, *partially* soluble in carbon bisulphide.	CLASS IV. Resins insoluble in chloroform, carbon bisulphide and benzene.
6. —	10. Dutch East Indies.	3. "Heraduccan," Singapore.	1. —
7. *Calamus Draco*, Singapore.	14. Pontianak, probably from *Calamus*.	4. Penang.	2. *Calamus Draco*, Bombay.
8. Sumatra.	17. *Calamus Draco*.	9. Fruits of *Calamus*, Sumatra.	5. Punjab.
11. Sumatra.	22. —	18. —	12. Probably *Calamus*.
	23. —	19. —	15. —
	13. Djernang Sanpit, Pontianak.	20. —	16. Said to be *Calamus*.
			24. *Dracæna Draco*, Madeira.
			25. *Dracæna Cinnabari*, Socotra.

In this list we have repeated the source or locality assigned to each resin, and it will be seen at a glance, especially at the fourth class, that a widely different source has been assigned to resins really identical with one another, and probably all derived from the same species, at all events from the same genus, while on the other hand the "calamus" resin occurs in all four classes. It was pointed out to us by Mr. Holmes, with regard to the resins exported from Bombay and said to be from *Calamus*, that they were probably imported into India, in the first instance from the east coast of Africa, and may have been derived from *Dracæna sp.* growing on the African coast or in the island of Socotra. The soundness of the classification which we have given and which is based primarily on solubility was entirely confirmed by an examination of the physical properties of the resins and of their behaviour towards various reagents. It would be useless to enter into details with regard to each resin in the list. We shall, therefore, confine ourselves to a general account of their properties and reactions, premising that the members of each group, as far as examined, show the closest agreement with one another. When carefully purified by solution in ether and reduced to powder, the resins of Classes I. and III. have a deep brick-red colour, those of Class II. a pink, and those of Class IV. a vermilion colour. In alcoholic solution a corresponding difference of colour is observable, Classes I. and III., being orange, Class II. pink-red (raspberry colour) and Class IV. blood-red. When heated, the resins of Classes I. and III. melt at about 80° C., and when the temperature is raised to their decomposing point give off highly irritating, red-coloured fumes; those of Class II. melt about 100° C. and give off aromatic non-irritating fumes, and those of Class IV. at about 60° C. and give off aromatic irritating fumes. All the resins dissolve to a slight extent in boiling water, those of Class IV. being rather more soluble than the others. The aqueous as well as the alcoholic solutions have an acid reaction. The behaviour of the resins of the different classes when treated with various reagents may be most easily exhibited in tabular form. The table is printed at the top of the next page.

The behaviour of the alcoholic solutions under treatment with various reagents, especially acetate of lead, is also characteristic. The resins of Classes I. and III give with acetate of lead a brownish-red precipitate, those of Class II. a lilac coloured precipitate, and those of Class IV. a mauve coloured precipitate, the precipitates being in all cases soluble in excess of alcohol, but insoluble in boiling water, ether, carbon bisulphide, benzene and chloroform. Hydrochloric acid dissolves all the resins to a slight extent, those of Class II. being somewhat more freely soluble than the others; ammonia reprecipitates the resins from the hydrochloric acid solution. The results of the analyses contained in the following table further confirm the classification which we have adopted. It is always a matter of difficulty to obtain resinous substances in a state of sufficient purity to admit of reliable analyses being made, but the results we obtained agree exceedingly well with one another and enable us to place confidence in the formulæ which we have assigned to the resins. Before burning the resins we purified them by dissolving repeatedly in ether

Table of Reactions.

	Class I.	Class II.	Class III.	Class IV.
Caustic soda . .	Almost insoluble in strong cold soda. Soluble in boiling soda to an orange-red fluid.	Readily soluble in strong, cold soda with beautiful purple colour, which changes to orange-yellow on dilution or boiling.	Almost insoluble in strong cold soda. Soluble in boiling soda to an orange-red fluid.	Soluble in cold soda with an orange-red colour.
Ammonia (·880) .	Slightly soluble in cold ammonia. Gives a reddish-yellow solution when heated, a portion being apparently insoluble.	Readily soluble in cold ammonia with a splendid purple colour.	Rather more soluble in cold ammonia than the resins of Class I.	Readily soluble in cold ammonia with a blood-red colour.
Lime Water . .	Insoluble in cold, and almost insoluble in boiling lime-water.	Soluble in cold lime-water with a purple-pink colour, which changes to orange-red on boiling.	Insoluble in cold, and soluble with difficulty in boiling lime-water.	Soluble in cold lime-water with a blood-red colour, which changes slightly on boiling.
Sodium Carbonate	Insoluble in cold sodium carbonate. Soluble in boiling sodium carbonate to an orange-red fluid, smelling like rhubarb.	Soluble in cold sodium carbonate with a mauve-pink colour, which changes to orange-red on boiling.	Insoluble in cold sodium carbonate. Soluble in boiling sodium carbonate to an orange-red fluid, smelling like rhubarb.	Soluble in cold sodium carbonate with a blood-red colour, which changes to orange-red on boiling.

Note.—When treated with caustic soda the resins effervesce, and a peculiar odour, like that of rhubarb is given off. Ammonia forms a clear mixture with alcoholic solutions of all the different classes.

and then precipitating from alcoholic solution with water, having previously heated the resins for several days at a temperature sufficient to expel volatile matter, of which traces are present in all of them.

Table of Combustions.

	Class I.		Class II.		Class III.		Class IV.	
	1	2	1	2	1	2	1	2
C	71·03	70·79	68·18	68·22	70·32	69·41	72·80	72·41
H	6·45	6·42	6·00	6·04	6·01	6·04	6·03	6·07
O	21·52	22·72	24·82	25·74	23·67	24·55	21·17	21·52
	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00
					3	4	3	
				C	73·10	71·89	72·16	
				H	5·81	6·56	6·11	
				O	21·09	21·55	21·73	
					100·00	100·00	100·00	

From these numbers we calculated for the resins of Classes I. and IV. the formula $C_{18}H_{18}O_4$. A substance having this composition would have a combining weight of 298 and contain 72·48 per cent. of carbon, 6·04 per cent. of hydrogen, and 21·48 per cent of oxygen—numbers which agree very closely with those determined by actual experiment, especially with the resins of Class IV. In the case of the resins of this class the formula calculated from the results of combustion was confirmed by analysis of the lead salt, three determinations of which gave respectively the numbers 25·33, 25·27 and 25·17 as the percentage of lead. On the assumption that this resin is a monobasic acid the composition of the lead salt would be $(C_{18}H_{17}O\ )_2Pb$, containing 25·84 per cent. of lead, a number which agrees very closely with that obtained by experiment. The resins of Class II. seem to have a somewhat different composition. If we assume their formula to be $C_{17}H_{18}O_5$ and calculate back to the percentage composition, we obtain the numbers C. 67·54, H. 5·96 and O. 26·50. We found it impossible to obtain consistent results in the case of the resins of Class III., the reason of which we shall presently explain.

Numerous analyses of dragon's blood are given by Johnstone (*Phil. Trans.*, 1859, 134; 1340, 384), and others. It is uncertain which variety of red resin Johnstone worked with, but his analyses agree tolerably closely with those of the resins of our first and fourth classes, to which the varieties most frequently met with seem to belong.

The resins of our third class are undoubtedly mixtures of two distinct resins which differ widely from one another in appearance and properties, although we were unable to separate the two portions sufficiently well to admit of reliable analyses being made. Johnstone found in one kind of dragon's blood which he examined two red resins, to one of which he assigned the formula $C_{20}H_{20}O_4$, and to the other the formula $C_{20}H_{21}O_4$.

Our results may be summed up as follows. There are at least four distinct kinds of red resin presently sold as dragon's blood, or labelled in collections under that name. One variety is brick-red in colour, melts at about 80° C., gives off red-coloured highly irritating fumes when decomposed by heat, dissolves readily with an orange-red colour in alcohol, ether, chloroform, carbon bisulphide and benzene, is insoluble or only slightly soluble in cold caustic soda, ammonia, lime water and sodium carbonate, and dissolves with difficulty when boiled in these reagents. Its alcoholic solution has an acid reaction and gives a brown-red coloured precipitate when mixed with a solution of lead acetate. Its composition may be represented by the formula $C_{18}H_{18}O_4$. This is undoubtedly the resin of *Calamus Draco*, some of the specimens which were examined having their origin well authenticated.

A second variety is of a beautiful carmine-red colour, melts about 100° C., gives off non-irritating fumes when decomposed by heat, dissolves freely with a pink colour in alcohol, ether and chloroform, but is insoluble in carbon bisulphide and benzene, dissolves readily in cold caustic soda, ammonia and sodium carbonate, and much more readily than the foregoing in lime water. Its alcoholic solution has an acid reaction and gives a lilac-coloured precipitate with lead acetate. Its composition may be represented by the formula $C_{17}H_{19}O_5$. The source of this resin is quite uncertain. We have no means of determining whether it is identical with any hitherto described variety of red resin. The specimens examined are marked as having come from the Dutch East Indies, but beyond this we know nothing of their origin.

A third variety is of a vermilion colour, melts about 80° C., gives off aromatic irritating fumes when decomposed by heat, dissolves with a blood-red colour in alcohol and ether, but is insoluble in chloroform, carbon bisulphide and benzene, dissolves readily in cold caustic soda, ammonia, lime water and sodium carbonate. Its alcoholic solution has an acid reaction and gives with lead acetate a mauve-coloured precipitate. Its composition may be represented by the formula $C_{18}H_{18}O_4$. This is the resin from species of *Dracæna*. One of the specimens examined is from *Dracæna Cinnabari*, Socotra, and as it was gathered by Professor Balfour there can be no doubt as to its origin. Another specimen is from *Dracæna Draco*, and its origin is also well authenticated. The other specimens examined are marked some of them *Calamus*, but there can be little doubt that this is a mistake, and that all the resins having the properties just enumerated are derived from species of *Dracæna*. It seems certain then that the resin derived from *Dracæna sp.* is totally different in property from that derived from *Calamus sp.*

The fourth variety is a mixture, in varying proportions, of a reddish-brown coloured resin, freely soluble in carbon bisulphide, and a light brick-red coloured resin, nearly insoluble in carbon bisulphide. The two portions also differ considerably as regards their solubility in ether, benzene, and other reagents, the dark portion being in all cases the less soluble of the two. Since, however, it dissolves to a slight extent in all reagents we found it impossible to effect a complete separation of the two portions. The portion freely soluble in carbon bisulphide is probably identical with the resins of our first class, while the other portion seems to be a distinct resin.

Much discussion has taken place with regard to the presence of a volatile acid in dragon's blood. It seems certain that none of the varieties of this resin contain benzoic acid; at all events we failed to obtain an extract from any of them with petroleum ether, in which benzoic acid is freely soluble. We tested for cinnamic acid by sublimation, and found it present in the resins of the first and third classes, but not in those of the second and fourth classes. To ascertain the delicacy of this method we made a preliminary experiment with artificial mixtures containing 1 per cent. of cinnamic acid, and found that the acid could be separated out by sublimation from very small quantities of such a mixture. Probably the error as to the presence of benzoic acid arose through confounding it with cinnamic acid, or possibly from working with a resin in which benzoic acid had been formed by partial oxidation.

Several valuable investigations upon the decomposition products yielded by dragon's blood, when subjected to destructive distillation and to the action of various oxidizing agents, have been conducted by Hlasiwetz and Barth, and others. Though probably the different kinds of resin will be found to yield nearly the same products, it is unfortunate that the characters of the different varieties had not been established before these investigations were undertaken, as it must be uncertain, unless each specimen was examined separately, whether or not the experimenters always had the same variety in hand.

[*The discussion on this paper is printed at p.* 372.]

THE PREPARATION OF LARD FOR USE IN PHARMACY.*

BY PROFESSOR REDWOOD.

I have read with much interest the paper on "Ointment Bases," communicated by Mr. Willmott to the Pharmaceutical Conference at its recent meeting, but the part of the subject which has more particularly attracted my attention is that which relates to prepared lard. Reference is made by Mr. Willmott to lard prepared in different ways, and it appears from the results of his experiments that when made according to the process of the British Pharmacopœia it does not keep free from rancidity for so long a time as some of the samples do which have been otherwise prepared. The general tendency of the discussion, as far as it related to this part of the subject, seems to have been also in the same direction; but neither in the paper nor in the discussion was the question of the best mode of preparing lard for use in pharmacy so specially referred to or fully discussed as I think it deserves to be.

When, in 1860, Mr. Hills, at a meeting of the Pharmaceutical Society, suggested a process for the preparation of lard, which consisted in removing from the "flare" all matter soluble in water, by first thoroughly washing it in a stream of cold water after breaking up the tissues and afterwards melting and straining the fat at a moderate heat, this method of operating seemed to be generally approved. It was adopted by men largely engaged in "rendering" fatty substances for use in pharmacy and for other purposes for which the fat was required to be as free as possible from flavour and not unduly subject to become rancid. It became the process of the British Pharmacopœia in 1868. In 1869 it formed the basis of a process, which was patented in Paris and this country by Hippolité Mège, for the production of a fat free from taste and odour, and suitable for dietetic use as a substitute for butter. Mège's process consists in passing the fat between revolving rollers,

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, November 7, 1883.

together with a stream of water, and then melting at "animal heat." This process has been used abroad in the production of the fatty substance called oleomargarine.

But while there have been advocates for this process, of whom I have been one, opinions have been now and then expressed to the effect that the washing of the flare before melting the fat, was rather hurtful than beneficial. I have reason to believe that this opinion has been gaining ground among those who have carefully inquired into the properties of the products obtained by the various methods which have been suggested for obtaining animal fat in its greatest state of purity.

I have had occasion during the last two or three years to make many experiments on the rendering and purification of animal fat, and at the same time have been brought into communication with manufacturers of oleomargarine on the large scale; the result of which experience has been that I have lost faith in the efficacy of the Pharmacopœia process. I have found that in the method now generally adopted by manufacturers of oleomargarine, which is produced in immense quantities, the use of water, for washing the fat before melting it, is not only omitted but specially avoided. The parts of the process to which most importance is attached are,—first, the selection of fresh and perfectly sweet natural fat, which is hung up and freely exposed to air and light. It thus becomes dried and freed from an odour which is present in the freshly slaughtered carcase. It is then carefully examined and adhering portions of flesh or membrane as far as possible removed; after which it is cut up and passed through a machine in which it is mashed so as completely to break up the membranous vesicles in which the fat is enclosed. The magma thus produced is put into a deep jacketed pan heated by warm water, and the fat is melted at a temperature not exceeding 130° Fahr.

If the flare has been very effectually mashed the fat may be easily melted away from the membranous matter at 120° F., or even below that, and no further continuance of the heat is required beyond what is necessary for effecting a separation of the melted fat from the membranous or other suspended matter. Complete separation of all suspended matter is obviously important, and therefore filtration seems desirable, where practicable; which, however, it is not on the large scale.

My experiments tend to indicate that the process just described is that best adapted for the preparation of lard for use in pharmacy. There is, however, a point connected with this or any other method of preparing lard which is deserving of more attention than it has, I believe, usually received, and that is, the source from which the flare has been derived. Everybody knows how greatly the quality of pork depends upon the manner in which the pig has been fed, and this applies to the fat as well as other parts of the animal. Some time ago I had some pork submitted to me for the expression of opinion upon it, which had a decided fishy flavour, both in taste and smell. This flavour was present in every part, fat and lean, and it is obvious that lard prepared from that fat would not be fit for use in pharmacy. The pig had been prescribed a fish diet. Barley meal would, no doubt, have produced a better variety of lard.

[*The discussion on this paper is printed at p.* 374.]

TERRA DI SIENA, OR TERRA BOLARE E GIALLA.*

These earths, known also under the names of ochre, bole, umber, etc., are considered by some mineralogists to be ferruginous clays, by others minerals of iron. They are chiefly found in large quantities in the communes of Castel del Piano and Arcidosso (Monte Amiata).†

The yellow earths and bole found on this mountain are true lacustrine deposits, found amid the trachytic rocks, of which it is principally composed. They lie under, and are entirely covered by, the vegetable soil. Varying in compactness and colour, they are termed yellow earths when of a clear ochreous tint, and "terra bolare," or bole, when of a dark chestnut colour. Each deposit consists, for the greater part, of yellow earth, beneath which bole is found in strata or small veins. The mineral being very friable its excavation is easy, and is generally conducted in open pits. The different qualities are separated during the process; the bole, which has the higher commercial value, being the more carefully treated.

After the first separation the bole is further classed into first, second, third, and intermediate qualities—"boletta," "fascia," "cerchione," etc. Its most important characteristic is termed, in commercial language, "punto di colore," or tint. The value of the bole rises as its tint deepens. Thus bole of the third quality is lighter than that of the second, and the second than that of the first. After number three come the "terra gialla."

The yellow earths, after excavation, are exposed to the open air for about a year, by the pit side, without classification. The bole, on the contrary, is placed in well-ventilated storehouses to dry for about six months. This diversity of treatment is owing to the fact that exposure to the elements brightens the colour of the yellow earths and raises their value, while it would damage the bole, by turning its darker tint first into an orange yellow, and, if continued, into an ordinary yellow earth. It also loses in compactness and crumbles up under exposure.

In addition to the "punto di colore," the size of the pieces influences the commercial value of the bole, which increases with their volume. Thus the classification is "Bolo pezzo," "Bolo grapolino," and "Bolo polvere." The yellow earths are classed as "Giallo in pezzi," "Giallo comune," and "Giallo impalpabile," but in these cases the impalpable is worth more than the common yellow.

The production of the Siena earths may be calculated at about 600 tons per annum, of which sum 50 tons are calcined and the rest sold in their natural condition. The value of the trade may be estimated from 100,000 to 150,000 lire. A company (limited), for the working and sale of the yellow earths and bole of Monte Amiata, was formed at Siena in 1872, with a capital of 100,000 lire.

CANADIAN HONEY.‡

The large profits hitherto realized by bee-keepers have induced many others to go into the business, and, consequently, competition is now very keen. It has been said that the quality of honey has suffered thereby, and that the relationship between honey and glucose is of a too intimate kind, but these statements are not borne out by fact. Bees feed on glucose with avidity, and can be made to become mere carriers of this substance to the hive, but this course cannot be economically followed, as dysentery is induced, and the bees are lost. Glucose may be mixed with honey after the latter is taken from the hive, and in warm weather it is difficult

* From a Report by Mr. Consul-General Colnaghi on the Trade and Commerce of the Province of Siena.

† These communes, both on the western slopes of Monte Amiata, are situated in the province of Grosseto. I have included bole among the products of the province of Siena on account of the name, and because the company working the deposits has its headquarters in the city of Siena.

‡ From the *Canadian Pharmaceutical Journal*, September, 1883.

to detect, but when cold weather sets in, such honey will not crystallize, or "cand," as it is technically termed, and the glucose readily separates and prevents solidification.

There are three leading varieties of Canadian honey, named after the food of the bees in the localities where the honey is collected. These are white clover, basswood or linden, and thistle. They are equal in value, but clover honey has perhaps the preference. It is rather darker in colour than the other kinds. Buckwheat honey is produced here to some extent, but is principally confined to the Erie coast, and is used by bee-keepers for feeding purposes, being too dark in colour, and rank in odour, for table use.

Now-a-days all honey is extracted without heat, by means of a machine constructed on the centrifugal principle, the comb being uninjured. It is replaced in the hive, and, in about four days, if the "flow" is good, it is again filled by the bees, ready for treatment. In this way the same comb will last for perhaps two seasons, when, if it is dark, dirty or broken, it is melted and made into "foundation" by a machine devised for that purpose. This foundation is completed by the bees, which put on the finishing touches, and are thus relieved of all the heavy work, devoting their time to pure business. Attempts have been made to reverse matters, so that instead of the bees making wax for man, man makes wax for the bees. Paraffin has been tried as a foundation, and is received with all thankfulness, but, alas, when the heat of summer comes, the foundation melts and the house becomes a ruin. From this it will be seen that beeswax is now seldom or never collected, except for the use of the bees themselves, and Canadian wax may practically be said to be out of the market. The present supply is principally obtained from Africa, where the bee is yet unused to the refinements of civilization.

IMPROVED METHOD FOR PREPARING SCLEROTIC ACID, THE ACTIVE PRINCIPLE OF ERGOT.*

Sclerotic acid (Acidum Sclerotinicum), which was first isolated from ergot by Professor Dragendorff and Dr. Podwissotzky, and which constitutes the active ingredient of the drug, has now been in use for about eight years, and though its effects were often found to be feeble, yet it has not been entirely abandoned, it being still considered by the best authorities to be the really valuable constituent. The occasional unsatisfactory action is rather due to the fact that the substance is supplied by manufacturers in an impure condition, deeply coloured, and containing variable quantities of water, all of which naturally interfere with its uniform action.

To remove these defects, and to place in the hands of practitioners as uniform a preparation as possible, Dr. Podwissotzky has improved his method of preparation as follows:

Four hundred grams of powdered ergot are heated for three or four hours on a steam-bath with 1 litre of distilled water and 60 grams of diluted (1:7) sulphuric acid, then pressed, and the residue again extracted with 500 c.c. of distilled water for two hours in the same manner. The liquid is expressed, united with the first, the whole heated to 70° C. (158° F.), and treated with neutral acetate of lead until this ceases to yield a precipitate. This reagent throws down the erythrosclerotin as an insoluble violet-lead compound. (Erythrosclerotin yields precipitates with metals, earths, and alkaline earths; if freed from these substances it is soluble in alcohol with red colour. After an extract of ergot has been freed from erythrosclerotin, it no longer gives a precipitate with acetate of lead.)

After the liquid, together with the precipitate, has been warmed for one hour more on the water-bath, it is filtered, and the excess of lead removed from the filtrate by hydrosulphuric acid. The sulphide of lead having been separated by filtration, the straw-yellow liquid is evaporated on a water-bath (if at all possible, in a vacuum apparatus) to a syrupy consistence (to about 150 c.c.), or better still until a coffee-brown colour shows itself at the margin of the residue in the dish. (This is a sign of the *beginning* decomposition of the sclerotic acid; the dark colour, when once produced, cannot be removed.)

The residue is now briskly stirred up and mixed with $1\frac{1}{2}$ litre of absolute alcohol, whereupon the sclerotic acid will separate in ten or twelve hours. The alcohol is then poured off, another half litre of absolute alcohol poured on, with which the mass is thoroughly kneaded in a mortar. Finally, it is removed and dried over caustic lime and sulphuric acid. By repeated kneading and working with absolute alcohol, the product may be rendered dry enough to be reduced to powder.

The yield is 12 to 14 grams, and the sclerotic acid thus obtained is best preserved over lime and sulphuric acid. Or, the product may be preserved in absolute alcohol, and may also be transported or shipped in the latter.

The product is quite light coloured, not deeper than gum arabic, but it cannot be obtained entirely free from calcium and potassium salts.

While Bonjean's as well as Wernig's ergotin, when used hypodermically, produce (often?) irritation or inflammation of the connective tissue, the latter does not occur with sclerotic acid. However, a solution of the last-named does not keep long, and to obviate this, some have been in the habit of combining it with salicylic acid. This being, however, but little soluble, and sometimes separating in form of fine needles, which themselves may cause irritation, Dr. Podwissotzky recommends to use thymol-water (1:1000) for solution. In this form, the remedy has been used successfully in the Insane Asylum at Dorpat, and is also commonly dispensed by the pharmacists of the city.

When treated with alkalies or alkaline earths, sclerotic acid *loses its effects completely*, a gum-like body being then formed, while ammonia is given off.

* *Pharm. Zeitsch. f. Russl.*, from *New Remedies.*

INLAND PARCELS POST.

COLLECTION OF PARCELS BY RURAL CARRIERS.

We have been requested to publish the following:—

"Commencing on the 1st November, rural carriers, whether on foot or mounted, will be required to accept parcels from the public for dispatch wherever they now collect letters, and the collection of parcels is subject to the following regulations:—

"'(*a.*) A rural carrier on foot must not accept, from any one person, a greater weight of parcels than 7 lbs. in the aggregate, unless he shall have received notice, on the previous day, from such person of his intention to send a greater weight.

"'(*b.*) A mounted rural carrier is not required to accept a greater weight in the aggregate than 21 lbs. from any one person unless similar notice shall have been given to him.

"'(*c.*) Such notice may also be given by the sender at any post-office on the route of the rural carrier, and the postmaster of such office will inform the rural carrier.

"'(*d.*) A parcel handed to a rural carrier must be within the prescribed limits of weight and size, and must bear stamps to the full amount required for postage, the sender being held responsible that these conditions are complied with.

"'(*e.*) A rural carrier may, at the request of the sender, weigh or measure a parcel, or check the postage, when his doing so does not interfere with the proper performance of his duties, but the sender must understand that the rural carrier is not responsible for the correctness of the weight, size or postage, as this responsibility rests with the office at which the rural carrier hands in the parcel. The rural carrier may, however, refuse to accept a parcel which, beyond all doubt, is above the limits of weight or size.

"'(*f.*) A rural carrier unable to accept more parcels must explain the reason to the person who offers the parcel, and must report the circumstance at the next sub-office on his route, and also to the postmaster of the terminal office.'"

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 10, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

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

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

THE WEIGHTS AND MEASURES ACT.

An annual report by the Board of Trade on its proceedings and business under the Weights and Measures Act has been issued during the past week, which although somewhat shorter and less exciting than some of its predecessors deals with one or two topics of interest to all persons in the habit of using weights and measures for the purposes of trade, whilst it is accompanied by an appendix of considerable scientific value. The report itself once more reflects in several places the powerlessness of the Board under the Weights and Measures Act to exercise authority, its function in this direction being limited to tendering advice in respect to subjects of complaint and inquiry. One of the questions that have been under the consideration of the Board relates to the practice of inspectors in respect to conical glass measures. It is stated that whilst in some of the principal districts of verification inspectors refuse to verify and mark for use in trade glass measures that contain more than a certain number of graduations or subdivisions—how many is not stated—in other districts inspectors pass them so overcrowded with graduations that in the opinion of the Board the intention of the Act is defeated and the use of accurate measures discouraged. A suggestion has therefore been communicated by the Board to the local inspectors that glass measures with an excess of graduations should not be verified, and it is hinted that it is a matter of grave doubt whether a local inspector would be justified in passing for use in trade measures graduated with more than the limited number of denominations marked on the Board of Trade conical glass standard measures. Another subject which has been brought under the notice of the Board, by the local authority of Glasgow, is the question of empowering inspectors to adjust weights and measures brought to them to be verified and found to be incorrect, and to charge a fee for the operation. It has been urged that although the Act takes no cognizance of adjustment, it is much more convenient that the inspector should adjust weights and measures found defective by him, otherwise it might become necessary to carry them to and fro several times before they were passed as agreeing with the standards. The fact of this representation is simply reported without comment, and it is easy to perceive that any such provision could hardly be made absolute, but would have to be surrounded with safeguards for the protection both of the public and the inspectors. Other representations that have been made to the Board concerned the desirability that uniformity should be established in the fees taken by different local authorities for stamping weights and measures under the Act, and also a grievance felt by some inspectors that they are not empowered to extend their testings to packages of goods which are alleged to contain a specific weight or measure.

Some doubt having arisen as to the standard kilogram in the possession of the Board of Trade, it was deemed advisable that a comparison of this unit of metric weight with some other authoritative standard should be made. Here some little difficulty occurred, as the original standard of metric weight, the "kilogramme des archives," has been admitted by the highest authorities to be incorrect, and the foreign standard possessing the greatest authority is that recently made and verified under the direction of the Comité International des Poids et Mesures, on which committee this country is not represented. By the courtesy of the President, however, this standard was made available for the comparison, and the English standard kilogram, which, when originally constructed in 1842, was found to be 1·563 milligrams too light, now proves too be 2·0178 milligrams deficient. It may be hoped that as the Board of Trade acknowledges its previous indebtedness to the results of the scientific researches carried out under the directions of this Committee our Government will see the propriety of contributing towards the payment of the expenses incurred, since it is hardly dignified for Great Britain to continue seeking *in formâ pauperis* boons so closely associated with its commercial interests. Another useful piece of work that has been done by the Board is to carry into effect the provision in the Act of 1878 to avoid the continual use, and probable constant wear, of the imperial standard of weight, by having made an accurate copy of the imperial standard pound. The new copy is similar in form and material to the standard, with the exception that a small proportion of iridium has been mixed with the platinum, as it was considered desirable that it should consist of a rather harder metal than the original. It is intended that this copy shall in future be used instead of the standard in all ordinary weighings conducted by the Standards Department. The Board of Trade has also had the opportunity during the past year of assisting the United States Government by making a comparison of the United States standard of length—a yard—with the British yard standards deposited in the office; the result was that the United States standard proved to be 0·000022 inch longer than the British. A second application from the same Government had to do with a doubt raised as to the ancient measurement of land in a city of the United States, involving the question when the present foot measure was established in that country and whether it may have appreciably differed at any time from the foot measure of Great Britain. The subject is not without historical interest and is discussed in a memorandum that will be attractive to persons of metrological and antiquarian proclivities. It must, however, suffice here to say that although it is difficult to give the precise date at which the present standard foot was introduced into the United States it is considered to be quite clear that it does not and never has differed appreciably from the third part of the English standard yard.

The Report also shows that the Board of Trade recognizes the necessity of keeping abreast of the progress of science by giving a formal sanction to and thus establishing new units of measurement as they are required. The enormous development in the practical application of electrical science to lighting and other purposes, which found legislative recognition last year in the Electric Lighting Act, has necessitated the adoption of some uniform unit of measurement of electrical energy, and it is stated that in the provisional orders under this Act a unit has been taken which is equivalent to the "energy "contained in a current of one thousand ampères "flowing under an electromotive force of one volt "during one hour." Whilst, however, the unit of measurement may be looked upon as thus settled, no practical meter of electricity capable of use in commerce and daily life has yet received official sanction. The attention of the Board has also been called to an analogous subject in the defects in the existing rules for testing gas meters as well as the want of a uniform standard of light, and it expresses the opinion that on these and other points legislation is desirable.

We have already spoken of the scientific value of the appendix to the Report, and this is especially manifest in a series of tables for the calculation of densities and expansions, which have been drawn up for future use in the Standards Office in consequence of the tables hitherto in use not having been found in accord with the most recent scientific research. These new determinations will no doubt be looked upon as a boon by many investigators, since the series includes tables showing the maximum pressure of aqueous vapour at different temperatures, ratios of densities of water and air, corrections necessary when weighing a gallon or a litre of water at different temperatures in glass or brass containing vessels, a table of the specific gravities of nearly one hundred substances, and several tables relating to the coefficients of expansion of a number of metals, glass and other substances at different temperatures. There is also a table of suggested allowances for variations of the barometer for use in petroleum testing. It will be evident, therefore, that the present Report shows no falling off in the quality of the work done by the Standards Department of the Board of Trade.

Reference is made in the Report to a decision under the Weights and Measures Act in the Appeal Court at Edinburgh, which seems to be open to remark in respect to the ground of the decision of one of the judges, which might prove misleading. The point in dispute was whether a "glass" is to be deemed a definite quantity. Lord YOUNG held that if a man asks for a "glass" he is in a sense buying by measure, but it is not by any known measure, local, customary or imperial. We think, however, it should be borne in mind that under the 19th section of the Act even local and customary measures are made illegal, and any person who sells by any denomination of weight or measure other than one of the imperial weights or measures, or some multiple or part thereof, is made liable to a fine. The Lord Justice Clerk was of opinion that in the sale of beverages by the glass the contract was one by price and not by measure, and this seems to us to be the sounder view of the case.

The first Evening Meeting of the North British Branch of the Pharmaceutical Society for a new session will be held in the Society's Rooms, 119A, George Street, Edinburgh, on Wednesday evening next, the 14th inst., at half-past eight o'clock, when the President of the Branch (Mr. John Nesbit) will deliver an address, and a paper, entitled "Hints to Young Pharmacists," by Mr. George Burrell, will be read.

* * *

The School of Pharmacy Students' Association will recommence its meetings on Thursday evening, the 15th inst., when the chair will be taken at 8 p.m. by the President, Professor Attfield, and an address will be delivered by Mr. Joseph Ince, the subject of which will be "Science, its Abuse and Use." At this meeting, also, the election of officers for the present session will take place. As most of our readers are aware, one of the principal objects of this Association is the encouragement of original investigation in pharmaceutical subjects by the members, and to afford aid in this direction a Research Fund has been established. We have reason to believe that there are those who are desirous of helping to augment this Fund; we would therefore mention that as it is maintained solely from the balance from the subscriptions of members, this purpose can be best attained by joining the Association, all past and present students of the School of Pharmacy being eligible for membership.

* * *

On Thursday, the 1st inst., the Edinburgh Geological Society celebrated its jubilee year by a Conversazione in the Museum of Science and Art, which was attended by representatives from no less than forty-seven societies existing in Scotland, among whom were the President (Mr. Nesbit) of the North British Branch of the Pharmaceutical Society and several members of the Council. In the course of the evening an able and interesting address was delivered by the Duke of Argyll on the Uniformitarian Theory.

* * *

An extraordinary crime is reported to have been perpetrated in a pharmacy in Strassburg early in the morning of the 23rd of October. About on o'clock the assistant on night duty went downstairs to the shop in consequence of the ringing of the night-bell by a person who said he wanted a prescription made up. Shortly afterwards the principal was surprised by the sounding of an electric bell in his room, and upon descending he found his assistant dreadfully mutilated and at the point of death. It is conjectured that the assistant, seeing the pretended customer in the act of raising an axe, tried to escape by running to a back room and touched the electric bell as he passed; but it would appear that the assassin was too quick for him and struck him down with repeated blows. The murderer, unfortunately, got clear away, taking the till with a small sum of money in it. M. Lienhardt, the victim, was forty-two years of age and leaves a widow and two children, for whom a fund is being raised.

* * *

The *Glasgow Medical Journal* for November contains a note on a case of lightning stroke, by Mr. J. Yule Mackay, which is made doubly interesting by a capital photograph, showing the curiously ramified markings produced upon the skin of a boy's arm by the action of the electric fluid. Similar cases have been previously reported; but we believe this is the first time that a permanent record of the marking has been secured, and we note with interest that this perpetuation is due to the intelligent promptitude of Mr. William Gunn, pharmaceutical chemist, of Dunse, the father of the boy, who had a photograph taken within four hours of the accident, before the phenomenon had had time to disappear.

* * *

Some time since a druggist residing in Brooklyn, who had been annoyed by boys mischievously ringing his night-bell and running away, let his anger get the better of his discretion, and lying in wait with a stick until the next ring came rushed out and thrashed—a customer! The consequence has been an action for damages, which were laid at two thousand dollars; only fifty dollars have, however, been awarded.

* * *

On Saturday evening last an extensive fire broke out in a warehouse in Buchanan Street, Glasgow, and we are sorry to notice that before it was extinguished the premises occupied by Messrs. Thomas Davison and Son, Chemists and Druggists, were involved in the conflagration.

* * *

The sessional arrangements of the Society of Arts include six series of Cantor Lectures, which will be delivered in the following order:—(1) "The Scientific Basis of Cookery," by Mr. W. Mattieu Williams; (2) "Recent Improvements in Photo-Mechanical Printing Methods," by Mr. T. Bolas; (3) "London Houses," by Mr. R. W. Edis; (4) "The Alloys used for Coinage," by Professor W. Chandler Roberts; (5) "Some New Optical Instruments and Arrangements," by Mr. J. Norman Lockyer; and (6) "Fermentation and Distillation," by Professor W. Noel Hartley. The Juvenile Lectures are to be on "Crystals and Crystallization," and delivered by Mr. J. Millar Thomson.

* * *

At the meeting of the Chemical Society held on Thursday evening next, papers will be read on "The Estimation of Starch," by C. O'Sullivan, and on "The Products of Decomposition of Solutions of Ammonium Nitrite," by G. Stillingfleet Johnson.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, November 7, 1883.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Messrs. Andrews, Bottle, Butt, Churchill, Gostling, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Squire, Symes, Woolley and Young.

The minutes of the last meeting were read and confirmed.

The Council went into committee for a short time to discuss some matters arising out of the minutes. On resuming,

Mr. SYMES, referring to the motion which he brought forward at the last meeting respecting an exhibition, said he should not, of course, attempt to raise that question again, but it had occurred to him since, that as new cases had been fitted up in the examination room which would probably relieve the cases in the Museum of some of the articles contained in them, a modified form of Mr. Schacht's original proposal for exhibiting pharmaceutical apparatus might be carried out. He would suggest that the Library and Laboratory Committee should consider the subject.

The PRESIDENT said he would bring the subject before the Committee at its next meeting.

Mr. GREENISH said the Curator had already obtained permission to appropriate a portion of the Museum to the exhibition of novelties.

The PRESIDENT said the Curator's application did not refer particularly to new apparatus, but that point should be considered.

Mr. SYMES said he had been informed by the Curator that when pharmacists visited the Museum they often asked what there was new, and were not always satisfied with seeing new drugs or plants with long names, but were anxious to know what was moving in connection with pharmacy.

Mr. SCHACHT suggested that the Committee might consider the desirability of parting with some of the old pieces of apparatus which might not be of much service.

DIPLOMAS.

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

Evans, Evan James.
Jones, Frank.
Longtoft, William.
Ord, Septimus William.
Pirie, William.
Puckey, Courtenay.

ELECTIONS.

MEMBER.

Pharmaceutical Chemist.

Evan James Evans, of Clevedon, having passed the Major examination and tendered his subscription for the current year, was elected a "Member" of the Society.

ASSOCIATE IN BUSINESS.

William Wrench Blades, of Wandsworth, having passed the Minor examination, being in business on his own account, and having tendered his subscription for the current year, was elected an "Associate in Business" of the Society.

ASSOCIATES.

The following, having passed the Minor examination and paid as Apprentices their subscriptions for the current year, were elected "Associates" of the Society:—

Baxter, William ....Bromley.
Briggs, George William ....Bulwell.
Clayton, George ....Manchester.
Cole, William ....West Cowes.
Doubleday, Frederick William..Norwich.
Fletcher, Francis Round ......Netherton.
Harold, John Patrick ....London.
Hedley, Charles Alfred ....South Shields.
Jackson, Harold ....Manchester.
Loeffler, George Berthold ......London.
Mann, William.................. ..Leicester.
Marshall, Sam ....Hyde.
Maxton, William ....Edinburgh.
Mitchell, Thomas Maxwell......Leeds.
Mowat, John Watt ....Coatbridge.
Nobbs, Arthur Perkins ....Newport, I.W.
Notcutt, William Brighty ......London.
Owen, David James...............Swansea.
Price, Charles Cleaver............Bristol.
Price, Henry Thomas ....Shrewsbury.
Pumphrey, Arthur ....York.
Reade, Leonard James ....Wolverhampton.
Rutherford, Fredk. Arthur R. ..Bristol.
Sharp, John ....Galashiels.
Sharp, Stephen.....................Heywood.
Smout, Charles Lickfold.........London.
Turner, John Edward.......... ..Woodbridge.
Wokes, Thomas Siminson ......Hull.
Woodruff, Albert Edward ......Sandwich.
Wrenn, William Albert ....Penge.

APPRENTICES OR STUDENTS.

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

Burnett, Augustus Frederick...Highbridge.
Huskisson, Owen Dudley ......London.
Jackson, John Thomas ....Scotforth.
Lewis, Thomas ....Llancain.

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

Mr. SCHACHT asked why the amount of the fine of one of the gentlemen who was to be restored to membership was greater than the others?

The PRESIDENT said because he had been longer in arrear.

The Council went into committee to further discuss this question.

REPORTS OF COMMITTEES.

FINANCE.

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

The PRESIDENT gave a summary of business that had been transacted in connection with the investments in freehold ground rents.

Mr. ROBBINS said it might be satisfactory to the Council to know that other societies were following the same course with regard to investments. He found that during the last year the Society of Arts had sold out stock and invested the money in freehold ground rents.

BENEVOLENT FUND.

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

£10 to a former member, aged 64, suffering from chronic illness.

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

£10 to the widow of a registered chemist and druggist.

£10 to a registered chemist and druggist.

Several applications the Committee declined to entertain, and one had been deferred for further information.

The report and recomendations were received and adopted.

LIBRARY, MUSEUM, LABORATORY, AND HOUSE.

Library.

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

Attendance.		Total.	Highest.	Lowest.	Average.
July	Day	561	38	7	21
	Evening	122	10	1	5
August	Day	61	10	0	2
September	Day	57	9	1	5 nearly

Circulation of books.	No. of Entries. Town.	Country.	Total.
July	150	111	261
August	62	43	105
September	52	100	152

Carriage paid:—	£	s.	d.
July	1	13	5
August	0	14	7½
September	1	9	1

The Librarian had also reported that in making the annual inspection of the Library, he had found that the undermentioned books were missing:—

Bentley's Elementary Botany.
New Remedies, vols. 9–10.

The tenth volume of the Journal of the Chemical Society, reported missing some years since, had been returned to the Library. Three volumes, lost while on loan, had been paid for by the borrowers.

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

Riverius (L.), Practice of Physic, 1678.
From Mr. T. GREENISH.

Martindale (W.), and W. W. Westcott, The Extra Pharmacopœia, 1883.
From Mr. H. K. LEWIS, Publisher.

India, Revenue and Agricultural Department, Collection of Papers on Bee-keeping in India, 1883.
From H.M. SECRETARY OF STATE FOR INDIA.

Méhu (C.), Sur la redissolution des pigments de l'urine, 1883.

Sutton (F.), Manuel systématique d'analyse chimique volumétrique, 1883. From Dr. MÉHU.

Institution of Civil Engineers, Charter, By-laws, and list of members, 1883. From the INSTITUTION.

Working bulletins for the Scientific Investigation of the Newer Materia Medica, vol. 1, 1883.
From Messrs. PARKE, DAVIS and Co.

Flückiger (F. A.), Pharmakognosie des Pflanzenreiches, 2e Aufl., 3e Lief, 1883. From the AUTHOR.

Plugge (P. C.), Über die Warscheinlichkeit einer Veränderung des Strychnins in dem thierischen Organismus, *etc.*, 1883. From the AUTHOR.

Chicandard (G.), La fermentation panaire, 1883.
From the AUTHOR.

Schär (E.), Die wichtigsten Genussmittel fremder Völker, 1877–8.
— Die Farbstoffe des Alterthums und der Neuzeit.
— Die ältesten Heilmittel aus dem Orient, 1877.
— Botanischer Congress (Abtheilung: Chinarinden) und Austellung pharmaceutisch wichtiger Pflanzenproducte zu Amsterdam, im April, 1877.
— Über verschiedene Reactionen der Kupferoxydsalze bei Gegenwart von Cyanverbindungen, 1869.
— Nachtrag zu den Beobachtungen über die Guajak-Kupfer-Reaction, 1870.
— Über die Knollen von Flüggea japonica, 1874.
— Notizen über Cubebencampher, 1875.
— Bemerkungen zu der Salzsäure-Reaction bei der Prüfung des Arrow-Root, 1875.
— Über Cortex Quebracho, 1881.
— Notizen über Oleum folior. Cinnamom. ceylan., 1882.
— Chemische Bemerkungen zur Berieselungsfrage.
— Die Chemie in Dienste der öffentlichen Gesundheitspflege, 1877. From the AUTHOR.

The Committee recommended the purchase of the undermentioned books:—

Martindale (W.) and W. W. Westcott, Extra Pharmacopœia, 2nd ed. 2 *copies.*

Haldane (R.), Workshop Receipts, 2nd series.

Dragendorff (G.), Plant Analysis, translated by H. G. Greenish.

Landolt (H.) and R. Börnstein, Physikalisch-chemische Tabellen.

Bentley (R.), Elementary Botany.

The Librarian had presented his report on the sixth annual meeting of the Library Association of the United Kingdom, held in Liverpool, September 11 to 14.

Curator's Report.

The Curator had reported the attendance in the Museum during July to have been:—

	Total.	Highest.	Lowest.	Average.
Morning .	415	32	3	16
Evening .	95	10	1	6

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

Herbarium specimens of the Siam Benzoin tree, without flowers or fruit. Sections of the trunk of the Siam Benzoin tree.

Herbarium specimen of the Sumatra Benzoin tree, with leaves, flowers and fruit.

Flowers and immature fruit, preserved in spirit, of the Sumatra Benzoin tree and dried mature fruit of the same tree.

Leaves of the Gamboge tree, both male and female, and flowers and immature fruit of the same preserved in spirit, and sections of the trunk of the tree.

Fruits of the Balsam of Peru tree grown in Singapore, and a specimen of the oil distilled from the seeds.

Specimens of both Black and White Rasamalas.

Specimen of Camphor made from *Blumea balsamifera.*

A piece of the wood of Liquidambar Altingia.

Sample of Minyak Tangkawang or Vegetable Tallow from Borneo.

Seeds of the Vegetable Tallow tree from Sarawak.

Seeds of the Vegetable Tallow tree from Pontianak.

From Mr. R. Jamie, Singapore.

A fine collection consisting of 145 specimens of Japanese drugs; a specimen of Ogea Gum; also specimens of drugs from Sierra Leone.

From the Director of the Royal Gardens, Kew.

Twelve specimens of Brazilian Drugs.

From Messrs. Christy and Co.

Poisonous points prepared from the seeds of *Abrus precatorius.* From Mr. Boverton Redwood.

Specimens of genuine *Ledgeriana* bark (C. *Calisaya*, var. *Ledgeriana*, How.), and of Red Bark, illustrating the paper in the *Pharmaceutical Journal* on Red Bark grown at different altitudes.

From Mr. J. E. Howard, F.R.S.

Specimens of the fruits, leaves and flowers of *Chailletia toxicaria*, a rat poison used in West Africa.

From Dr. W. Renner.

Specimen of a fragrant resin with the odour of Angelica, from the Solomon Islands.

From Mr. R. Reynolds, of Leeds.

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

The Committee had considered the question of appointing an assistant to the Curator and recommended that a person should be engaged who would make himself generally useful, rather than one of scientific attainments, and that the appointment should be left in the hands of the President and Curator, subject to an approval by the Committee at the next meeting.

The question of commutation of arrears of subscriptions had also been considered, and the Committee recommended that no alteration be made in the instructions given to the office.

On the motion that the report be adopted—

Mr. Schacht proposed to discuss the question referred to in the last paragraph and began to state the information which the Committee had received from the Assistant Secretary on the subject, when it was proposed and carried that the Council go into committee to discuss this topic.

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

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor reporting the progress made with cases which had been put in his hands. A penalty of £5 and costs had been paid into court by

F. Bradley, 161, York Street, Hulme, Manchester.

Several new cases of alleged infringement of the Pharmacy Act, had been brought before the Committee and in most of them it was recommended that a prosecution be instituted. A case of appeal from the Registrar's decision refusing to place a certain name on the Register had come before the Committee, and had been deferred for further investigation.

Pharmacy Acts Amendment Bill.

A Deputation from the Executive Committee of the Chemists and Druggists' Trade Association had waited on the General Purposes Committee, which consists of the whole Council, in order to communicate its views with regard to the proposed Pharmacy Acts Amendment Bill. The Deputation consisted of—

Mr. John Harrison, President.
Mr. W. G. Cross, Vice-President.
Mr. Thomas Barclay.
Mr. A. H. Mason.
Mr. Owen Jones.
Mr. G. H. Laird.
Mr. George Walker.
Mr. W. F. Haydon, Secretary.

This report was, as usual, considered in committee. On resuming, the report and recommendations were received and adopted.

REPORT OF EXAMINATIONS.

October, 1883.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (17th)	6	3	3
„ (18th)	5	2	3
	— 11	—5	—6
Minor (17th)	19	9	10
„ (18th)	20	5	15
„ (19th)	25	9	16
„ (24th)	25	13	12
„ (25th)	25	7	18
	—114	—43	—71
	125	48	77

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Major (10th)	1	1	0
Minor (10th)	13	2	11
„ (11th)	12	6	6
„ (12th)	16	8	8
	—41	—16	—25
	42	17	25

Preliminary Examination.

	Candidates.		
	Examined.	Passed.	Failed
October 2nd.	391	179	212

Twenty-two certificates received in lieu of the Society's examination:—

5 College of Preceptors.
1 Royal College of Surgeons of England.
9 University of Cambridge.
1 " Durham.
3 " Edinburgh.
1 " London.
2 " Oxford.

EVENING MEETING.

Wednesday, November 7, 1883.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The second Evening Meeting of the session was held on Wednesday, the 7th inst., at half-past eight o'clock.

The minutes of the last meeting having been read and confirmed, a paper was read on—

THE CLASSIFICATION AND PROPERTIES OF RED RESINS KNOWN UNDER THE NAME OF DRAGON'S BLOOD.

BY J. J. DOBBIE AND G. G. HENDERSON.

The paper is printed at p. 361, and gave rise to the following discussion:—

Professor BAYLEY BALFOUR said dragon's blood was a substance of practically little importance at the present day, but it was frequently referred to by the older writers and travellers,—Marco Polo, for instance,—and it was considered in those days as a panacea. It was formerly an important article of commerce in the East, and also between the Portuguese and the Canary Islands. Now, however, it was very little used, except perhaps for colouring tooth powders, and he believed coachbuilders also used it as a colouring matter. If, however, it was not of much practical importance it had a considerable interest from the antiquarian and botanical point of view, because the true dragon's blood was obtained from plants of the genus *Dracœna*, etc., and the species which yielded it were only found in a few localities, and these at wide intervals over the surface of the globe. There were many kinds of dragon's blood in commerce, as had been pointed out, but the genuine specimens were all obtained from some member of the genus *Dracœna*. One kind very much in commerce was the red dragon's blood, obtained from the *Calamus*, a species of palm, but it was quite different from that obtained from the *Dracœna*. The oldest mention of this substance was by Dioscorides, who referred to a substance which he called "kinnabari," as being brought from the island of Dioscoris, which had been identified with the island of Socotra. Socotra was at the extreme north-east corner of Africa, and had been identified by M. Marriette as the Islands of the Sea referred to in Scripture. M. Marriette had found on a Theban monument a representation of the ambassadors of one of the old queens of Egypt, who were sent to a place called To Nuter, and he had identified the Archipelago of To Nuter with the Island of Socotra. Curiously, however, this island, although so well known in ancient times, seemed to have dropped out of knowledge, and at the present day hardly one in a hundred knew where it was. A few years ago he went to examine the fauna and flora of the island, and brought back with him amongst other things specimens of dragon's blood. This "kinnabari," which Dioscorides mentioned, was obtained from a species of *Dracœna* that grew on the island, belonging to the family of the Liliacæ. All the species of that genus did not yield a resin, but four only, which belonged to a very peculiar type of the family, a very old type which branched very freely and formed a thick trunk, and of which there were very few representatives at the present day. He had drawings of the tree and also a number of the leaves which he would pass round. The peculiarity of this species was that not only did the trees branch freely but the leaves were curiously stiff and sword-like, and it formed a very thick stem. Many would no doubt have heard of the famous dragon's blood tree of Orotava in Teneriffe. The resin was used by the Guanchos for the purpose of embalming. The genus *Dracœna* was peculiar amongst all monocotyledonous plants from the fact that the stem showed a great secondary growth in thickness, arising from a formation of new tissue. The *Dracœna* of Orotava attained the height of about 60 ft., and a circumference of 48 feet; unfortunately, it was blown down in 1868. The resin was secreted from the stem in the form of tears, exuding naturally from small cracks or crevices, and forming a large red mass. In Socotra it exuded most abundantly immediately after the rainy season. [A specimen was shown exhibiting the resin adhering to the tree.] The natives of Socotra collected it by chipping off the resin with a knife into a small bit of skin placed against the tree; and there were different qualities collected. First of all there were the large tears, which was the best form and most expensive, which they called *edah amsello.* Naturally, in breaking it off small portions became detached, which were collected, and formed a small powdery dragon's blood known as *edah dukkah*; and thirdly, in order to prevent any loss, they melted the refuse into cakes, which were afterwards broken up into smaller masses and called *edah mukdehah.*, which was the cheapest kind. This was the true dragon's blood as collected in the Island of Socotra, which was meant by Pliny and many other old authors. That obtained in the Canary Islands was of much the same character, but the species of tree was quite different, being known as the *Dracœna Draco*. For a long time it was considered the only dragon's blood tree; but not many years ago, when Miss Tinne made an expedition into the interior of Africa, she went up to the source of the Bahr el Ghazal River and discovered there another branching *Dracœna*, which yielded a kind of dragon's blood. She brought home specimens, which were described as *Dracœna Ombet*, but no resin had been obtained from that tree. Dr. Schweinfurth also brought the same tree from Suakim and there was no doubt that it was a distinct resin-yielding tree; though as yet the character of the resin had not been determined. Later, Hildebrand, in travelling to Zanzibar, found on the Somali Coast another species of resin-yielding *Dracœna*, which he brought home and it was described as *Dracœna schizantha*; but the resin had not yet been examined. There were thus four distinct species of *Dracœna*, all yielding apparently a distinct resin. The only resins, however, of which they possessed specimens were from the Canary Islands (*Dracœna Draco*) and from Socotra (*Dracœna Cinnabari*). It was very curious that four trees should be found all belonging to this peculiar old type of vegetation, existing in such different places, and that was one of the most interesting facts concerning the distribution of plants in these regions. One of the most interesting subjects of botanical speculation was the origin and development of the flora on the highlands of Africa. It might be known to some that at the Cape and on the West Coast about Angola, and also in the north-western parts and in the Canary Islands, as well as in the highlands of Abyssinia, Nubia and Somali, there were found a number of plants which closely resembled one another; in some cases they were specifically alike, and in others generically; and it was an interesting problem to account for the extraordinary distribution of these genera and their absence in the intermediate localities. One could not account for it by the fact that the intermediate land had not been properly explored, because these plants were only found on the higher lands, and the only explanation seemed to be, that these were the remains of a very old African flora, which once peopled the greater part of the continent, at a time when the climate was very much colder than at present. As the ice in the ice age gradually receded northward and the climate got warmer, these plants were gradually driven upwards to higher regions and both northwards and southwards, and the result was that at the present day, on the high peaks of South Africa, in the Canary Islands, and in the other places he had mentioned, the remains were found of the old flora which, by climatic changes, had been gradually driven out and replaced by more tropical plants. As yet no *Dracæna* had been found in South Africa, but it would not be surprising if one were found on the higher lands there. He might also recall to the recollection of the meeting that the Island of Socotra, which though it lay in the pathway of civilization had yet been so long unknown, yielded a very important drug, the Socotrine aloes. It was supposed by many to take its name from the island, though others derived it in a different way; but there was no doubt that the true Socotrine aloes came from Socotra, though it was not until four years ago, when he visited the island, and was able to obtain and bring home specimens, that the plant which yielded it had been properly described. The plant had been named *Aloe Perryi* by Baker, who identified a leaf brought home by Commander Perry some years previously, and there were several plants now to be seen growing in Kew Gardens. Another important point in connection with this island was the occurrence upon it of a great number of myrrh and olibanum trees. The sources of true myrrh and olibanum had been long disputed; the true myrrh plant was now pretty well ascertained, but there was little doubt that amongst the myrrhs sent into the markets in the East, a great number were spurious. There had also been a great deal of discussion as to the locality of Sheba, the queen of which paid the visit to Solomon and as to the Islands of the Sea; but this identification by Marriette of the Island of Socotra with the Archipelago of To Nuter, as being the place where the Queens of Egypt sent ambassadors to procure myrrh and olibanum, would tend to show that probably Socotra may have been one of the great myrrh and olibanum-producing countries, whence the ancients procured those substances; it was interesting, therefore, to ascertain whether there were any botanical support for that view. It was found that in Socotra there were a great number of myrrh and olibanum plants. The olibanum-yielding genus (*Boswellia*) had hitherto been considered to contain only four species, but in Socotra three special species were found, so that the island contained more species of that genus than any other area of like extent. In the same way the genus *Balsamodendron*, the myrrh-yielding plants, had three distinct representatives in Socotra, and there were probably two more, so that it must in past times, when the commerce with adjacent countries was greater than at present, have supplied many of the markets of the East with these substances.

Professor Bentley desired to offer his thanks to Professor Bayley Balfour for the interesting account he had given of the botany of the species of *Dracæna*, which yielded either the Socotrine dragon's blood or those which they had reason to believe yielded a red resin, which, perhaps, although not altogether authenticated, would be found to be essentially the same in character with that which had been described to-day from the Island of Socotra. They were also much indebted to Professor Balfour for being the first to authenticate the real source of that very important drug, Socotrine aloes; and his investigations generally with regard to the Island of Socotra, of which he had given a short abstract, showed how thoroughly he had explored it. It was quite true that dragon's blood was not a subject of much practical interest, being very little used, at least, in this country, but it was a substance of which they had the very earliest records, finding it mentioned as a matter of commerce between the Arabians and Chinese, along with such substances as olibanum, myrrh and liquid styrax. It was rather remarkable that even at that time the Chinese were the great users of dragon's blood, and at the present day he believed this was still the case. They did not get it now, however, from the *Dracæna Cinnabari* of Socotra, but from Sumatra, where it was derived from the *Calamus*. Practically, the only kinds of dragon's blood of which they had any special knowledge were those from *Calamus* and *Dracæna*. There were a great number of the specimens in different museums which had no authentication, and it was very doubtful whence they were derived. There were one or two interesting chemical facts with regard to these resins. It was generally stated that all kinds of dragon's blood contained iron, and he should like to know whether the gentlemen who had investigated these resins had tested for iron. But the matter of greatest interest was the benzoic acid. It had always been said that *Calamus* dragon's blood contained benzoic acid, and one of the tests given by which to distinguish the Socotrine dragon's blood from that of Sumatra was that the Socotrine resin did not evolve benzoic acid when heated. That was the test given in most works of repute, such as Flückiger and Hanbury's. The investigations of the authors of the paper now under discussion proved, however, that dragon's blood contained no benzoic acid. It also appeared from the present paper that the specimens in Class I., which appeared to be well authenticated, and which probably all came from the *Calamus*, contained cinnamic acid. The specimens in the fourth class were said to come from *Calamus Draco* (Bombay) and from the Punjaub: and these, as well as two well authenticated species, the *Dracæna Draco* and *D. Cinnabari*, contained no cinnamic acid. It thus appeared that the resins of *Calamus Draco* from Bombay and the Punjaub were said to contain no cinnamic acid, while that of *Calamus Draco* from Sumatra did contain that acid. He thought that could easily be accounted for, as it was pointed out with regard to the resins exported from Bombay, and said to be from *Calamus*, that they probably came first from the east coast of Africa. He should have said there could be no doubt about it. He believed it was mentioned by Hanbury without question that the so-called Bombay kind was obtained from Africa, and probably from Socotra. In Professor Balfour's interesting paper at the British Association he had referred to the commerce between the Island of Socotra and Zanzibar, and from Zanzibar many articles of commerce went to Bombay, so he thought there could be little doubt that the variety which was said to be from *Calamus Draco* was really from a *Dracæna*, and if so that explained the discrepancy. He should not be at all surprised to hear that authentic specimens from *Dracænas* would have no cinnamic acid, whilst those from *Calamus* would be found to contain it.

Mr. Umney said it was quite unnecessary to apologize for this very interesting paper, and the remarks Professor Balfour had been kind enough to make, on the ground that dragon's blood was so little used. It was quite true it was little used in medicine, but it was largely used in the arts; certainly, at least 50,000 pounds weight reached this country annually. This only showed how little was really known of dragon's blood, and he must say that when one saw the large piles which were exposed weekly for sale, it almost made one ashamed to handle a thing of which he knew so little. The meeting was much indebted to the gentlemen who had investigated the chemistry of the matter and also to Professor Balfour, who had brought forward such interesting facts in connection with its botanical distribution.

Mr. Holmes said he was sure that if Mr. Hanbury had been alive he would have been exceedingly delighted with this paper, having paid considerable attention to the subject of dragon's blood, as might be gathered from the remarks in the 'Pharmacographia.' Professor Balfour had shown that of the dragon's blood there were four different classes, two of which were obtained from plants of which nothing whatever was known, whilst at the same time he had cleared up the difficulties which even Mr. Hanbury was obliged to acknowledge for want of further information with regard to the properties of the dragon's blood from the *Dracænas*. The fact that the dragon's blood from all the *Dracænas* which are known to yield the resin had very similar properties, so that they could all be put into one group, was also an addition to our knowledge of the subject. One point came out in the first table, which was of some importance. Mr. Umney had shown that dragon's blood was largely imported into this country, but in Class IV. it was pointed out that some Socotra dragon's blood had gone to India, and as far as the Punjaub, showing that although it might not be much used here as medicine, it was probably largely so used in India. The collection in the Indian Museum, a portion of which had been handed over to the Pharmaceutical Society, contained a large number of specimens of dragon's blood, showing that it was much used in various districts in India.

Professor Bentley said he believed it was used in this country for staining marble.

Mr. Umney said it was also used by French polishers.

Mr. Moss said Professor Balfour had made one or two interesting remarks on Socotrine aloes, and he should like to ask him if he could say how it was that now-a-days they never met with the deep-coloured Socotrine aloes they were accustomed to ten years ago, aloes which broke with a beautiful glassy fracture, translucent and red at the edges. That which they now met with usually came in monkey or goat skins and broke with a dull fracture. If it were not in those skins it was in an almost liquid state. He was surprised to hear Professors Bentley and Balfour speak of dragon's blood as being of so little consequence, for probably neither of those gentlemen had a piece of polished mahogany in his house which did not owe a great deal of its beauty of colour to this substance.

The President then proposed a vote of thanks to the authors of the paper, who, he said, had done an immense amount of work in examining these specimens; they were, therefore, especially grateful to these officers of the University of Edinburgh for investigating these resins. When he came to the botanical part of the subject he felt personally it was a great mistake that he was a pharmacist, and not a botanist, for he should like to wander over the world looking for fresh specimens, and at all events endeavouring to add to the sum of botanical knowledge. He must, therefore, include in the vote of thanks, Professor Balfour, who had given the meeting so much interesting information, and also the Royal Geographical Society, which had kindly lent them a map for illustrating the Professor's remarks.

Professor Bayley Balfour, in thanking the Society for the kind way in which the communication had been received, desired to say that the only way to obtain further information was to impart that which one possessed, and he was much indebted to Mr. Umney and Mr. Moss for what they had said as to the importance of this substance. With regard to aloes, he could not give any very definite information, but he might say that he witnessed the collection of it on the island, which was a very simple process. A small depression was made in the ground, in which was placed a small piece of goat's skin; then a number of aloe leaves were cut off and laid round, with the cut edges projecting into the depression, and in two or three hours the juice had all exuded and filled the little cup thus made. The juice was then transferred to a larger vessel of goat's skin, and in this state was termed *tâyef rhiho*, or watery aloes, and having been kept for a short time, was exported in that state to Mascate and Arabia. He must say that his information on these points, having to be obtained through interpreters, might not be quite accurate in all details. A certain kind of aloes, again, was kept for about a month in skins, during which time the watery part evaporated, and it got into a more viscid consistence and was then known as *tâyef geshushah*, and was exported somewhere else. After it had been kept still longer, say about six weeks from the date of collection, it became quite dense, though not solid, and was then known as *tâyef kasahul*, which was considered the best. He obtained from the Sultan three skins of aloes in different stages, and though he was three weeks on the journey home, he still found the watery aloes quite fluid, and put it into large bottles, in which he found a large yellow deposit at the bottom, possibly consisting of aloin. The other two skins he had left as they were, and on looking at them the other day he found they were quite hard and solid. If the subject was of interest to pharmacists, he should be happy to send specimens for examination. If any members of the Pharmaceutical Society could suggest any way in which these specimens could be utilized he should be only too glad.

The next paper read was on—

The Preparation of Lard.

BY PROFESSOR REDWOOD.

The paper is printed at page 364, and gave rise to the following discussion:—

The President said this was a practical subject, referring to a substance of great importance in pharmacy, and the problem seemed to be whether lard was not best prepared without coming in contact with water.

Mr. Willmott was very glad that his experience of prepared lard, which he communicated to the Conference at Southport, had been the means of eliciting from Professor Redwood the interesting paper he had now given. The method referred to as being adopted by manufacturers of oleomargarine was to an extent identical with what he had advocated, a simple process of melting and straining. There was first the careful selection of the fat, then the separation of the adhering membranes, then the complete bruising up of the mass, and lastly, the melting at the lowest temperature possible and straining through fine tow or a double layer of the finest flannel. He remembered thinking at the time that this was amply sufficient for the purpose intended, but Professor Redwood said filtration seemed desirable where practicable; he presumed filtration through paper was intended, and at the Conference Meeting Professor Attfield referred to a certain separation of material brought about by the filtration of fats. The question seemed to arise, under what conditions was this separation effected, and how did it compare with the process of filtration now proposed. Apart from that point, he thought as regards stability the method given by Professor Redwood was the best which could possibly be adopted. One thing seemed tolerably clear, that the less heat the fat was subjected to, the better, as a rule, was the result.

Mr. Martindale said he had not had much personal experience in this matter, but he had seen the manufacture of lard on a large scale in the North of England some time ago. The process consisted in cutting up the flare and acting upon it by means of steam, so that the scrap which was left behind was rendered almost crisp. The strained melted fat was poured into warm water and stirred, after which a considerable sediment fell to the bottom, consisting of albumen and other substances. The liquid fat was drawn off into bladders at a level above that of the water. That manufacturer supplied very large quantities of very pure lard. Reasoning from analogy one would think that that process still left the lard somewhat hydrated, which he did not think was good, but he knew from experience that it did keep well. That reasoning would lead one to suppose that leaving even a trace of water in contact with fat was bad, that it always tended to cause the fat to become rancid, as it did cod liver oil, for example, and probably if the lard had been thoroughly dehydrated by gentle heat it would have been better. There was something taken out of lard by this process which seemed to be only done by water and which was useful on the manufacturing scale.

The President said it seemed to him that the question lay within a very small compass. He should gather that Mr. Hills, and those who thought with him that water was convenient, reasoned that it was desirable to get rid of a certain unpleasantness which there was about fresh flare, and, instead of leaving the outside to purify itself by exposure to the air for a time, they thought it desirable to wash the internal fat. A good many years ago he had himself made some experiments in that direction, not on a large scale, and the results obtained were pretty much this, that if fresh flare were kept a few hours until it was quite sweet to the smell, then put under an ordinary press and "smashed," and the fat afterwards melted out at the lowest possible temperature, a result was obtained that was all that could be desired. One would naturally suppose that contact with water was not a desirable thing for any fat. He thought the result of Mr. Willmott's paper at the Conference and this one from Professor Redwood would be to suggest a process which would improve the character of this preparation. He concluded by proposing a vote of thanks to Professor Redwood, which was carried unanimously.

Provincial Transactions.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The opening meeting of the above Association was held at the George Hotel, on Wednesday, October 24. There was a fair attendance of the members present. The President, Mr. Councillor Fitzhugh, F.C.S., occupied the chair.

It was reported that the Pharmaceutical Chemistry Class had begun its meetings at the University College under the superintendence of Professor Clowes, D.Sc., F.I.C. Twenty-seven associates had given in their names. The average attendance had been twenty-three. Several of the masters present testified to the good work the class was doing, and the great amount of assistance it would be to the young men in their preparation for the Minor examination.

The Hon. Secretary, Mr. C. A. Bolton, reported upon the steps the Council had taken towards securing a suitable room for the young men to meet in, and a place where a museum and library might be opened for their use one night per week. Successful arrangements were stated to have been made with the Nottingham School Institute for placing the necessary cases in their rooms at a nominal rental. The meeting cordially ratified the action of the Council, and suggested that the room be fitted up as quickly as possible.

The question of the Society's votes at the coming election of annuitants was next considered, and after discussion of the claims of the various applicants the votes at the disposal of the President were instructed to be divided amongst five specified candidates.

The President announced that since the last meeting Mr. J. H. Atherton, F.C.S., one of the founders of the society and for some years its President, had died. The Council, in the name of the Society, had instructed that a letter of sympathy should be sent to the widow and family, the reply to which had been received, was read, and ordered to be entered on the minutes.

The President then opened a discussion upon Professor Attfield's Presidential Address at Southport, in which he was followed by Messrs. J. Wilford, A. E. Beilby, W. H. Parker, R. Jackson, C. W. Warriner, W. V. Holgate, and others. After a very long and animated discussion, the following resolution on the motion of the Secretary, seconded by Mr. W. H. Parker, was carried unanimously:—"That the best thanks of this Association be given to Professor Attfield, Ph.D., F.R.S., F.I.C., for his able, suggestive and comprehensive address delivered at Southport."

Twenty-two gentlemen were then proposed as associates.

OLDHAM CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

At a meeting of the members of the above Association held in their room, Church Institute, Mr. Charles Jones read a paper on "Botany."

The essayist during his remarks gave a very interesting description of a plant's existence from its seed germination to its maturity, he afterwards spoke of the different functions of each part of the same, and altogether the paper was most enjoyable.

A vote of thanks to Mr. Jones was proposed by Mr. Swinbourn, seconded by Mr. Lees, and passed unanimously. Mr. Martin, President, occupied the chair.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The annual meeting of the above Association was held on Wednesday evening, October 24, last, at 23, Burlington Chambers, New Street, Birmingham, when the following gentlemen were elected officers for the ensuing year:—President, Mr. J. Lucas; Vice-Presidents, Messrs. Brown and Barlow; Hon. Secretaries, Messrs. Thompson and Wright; Hon. Treasurer, Mr. J. Lucas; Auditors, Messrs. Arblaster and Haydon; General Committee, the officers of the Association together with Messrs. Austin, Barclay, Blackwell, Churchill, Dewson, Ellis, Gibson, Grieves, Hooper, Howes, Jones, Morris, Perry, Sanderson, A. Southall, W. Southall, Wakefield, Weaver, Wilcox and Wilkes.

The Secretaries reported that a revised price list with some improvements was in the press and would be ready in a few days; that arrangements had been made with Mr. Stokes Dewson to give a series of lectures for the Minor on two afternoons per week, provided a certain number of students would give in their names at once, and that a hope was entertained that next session, satisfactory arrangements will be made with the authorities of Mason's College to undertake the teaching of pharmaceutical students; that during the past session Mr. David Hooper, F.C.S., gave a very interesting lecture on "Courage," and that the same gentleman would lecture on December 12, next, on "Justus von Liebig: his Life and Works;" and that Mr. A. E. Robinson, F.C.S., had kindly consented to give a lecture on Wednesday, November 28, entitled "Michael Faraday: the Man and the Chemist." The thirteenth annual *soirée* will be held on January 25, 1884.

LIVERPOOL CHEMISTS' ASSOCIATION.

The second general meeting of the thirty-fifth session was held at the Royal Institution, on Thursday evening, October 25. The President, Mr. Edward Davies, F.C.S., F.I.C., in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations were announced:—*The Pharmaceutical Journal*, from the Society; *The Canadian Pharmaceutical Journal*, from the Editor.

Messrs. W. R. Smith and T. R. McPhail were elected members.

There being no miscellaneous communications, the Predent called upon Mr. A. H. Mason, F.C.S., Vice-President, to read the paper of the evening, on the following subject:—"The Condition of Pharmacy: Should it be under State Control?" The paper, which was of considerable length, discussed the points raised in Professor Attfield's address and the subject of patent medicines. With respect to proposed legislation, the author expressed his opinion that the draft Bill to amend the Pharmacy Act did not emanate from a body which was representative of the chemists and druggists of the country.

M. T. F. Abraham said that with regard to the patent medicine duty, he agreed with the author of the paper that the term "patent," as applied to this class of medicines, was an absurdity and anomaly, conveying, as it did, to the public mind the notion that these medicines received the Government's sanction and approval. In opposition to the opinion given by Mr. Mason he considered that the Pharmaceutical Society might be fairly considered as representing the druggists of this country and that those who held aloof from voting for its members thereby gave their tacit acquiescence to the same. He concluded by proposing a vote of thanks to Mr. Mason for his paper.

Dr. Symes, in seconding the vote of thanks, remarked that Mr. Mason's paper was the first the Association had had, for some years past, bearing directly on trade interests, and he was sorry there were not more present to take an interest in what he would call the politics of pharmacy. He considered that a druggist had as good a chance of making a fair living as any other calling, provided, of course, he possessed the ordinary necessary qualifications, without which no one could expect success. He thought that the whole tendency of the recent address of Professor Attfield was to endeavour to secure a monopoly for the English chemist and druggist. He did not know any class of the community who had anything approaching the monopoly thus claimed for the druggist. The medical faculty had quite as important a claim for State protection as the druggists, and yet they did not attempt to secure the monopoly of the sole right of prescribing, so long as those exercising the same did not assume a title to deceive the public.

Mr. Conroy, in supporting the motion, took exception to Mr. Mason's remark that a copy of Professor Attfield's address should be sent to every member of Parliament. He thought this would be of little benefit, as it was a well-known fact that these gentlemen were amongst the principal supporters of the chief opponent of the druggists, namely, the stores. He could not help thinking that chemists had trespassed on other trades as much as anyone else, and therefore they should be the last to complain of others dealing in articles which in no sense could be considered as within their rights to control. He deprecated the idea of too much importance being placed on the replies from country chemists which had been received by Professor Attfield in response to his inquiries, and concluded by supporting the vote of thanks to Mr. Mason.

The President having put the motion, it was carried by acclamation.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

A general meeting was held in the Society's Rooms, Market Place, Sheffield, on Wednesday evening, October 31. Mr. Preston, the President, in the chair.

The minutes of the last meeting were read and confirmed, and the donations of the current numbers of the *Pharmaceutical Journal* announced.

The President then called upon Mr. J. M. Furness to read his paper, entitled "Our Allegiance to the Pharmaceutical Society." We regret that the great pressure upon our space prevents the publication of this address *in extenso*, but the following abstract will indicate its character:—

Mr. Furness commenced his paper by saying that the abstention of so large a proportion of qualified persons from joining the Pharmaceutical Society raised the question as to what could be the cause of the estrangement, and whether the Society had failed to justify its existence as a corporate body in carrying out the principles for which it was established. In order to assist in forming a judgment upon these points, he gave a brief sketch of the origin, establishment and progress of the Society, which he said would be sufficient to make it apparent to all but the biassed, that the Society is worthy and demands the allegiance of all practitioners of pharmacy, and that the position of the eleven thousand who do not subscribe to its funds is not an enviable one, seeing that they are willing to receive everything and unwilling to yield anything. Mr. Furness then proceeded as follows:—"The Society exhibits no signs of decay, it displays no lack of zeal, but still shows a healthy vitality and sound vigorous constitution, and is capable of continuing the work of reform, improvement and progression of which it can show such a satisfactory record during the past forty-two years. It has become a publicly recognized and national institution with which no one need feel ashamed of being connected; it has proved beneficial to the public and creditable to ourselves. It has undoubtedly increased the respectability and importance of our calling and conferred social advantages and distinction upon its followers. From its labours have resulted complete registration of all the members of the body, with all its attendant importance and advantages. Local secretaries have been established throughout the country,—to watch its interests,—who are invaluable for gaining information on any given point, or when the whole body requires rousing into action. It has also always endeavoured to promote good feeling and fellowship among its members, and for this purpose has introduced several pleasant annual social gatherings in London to bring the members together; it has encouraged the formation of provincial Associations, such as this, throughout the kingdom, and its leaders promoted the British Pharmaceutical Conference, all of which have tended to many friendships and acquaintances being formed, and men in the same town, often near neighbours, and who never exchanged a friendly greeting, have been brought together and made friendly. A society which has, in such a brief period, accomplished objects like these among its many achievements, is a distinct gain and advantage to every individual practitioner of pharmacy, and, judging it by its own works, the Pharmaceutical Society claims the allegiance of all. It is, therefore, surprising that such apathy exists among the fraternity about joining its ranks, and that there should be only 5500 connected with the Society out of 17,000 entitled to enjoy its privileges and advantages is simply astonishing, and scarcely speaks well in favour of the perception of those members of the trade, who, while content to reap the advantages the Pharmaceutical Society can bring about and dispense, are also content to receive them as benefits dropped from above, or raised from below, as a matter of course, and requiring no recognition from them. The Society works for all in the trade, not simply for its members now, and this want of allegiance places the Council in an invidious position, seeing it has the government of the whole body in its hands, and only receives the support of about one-third of its constituency. Although it is endowed with considerable duties and responsibilities by the Legislature, it is in reality a voluntary Society, and it is a question well worthy of discussion whether allegiance to the Society should be made compulsory in any way, or whether we should wait patiently until the time comes when none are connected with the business, excepting such as have been under the influence and brought into contact with the Pharmaceutical Society by its examinations, when it is almost safe to predict that a different state of things will exist in the bright time that will dawn upon pharmacy if the Society continues its labours in the future as successfully and upon the same lines as in the past."

The President, in inviting discussion, said that Mr. Furness had travelled over a deal of ground in the half hour he had addressed them. There was plenty of matter for discussion, and as he felt some part of the paper was applicable to himself he should think about making amends. The remarks on the Benevolent Fund were specially worthy of notice, and he commended the fund to their favourable consideration.

Mr. Learoyd moved a vote of thanks, confessing, however, that he was disappointed with the paper. He came, he said, expecting to hear something to argue about, but there was nothing beyond what everybody knew and which was indisputable. He would reserve a statement of his views on some of the questions until the next meeting, when he proposed to read a paper.

Mr. N. E. Smith, in seconding the vote of thanks, said he was at variance with Mr. Learoyd. He considered there was plenty of matter for discussion in the paper; he had gained a good deal of information and had formed a much more favourable opinion of the Pharmaceutical Society than he had had before.

Mr. F. A. Dobson supported the motion of a vote of thanks. In his opinion, joining the Society should be made compulsory on all on commencing business; he could see little difference in this respect between themselves and solicitors who had to subscribe yearly to the Incorporated Law Society, and if they did not pay they did not secure registration, but were struck off the rolls. With reference to restrictions on the sale of poisons he thought the schedule ought to be abolished or considerably extended.

Mr. Furness replied to the discussion and thanked the members for their vote of thanks.

The following gentlemen were elected members of the Society:—Messrs. F. A. Dobson, Harrison, W. H. Maxey and H. R. Thatcher.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, Nov 1, Dr. W. H. Perkin, F.R.S., President, in the chair.

The following certificates were read for the first time:—Messrs. C. J. Baker, F. A. Blair, L. Briant, R. Datta, R. G. Durrant, T. Hart, A. E. Harris, W. Irwin, S. Johnson, R. Jackson, H. C. Lee, W. H. Martin, C. E. Potter, B. M. H. Rogers, W. G. Whittam, H. A. Wetzel.

The President announced that no books would be issued from the Library during the present month, in consequence of the preparation of the catalogue; the books can be used for reference as usual.

The Secretary read the following papers—

On the Production of Hydroxylamine from Nitric Acid. By E. Divers.—Lossen, in 1865, prepared this substance by the action of tin and hydrochloric acid on ethyl nitrate. Maumené showed that ammonium nitrate might be substituted for ethyl nitrate. In 1872 the author found that sodium nitrate, and, indeed, nitric acid itself, could be used with excellent results. Since then the author has worked at the subject and his results are given in the present paper. The author gives a detailed account of the action of various metals on nitric acid alone and in the presence of hydrochloric or sulphuric acid. As an example, 58 c.c. of fuming hydrochloric acid were mixed with 5 c.c. of nitric acid (sp. gr. 1·42) and the mixture poured quickly on 35 grams of granulated tin placed in a flask filled with carbon dioxide. The flask was cooled by immersion in water; the ebullition soon ceased, and the solution was then poured off; 21 grams of tin were dissolved. The solution was diluted, the tin removed by sulphuretted hydrogen, etc., and the hydroxylamine in the filtrate determined by decinormal solution of iodine, sodium carbonate being added to keep the solution alkaline. About 4½ grams of nitric acid were thus converted (out of 5 grams) into hydroxylamine. The following is suggested as a good lecture experiment to show the formation of hydroxylamine. Pour some dilute sulphuric acid on zinc and then add a little nitric acid, in half a minute pour off the acid solution, add a large excess of potassium hydrate so as to dissolve the zinc hydrate, and then a very little copper sulphate solution. The characteristic yellow precipitate, proving the presence of hydroxylamine, will appear on stirring. The latter part of the paper contains a rather lengthy discussion on the nature of the reduction of nitric acid. The author gives the following summary of his results. Free nitric acid yields hydroxylamine when treated with tin, zinc, cadmium, magnesium and aluminium. In the presence of hydrochloric or sulphuric acid the quantity (with tin and zinc) may be considerable. Without a second acid only traces of hydroxylamine can be detected. There is no reason to believe that the action of the hydrochloric or sulphuric acid upon the metal is instrumental in forming hydroxylamine. The second acid serves to decompose nitrate as fast as it is produced. In this way (1) it holds the hydroxylamine in a state more stable than the nitrate; (2) it preserves the hydroxylamine from the destructive action of nitrous acid by preventing that formation of this acid which would otherwise result from the reaction between a metal yielding hydroxylamine and its own nitrate; and (3) it determines the reduction of all the nitric acid to hydroxylamine by supplying the hydrogen for reproducing it and so keeping it free to the last. Metals act upon nitric acid in one of two ways, and are accordingly divisible into two classes. One includes the metals, silver, mercury, copper and bismuth, which form nitrite, water and nitrate, but neither ammonia nor hydroxylamine, and do not convert their nitrate to nitrite. These metals decompose nitric acid into hydroxyl and nitroxyl, combining with these radicals to form hydroxide and nitrite, which by secondary reactions become water, nitrous acid and metal nitrate. These metals therefore separate nitrogen from oxygen (hydroxyl) in decomposing nitric acid; they do not in this decomposition separate hydrogen from oxygen, just as they do not do so in any other case. The other class of metals includes tin, zinc, cadmium, magnesium, aluminium, lead, iron, and the alkali metals. These metals form ammonia and generally also hydroxylamine: they do not yield nitrite or nitrous acid with free nitric acid, but they readily form nitrite by acting on their own nitrate. They exercise two actions; one upon the nitric acid, the other upon the hydroxylamine. They act first upon seven molecules of the acid, separating, in the form of hydroxylamine, the hydrogen of six of them by forming nitrate, and leaving the seventh converted into water and hydroxylamine. This action occurs without evident break into successive stages. The second action of these metals is that in which they combine with hydroxylamine to form metal ammonium hydroxide, which decomposes with water into metal hydroxide and ammonia. Nitrites have a constitution indicated by the name nitronates, *i.e.*, they have their metal directly united to their nitrogen. They have the same radical, NO_2, as nitrates have, these being its metal-oxyl compounds.

Professor Debus, while recognizing the great value of the paper as to its experimental work, could not agree with some of the theoretical conclusions; the statement that a metal attached itself directly to nitrogen in a nitrite seemed quite hypothetical.

Dr. Armstrong said there was so much to be learned as to the action of nitric acid that they were as yet hardly in a position to discuss its decompositions. There seemed to be very little doubt that pure nitric acid had no action upon silver, but that some nitrous acid was necessary to start the reaction.

On the Chemistry of Lacquer (Part I). A communication from the Chemical Society of Tokio by K. Yoshida. Japanese lacquer (Urushi) is the milky secretion of *Rhus vernicifera*. The tree is 9–12 feet and resembles the ordinary wax tree. Two varieties of urushi exist, "Kiurushi" and "Seshime urushi." The "Kiurushi" or raw lacquer is the best, being the natural juice which exudes from cuts in the stem; the seshime urushi being prepared by soaking branches and twigs for some months in water. The urushi is usually coloured with lampblack, vermilion, indigo, etc. The pure urushi is a thick, greyish fluid, having a characteristic sweetish odour, sp. gr. 1·0020 at 20° C. When exposed to moist air at 20° in thin layers it rapidly darkens in colour and dries up to a lustrous translucent varnish. Ishimaton, on February 18, 1879, gave some account of this lacquer to the Manchester Philosophical Society, and showed that it contained a resin, a gum, water and a small quantity of residue insoluble in ether, water and alcohol. The author extracted urushi with alcohol and obtained a peculiar acid, urushic acid, and a volatile poisonous substance. Urushic acid, $C_{14}H_{18}O_2$, is a pasty substance, soluble in benzene, etc., which does not dry up when exposed to moist air. The author has studied the action of bromine, strong hydrochloric acid and nitric acid, and has prepared the copper, lead and iron salts. The gum is identical with gum arabic. A mixture of gum and urushic acid does not harden on exposure to the air. The portion insoluble in alcohol and boiling water contains a peculiar nitrogenous substance, but it has, after boiling, no action on urushic acid; if, however, after extracting the urushi with alcohol the residue be treated with cold water, an extract is obtained containing a diastatic matter which effects the hardening of urushi. The author has made experiments as to the hardening of urushi in different gases; he finds that moist air and a temperature of 20°–23°C. are the most favourable conditions. After the hardening the urushic acid is found to be converted into a new substance, oxyurushic acid, $C_{14}H_{18}O_3$, quite insoluble in every substance tried. This body can be formed by the action of strong chromic acid on urushic acid.

The President said that the mode of action of the diastase did not seem very fully explained in the paper; it was curious that the lacquer varnish dried best in moist air, the reverse being the case with the ordinary varnishes in use in this country. In some experiments which he had made with an amber varnish he had found that sunlight had a great influence in promoting the hardening of the varnish.

On some Compounds of Phenols with Amidobases. By G. Dyson.—In a recent paper, Dale and Schorlemmer came to the conclusion that aurin combines with the amidobases, and prepared pure rosanilin phenate. The author has prepared and investigated this and several other similar compounds:—Aniline phenate, toluidine phenate, naphthylamine phenate, aniline β-naphthate, toluidine naphthate, rosaniline phenate, xylidine naphthate, rosaniline aurinate, aniline aurinate.

On the Alleged Decomposition of Phosphorous Anhydride by Sun-Light. By R. Cooper and V. B. Lewis.—In a paper read before the Southport Meeting of the British Association by the Rev. A. Irving, the author states that phosphorous anhydride, prepared by passing a slow stream of dry air over molten phosphorus decomposes when exposed to sunlight into amorphous phosphorus and phosphoric anhydride. The authors have repeated this experiment and analysed the sublimate obtained in the manner described by Irving; it consisted of 78·2 per cent. of phosphoric anhydride, 4·7 per cent, phosphorous anhydride and 17 per cent. of phosphorus. On exposing this white mixture to sunlight it became red, the phosphorus being converted into the amorphous variety. In another experiment the air after passing over the melted phosphorus bubbled through carbon disulphide. After some time the bisulphide was allowed to evaporate on blotting paper, when enough phosphorus was left behind to give dense fumes.

Professor Debus called attention to the fact that it was generally stated in text-books that phosphorous anhydride could be prepared by passing air over heated phosphorus.

The Society then adjourned to November 15.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held on Wednesday evening, October 31; Mr. Parkinson, President, in the chair, when a paper on "New Remedies" was read by Mr. J. F. Burnett, of which the following is an abstract:—

The essayist remarked that what he had to say was not the result of original investigation, but a series of facts compiled from various published sources which might prove interesting, as many pharmacists seemed to know very little of these recently introduced drugs. The drugs alluded to were as follows:—The bark of *Hamamelis virginica*, a remedy gaining a reputation as an astringent and likely to gain a permanent place in materia medica. Sassy bark, recommended by some as sedative in heart disorders, its action being somewhat similar to digitalis. The seeds of *Abrus precatorius*, not only considered interesting on account of the property ascribed to the infusion of producing ophthalmia, but also used as a standard of weight for Indian jewellers. *Piscidia erythrina* a third drug furnished by the Leguminosæ, possessing sedative properties similar to opium, but producing no objectionable after-effects. Kola nuts, very much vaunted now as a specific for intemperance, their property being usually ascribed to the caffeine they contain; their use as a clearing agent for putrid water was alluded to. Quebracho, becoming a favourite with many practitioners as a remedy for dyspnœa. At one time there were numerous substitutions in the market, so that this drug had only recently been fairly tried. A brief allusion was made to cascara sagrada, as being likely to perfectly supersede the other species of *Rhamnus* as a safe but certain laxative. Papaw juice was spoken of as a valuable aid to digestion, its active principle being papain. In conclusion the essayist hoped that what he had said would stimulate all the members of the Association to inquire more into these "new remedies," a further knowledge of which would, of course, make them better qualified for their position in life.

Specimens, sketches, etc., were exhibited to illustrate the paper.

A discussion followed, in which the President, Messrs. Braithwaite, Briggs, Cooper, Cracknell and Millhouse took part.

Parliamentary and Law Proceedings.

Alleged Poisoning by Canned Salmon.

On Thursday, Mr. S. F. Langham, the Deputy Coroner for Westminster, held an inquiry as to the circumstances attending the death of Julia Nunn, aged 17. It appeared from the evidence that the deceased became ill after eating some potted salmon purchased at a grocer's shop.

Dr. John Hunt, surgeon, of 1, St. George's Square, Pimlico, said he was called to see the deceased on Monday afternoon, the 13th ult., when she was in a serious condition, and had all the appearance of a person suffering from an irritant poison. He held a consultation with another medical gentleman, and they agreed that the girl was suffering from the effects of poisoned salmon. Four days later the patient showed symptoms of improvement; but she had a relapse, and died last Saturday morning. He made a *post-mortem* examination and found all the stomach, intestines and other internal organs in a state of extreme inflammation. Death had been caused by peritonitis, the result of taking poisoned salmon. On looking at the pot from which the salmon had been taken he found it to be denuded of its tin in many places. The tin was dissolved from the iron, and nitrate of tin (*sic*) having been formed, the salmon had become decomposed. In his opinion all such tins ought to bear a label to the effect that the food should be eaten directly the tin was opened. Experiments had been made, and the "nitrate of tin" found mixed with the fish had killed guinea pigs. It would be much better if food of this description were put into glass vessels.

The Jury returned a verdict that the deceased was poisoned by tinned salmon imported by Messrs. Lazenby and sold by Mr. Barrow.

The Coroner said he would communicate with Messrs. Lazenby with a view to their corresponding with the manufacturers of the compound.—*Times.*

Poisoning by a Liniment.

On Thursday, Dr. Danford Thomas held an inquest on the body of William Harris, a solicitor, aged 82, who died on Tuesday afternoon. According to the evidence of the son of the deceased, his father, who was very absent-minded, went into his dressing-room on Tuesday morning and took what he believed to be an aperient draught. Shortly afterwards he complained of a pain in his stomach. Dr. Norton was called in and found the deceased's tongue much blistered. The bottle which was supposed to have contained the draught was ascertained to have held a poisonous liniment, known as "nine oils," largely consisting of ammonia, and used by the deceased for skin disease from which he suffered. The deceased had long been in the habit of doctoring himself, and his dressing-room (the Coroner said) presented the "appearance of a chemist's shop in a state of confusion." The liniment was poured by the deceased from a large into smaller bottles for more convenient use.

Dr. Norton said that death was the result of the dose of liniment taken by the deceased.

The Jury returned a verdict of "Death from misadventure."—*Times.*

Reviews.

The Book of Prescriptions.* Sixth Edition. By Henry Beasley.

The various publications bearing the author's name are so well known that they scarcely need introduction. They show uniformly care and accuracy in their compilation; and the favour with which they have been received by the public is evidence that they have supplied a want.

The present volume contains upwards of three thousand prescriptions selected from the practice of the medical profession; the source of each drug is indicated, and brief pharmaceutical notes appended. The solubility, vehicle for exhibition, dose, incompatibles, and when necessary, the antidotes of each remedy are described.

To the young practitioner, therefore, such a compendium offers obvious advantages; while the pharmacist may gather much information from its pages. It is a handy and useful manual.

Workshop Receipts.† Second Series. By Robert Haldane.

The title of the book affords the best indication of its design. We have already important works bearing upon the industrial arts and allied sciences, which under the form of enlarged dictionaries or encyclopædias treat fully on manufacturing processes. The names of Brande, Ure and Muspratt will naturally occur to every reader in connection with this subject. But the growth of technical art has been so rapid, and so many minor interests have been created, that there remains ample room for less ambitious effort, which in its own way may be distinctly useful. There is a large amount of information indispensable to the artizan, the small manufacturer or the scientific amateur, which though scarcely worthy of being included in an elaborate treatise, yet might find a place with great advantage in some special reference work. To group together these outlying processes, and to describe them so that the reader may be able to apply them for himself, is the object contemplated by Mr. Robert Haldane. An opportunity has been offered to the writer, of which he has availed himself successfully, of introducing a number of recipes and hints based rather on the rule of thumb than on scientific principles. These are called generally trade secrets, and are often guarded by their possessors with jealous care. They are the results of long experience and their practical value cannot be ignored. The result is the volume now before us, in which the genuine workman will find many things worthy of his attention, and which the amateur may consult with equal pleasure and instruction. Amongst the more chemical topics will be found alcohol, the alkaloids, disinfectants, hydrogen peroxide and a new process for magnesia; the arts are represented by bleaching, dyeing, inks and pigments; pharmacy, by the preparation of essences, extracts and glycerine; the laboratory, by cements and lutes; while the amateur may turn to the sections of luminous bodies, or copying. Confectionery occupies a fair space, and there are a variety of other receipts belonging to the workshop, but hard to classify. By 'Receipts,' short abstracts are intended or descriptive notices, for the work in no way resembles a pocket formulary, and its contents are so well arranged and elucidated that the term compilation is not strictly accurate. Mr. Haldane has executed his task faithfully and well. A copious index is appended.

* London: J. and A. Churchill. 18mo. Pp. i.–xx., 1–593. 6*s*. 6*d*.

† London and New York: E. and F. N. Spon. Crown 8vo. Pp. i.–viii., 1–485. 5*s*.

Correspondence.

Liquid Extract of Cinchona.

Sir,—In allusion to the observations of Professor Redwood, reported in your correspondence of November 3 I have no desire to set myself up as a censor of the British Pharmacopœia, nor do I consider that because I intimate that the extractum cinchonæ liquidum has little relation to the liquor cinchonæ cordifoliæ of the late Richard Battley, I can be regarded as condemning it. All I would be taken to mean is, that although it may be a substitute for, it is not the preparation made by Mr. Battley during the time I was working with him in his laboratory, when it acquired its speedy reputation amongst the most distinguished members of the medical profession. The remarks I referred to were made at the meeting in March last, by one who has had great experience in the pharmacy of bark, and I was, accordingly, led to quote them. If Professor Redwood will be so good as to refer, he will see that I did not declare "that the framers of the Pharmacopœia have much aided in bringing the pharmacy of cinchona bark into a muddle," but that following the quotation, which Dr. Redwood has not given in full, I added that they "had much aided this state of things." If Mr. Battley gave, "for the benefit of all comers, a detailed description of his process, and which is precisely that given in the Pharmacopœia," it would have been interesting if Dr. Redwood had put this at the meeting in March, when he stated that the preparation did not originate even with the pharmacists or medical men of this country. If Mr. Battley did, generously, give his form in all its details to the London College, why was the name changed to extractum cinchonæ liquidum, and if also, for the benefit of all comers, why have there been and why are there still so many feeble imitations, and where the occasion for so much debate?

Referring to my remark that I forbear, in justice to another, to recapitulate the steps of the process, Professor Redwood kindly suggests that I might have written, in justice "to myself." Not having the slightest interest, directly or indirectly, in the liquor cinchonæ cordifoliæ, I can dismiss this part of the matter for the Professor to digest.

A dead dog is better than a live lion, and I should wish that Mr. Battley's word for his process should be taken in preference to Heathfield's; yet, although the former truthfully stated facts, he did not disclose the whole of the operations; did not enter into some details of manipulation and elimination which, at least when I worked with him in his laboratory, constituted the essence and completeness of the preparation. I am not the champion of the late Richard Battley, nor of any other maker of his liquor cinchonæ; but it is just to his memory to touch upon the foresight and ability he displayed at a time when pharmaceutical skill was shrouded in the gloom of the dark ages, and to add that he introduced a medicine which rapidly gained general esteem, and which, whatever may have been his public utterances regarding it, has not yet made its appearance in any published formula.

Shortly referring to the inquiry of "D. Cinchon," it is not for me to contribute any expresssion regarding the label. I was not the composer of it, nor have I seen it for upwards of twenty years. The process which was adopted was of such a nature that a product was obtained very much stronger than any other liquid preparation of bark of the same specific gravity with which I have been acquainted, but I must ask your correspondent to refer to another source for a reply to his inquiry.

Wilson Street. W. E. Heathfield.

Ungt. Hydrargyri Nitratis.

Sir,—I am greatly obliged to Mr. Maben for the trouble he has taken in further elucidating his paper relative to the above Pharmacopœia preparation. In referring, in his letter, to my contribution on the ointment bases, he does not, I think, represent me quite correctly. I shall be glad, therefore, without wishing to prolong the discussion, or to encroach needlessly on your space, if you will allow me just a word or two in reply.

Mr. Maben says:—"Mr. Willmott states that olive oil ointments do not deteriorate for the reason that 'a larger proportion of the acid is retained in its normal condition.'" Now I do not "state" this; I simply say it will be convenient to adopt it as an hypothesis; and though I do not, and will not, contradict Mr. Maben's statement that, "as between an olive oil ointment and a seed oil (10 per cent.) ointment, the difference is due not so much to the acid as to some active principle in the seed oil;" it has yet, I think, to be shown that with an equal quantity of nitric acid present in the two cases (both ointments being kept in securely stoppered bottles), there would, in the long run, be much, if any, difference between them. In referring, in my paper, to nitric acid as preventing all change (whether pure oil be used or not), I speak of it as being, not simply "in excess," but as being increased to three-fifths of the weight of the oil and lard combined, a quantity, of course, quite inadmissible in any ordinary formula.

Again, Mr. Maben says:—"Mr. Willmott, referring to lard, states that its reducing power is even lower than that of oil, etc." I cannot find such a statement in my paper. I assume (and here again it is put as hypothetical) that lard exercises less power than even olive oil—not in "reducing" the mercury, but in breaking up the nitric acid in the presence of heat, and hence the more stable result. When the finished ointment is mixed with seven times its weight of lard on an ordinary slab, Mr. Maben will see at once that the conditions are entirely different. Squire, in his 'Companion,' speaking of the correctly prepared B.P. ointment, says:—"On being diluted with lard, it soon acquires a leaden colour." In such a case the addition of nitric acid as suggested by Mr. Maben, would scarcely, I think, be considered admissible.

As regards the highest frothing point, it must not be overlooked that my experiments were conducted in the height of summer, and consequently with materials subjected to, or, so to speak, under the influence of a steady July temperature. I can quite believe that a difference of several degrees may be accounted for in this way.

If I were to suggest any alteration in the present formula for ung. hyd. nit., it would be to take the proportions, pretty nearly, of oil and lard of the London Pharmacopœia with the increased quantity of nitric acid ordered in the British. When carefully manipulated, this produces a result satisfactory in all respects.

King's College Hospital. W. Willmott.

The Indication of Alkalinity in the Estimation of Hydrocyanic Acid.

Sir,—In my note on the estimation of hydrocyanic acid, the following clause is slightly in error—(paragraph 3): "No change occurs until the acid is wholly converted into sodium cyanide and the solution has become slightly alkaline, at which point a pale crimson colour appears." Owing to the presence of a little carbonate in the soda solution and the slow action of the acid thereon, the solution becomes slightly tinted before the acid is saturated; the alkali should therefore be added until the solution becomes decidedly crimson. With deficiency of alkali the colour disappears during titration.

A few trials will furnish an indication for future guidance.

Edinburgh. Peter MacEwan.

Tincture of Nux Vomica prepared from the Extract.

Sir,—I have been in the habit of making this tincture from the B.P. extract for about ten years, and unlike Mr. Tanner (vide *Pharm. Journ.*, October 13,) I have every reason to believe it a satisfactory mode of preparing the tincture, and for uniformity of strength far preferable to the B.P. formula, as tinctures made from extract cannot vary so much as when prepared from the crude drug.

Last week I made a quantity of the tincture by putting 48 grs. of extract into a 16-ounce bottle of spirit at 10 p.m., allowing it to stand until next morning, then shaking well, placing it aside for a couple of days, when the tincture had become quite clear and bright, with a slight sediment at the bottom of the bottle, which if collected might weigh about 2 grains. I have always considered this sediment the result of carelessly drying the extract, and I do not think such a small matter as this sediment should outweigh the more important point of uniformity of strength; the B.P. formula is so troublesome that few retail chemists make their own tinct. nux vom.

London. J. Hick.

The Supply of Drugs to the Public.

Sir,—I do not consider that the means proposed by Mr. George Nind to alleviate the unsatisfactory condition of supply and remuneration in the drug trade would prove at all satisfactory. In fact it is scarcely intelligible what he really means.

He commences with a suggestion having, he says, for its object "the bringing back the sale of medicines to the public to its legitimate distributors." Yet he proposes that these distributors should be anyone, grocer, oilman, huckster, store-keeper or draper, for surely he could not look upon the chemist, who merely examined the drugs and supplied the labels, as a distributor.

This may be, as he says, "a simple and easy manner of defining the responsibility of the chemist." But what chemist would like to undertake the responsibility? After examining a parcel of drugs what guarantee would the chemist have that the huckster really put that same drug into the packet that would eventually bear his (the chemist's) name? Then again, Mr. Nind mystifies us by his reference to the Parcels Post. If, as he says, "the sale of medicines is becoming more and more convenient if supplied in packets or bottles" (through the Parcels Post), why could not the sale be confined to chemists, instead of being conducted, as he advocates, by hucksters, etc.

I think too, that if, as Professor Attfield suggests, the spirit and letter of the existing Pharmacy Act were extended, the retail sale in open shop of most of the simple and compound medicines of the B.P. being carried on only by qualified druggists, unregistered persons being allowed to sell the few remaining drugs, if contained in duly secured packets bearing the name of a registered chemist, the condition of supply in the drug trade would be more satisfactory, and the remuneration also, the latter I think being greater than if the chemist examined drugs for hucksters and supplied them with labels. J. Kemble.

F. Barry.—We are unable to give you any information as to the comparative rarity of the two works, which are both in the library of the Pharmaceutical Society. The price that they would fetch would depend very much upon the idiosyncrasy of the buyer.

C. Ridgley.—The penal provisions are very sweeping in their character. According to 52 Geo. III. c. 150, sect. ii., any person who "shall utter, vend, or expose to sale, or offer or keep ready for sale, whether for foreign or home consumption, or buy or receive or keep for the purpose of selling by retail either on his, her or their own account, or on account or behalf of any other person or persons, any packet," etc., containing an article liable to pay duty as a patent medicine, which is not provided with the proper stamp, is made liable to forfeit for every offence the sum of £10.

J. H. H.—For information respecting "kairine," see vol. xiii., pp. 444, 994 and 1065.

Pharmakon (who should have sent his name and address) is recommended to apply to one of the nursing associations for information.

Communications, Letters, etc., have been received from Messrs. Pridham, Stanford, Gostling, Mayor, Wood, Moeller, Kenbaan, Kino, T. A. W.

OLEUM RUSCI.*

BY PETER MACEWAN.

During the past two or three years a demand has sprung up for oleum rusci, and considerable doubt has been expressed as to its nature and quality, articles of different characters having been supplied.

It would appear from the name that the article has some relation to butcher's broom (*Ruscus aculeatus*), but we learn from various sources that it is merely one of the synonyms of the empyreumatic oil of common birch (*Betula alba*). Thus the Danish Pharmacopœia, 1805, has the oil under these names, "Oleum betulinum, oleum rusci, oleum brusci," the latter being another name for the butcher's broom. These names are quoted in the Norwegian Pharmacopœia of 1854 under "Pix epidermidis betulæ albæ;" more recently we find that Hager uses the synonym for the birch tar oil, and the Dutch Society for the Advancement of Pharmacy have it as "Oleum betulæ rectificatum, oleum rusci."†

I can find no explanation of the association of the words "Ruscus" and "Bruscus" with this birch product, and can offer none, unless "Brzoza" (Polish for birch) may have been corrupted into "Bruscus" and thence into "Ruscus." At all events it is beyond dispute that oleum rusci is birch tar oil.

The oil has been long known as that used in currying Russia leather, to which it imparts the peculiar odour and lasting properties that are so much admired; it is chiefly made in Russia and Poland. The bark, and sometimes the rootlets and twigs, are subjected to dry distillation, the retort being of clay and connected by wooden pipes to a receiver placed in the earth. Hager states that this oil is a thickish liquid of a reddish-brown or brown-black colour, peculiar empyreumatic odour, and sparingly soluble in water, but soluble in alcohol and ether to a great extent. The redistilled oil of the Dutch Society is said to be a red-brown volatile oil, sp. gr. 0·800–0·987, soluble in an equal weight of alcohol and imparting an acid reaction to water. Birch bark has a mildly fragrant odour and by gentle heating yields a sublimate of birch camphor or betulin ($C_{36}H_{60}O_3$). This body, as obtained from the bark by exhaustion with alcohol, is odourless and tasteless, but when subjected to a high temperature (above 258° C.) it gives off vapours smelling strongly like Russia leather. This change will very probably be effected in the distillation of the empyreumatic oil from the bark, thereby accounting for its distinctive odour. Independently of its use in currying, the oil is held in high esteem by the Russian peasantry as a household remedy for all diseases, as well as by the medical practitioners in the treatment of skin diseases, rheumatism and the like; it is similarly used in Germany, whence it is exported. Its reputation has travelled to this country, but I am afraid that the remedy has not accompanied the reputation.

Through the kindness of Mr. Holmes, Curator of the Museum of the Pharmaceeutical Society, I have received a small portion of a veritable specimen brought from Russia by Mr. Greenish, of which Mr. Holmes gives me the following particulars:—

"Specimen 511 b" (Museum Catalogue) "is a black empyreumatic fluid, resembling in odour the liquid known as 'essence of smoke,' used for curing hams; after a mere trace of it has been rubbed on the hand an odour like Russia leather is perceptible. The fluid, when caused to cover the side of the bottle in thin layer, is black with a brown tinge. . . . I believe the pyroligneous oil of birch is sometimes prescribed under the name of 'ol. rusci.' . . . . Dr. Symes tells me that there is a brown oil of birch which he believes is only the dark oil redistilled." There is no doubt whatever that oil similar to Mr. Greenish's is extremely rare in this country, although the oil mentioned by Dr. Symes is readily procurable; but there are others which can only be called substitutions and sophistications, and of these I append particulars. I have only had small samples given me, and of these only No. 1 seems favourable for further investigation.

No. 1. Red-brown "redistilled oil," sp. gr. 0·941. Exposed for fifteen minutes on a water-bath it was reduced to half its original bulk. Residue resembled Mr. Greenish's specimen; betulin odour intensified, but more pyroligneous than the veritable specimen.

No. 2. Red-brown "redistilled oil," sp. gr. 876. (This oil is more fragrant than the genuine or No. 1, and suggests "doctoring.") On a water-bath, the greater part volatilized within ten minutes, leaving a small residue of an oily nature and strong pyroligneous odour.

No. 3. A thick tar, black and bituminous. Odour somewhat like huile de cade. This was not examined, Hager stating that very thick varieties should be rejected.

No. 4. An amber coloured oil, sp. gr. 0·891. Odour like that of common spirit of tar (ol. picis rect.). On the water-bath a small quantity was vaporized within ten minutes, leaving a mere trace of resinous matter destitute of betulin odour.

Owing to my portion of Mr. Greenish's sample being extremely small, I have only been able to take its sp. gr. roughly and found it to be 0·943: this, however, requires verification. On the water-bath it leaves a thick and tenacious black residue having the betulin odour. The only specimen which compares favourably with it is No. 1, which answers the description of the redistilled oil of the Dutch Society. It is much thinner than the genuine oil and the pyroligneous odour is stronger; but a trace of it, treated as directed by Mr. Holmes, gives a powerful betulin odour in the course of fifteen minutes. This variety is readily obtainable. From the behaviour of No. 2 I am inclined to think that it is a "made-up" oil, since the fragrance entirely disappears on the water-bath. No. 4 is the "ol. rusci" which has been so largely supplied to pharmacists, and several eminent dermatologists have formed their opinions of the value of the remedy from their experience with this variety. It is not surprising, therefore, that they have reverted in some cases to old-fashioned remedies such as huile de cade. This is to be regretted, for ol. rusci has been found useful in the hands of continental practitioners, and if a demand were here made for the genuine oil, means would not be wanting for obtaining it.

I cannot conclude without expressing my thanks to Mr. Holmes for his assistance, and to Messrs. Crowden and Hill for specimens.

* The greater portion of this paper was read before the Edinburgh Chemists' Assistants and Apprentices' Association, November 7, 1883.

† *Pharm. Journ.*, [3], xiii., 10.

THE NEW PHARMACOPŒIAS FOR THE UNITED STATES AND GERMANY.

(*Continued from p.* 342.)

SODIUM SALTS.—The total number of kinds of sodium salts included in the U.S.P., 1870 and 1880, the P.G., 1870 and 1880, and the B.P. is 27, and of these 24 are in the U.S.P. 1880. None has been omitted that was in the U.S.P., 1870, whilst on the other hand 9 have been added,—the benzoate, bisulphite, bromide, chlorate, iodide, pyrophosphate, salicylate, santoninate and sulphocarbolate. In fact there is really only one sodium salt in the other Pharmacopœias that is not in the U.S.P., 1880,—the valerianate of the B.P.; the other two kinds not included being natrium carbonicum crudum and natrium sulfuricum siccum, P.G. The P.G., 1880, includes only 16 kinds of sodium compounds: the hyposulphite, pyrophosphate and santonate of the P.G., 1870, having been omitted and the benzoate, bromide, iodide and salicylate added. It will, therefore, be seen that two out of the three that have been dismissed from the P.G., the pyrophosphate and santoninate, have now been included in the U.S.P., presumably to meet the requirements of medical practitioners of German origin in the United States, whilst the hyposulphite was official before. The following are principal characters of the sodium compounds in the U.S.P. or P.G., but not in the B.P.:—

Sodii Benzoas, U.S.P.; *Natrium Benzoicum*, P.G. —According to the U.S.P., the benzoate of sodium contains a molecule of water of crystallization, and is "a white semi-crystalline or amorphous powder, efflorescent on exposure to air, odourless or having a faint odour of benzoin, of a sweetly astringent taste free from bitterness and having a neutral reaction." In the P.G. it is said to be a white, anhydrous, amorphous powder, which in aqueous solution (1 in 10) has a subacid reaction. The U.S.P. gives the solubility at 15° C. as 1 in 1·8 of water and 1 in 45 of alcohol; in boiling water 1 in 1·3 and in boiling alcohol 1 in 20. When heated it melts, emitting vapour having the odour of benzoic acid, then chars and finally leaves a blackened residue having an alkaline reaction, which effervesces with acids and imparts a yellow colour to flame, not more than transiently red when observed through blue glass. An aqueous solution treated with dilute solution of ferric sulphate gives a flesh-coloured precipitate, which distinguishes it from sodium salicylate. The P.G. adds tests for the absence of carbonate, sulphate or chloride, and requires that the pasty crystalline mass that forms when an aqueous solution (1 in 12) is treated with hydrochloric acid shall be soluble entirely in ether.

Sodii Bicarbonas Venalis, U.S.P.—The U.S.P. admits a commercial salt, which according to the tests must correspond to at least 95 per cent. of bicarbonate of sodium.

Sodii Bisulphis ($NaHSO_3$), U.S.P. (new).—Opaque, prismatic crystals, or a crystalline or granular powder, slowly oxidized and losing sulphurous acid on exposure to air, having a faint sulphurous odour, a disagreeable sulphurous taste and an acid reaction. Soluble in 4 parts of water or 72 parts of alcohol at 15° C., in 2 parts of boiling water and in 49 parts of boiling alcohol. The iodine and starch test indicates at least 90 per cent. of pure bisulphite of sodium. Bisulphite of sodium is distinguished from the hyposulphite by the aqueous solution evolving sulphurous vapour and not becoming cloudy upon the addition of hydrochloric acid. It is not so stable as the sulphite and requires to be kept in stoppered bottles.

Sodii Bromidum, U.S.P. (new); *Natrium bromatum*, P.G. (new).—According to the U.S.P. in "small colourless or white monoclinic crystals, or a crystalline powder, permanent in dry air, odourless, having a saline, slightly bitter taste and a neutral or faintly alkaline reaction. Soluble in 1·2 parts of water or 13 parts of alcohol [sp. gr. 0·820] at 15° C.; in 0·5 part of boiling water or in 11 parts of boiling alcohol." The P.G. differs in giving the solubility as in 1·8 parts of water or in 5 parts of spirit (sp. gr. 0·830). Bromide of sodium crystallizes at ordinary temperatures in rhombic prisms with two molecules of water, but at a temperature above 30° C. it crystallizes anhydrous; it is this anhydrous form that is official in both works. Tests for the absence of bromate, iodide and more than a trace of sulphate or potassium salt are given. The U.S.P. test for chloride would allow 3 per cent., but that of the P.G. only 2¼ per cent. The P.G. also requires that when placed upon moistened red test paper bromide of sodium shall not immediately produce a blue colour.

Sodii Chloras, U.S.P. (new).—"Colourless, transparent tetrahedrons of the regular system, permanent in dry air, odourless, having a cooling saline taste and a neutral reaction." It has the advantage of being much more soluble than the corresponding potassium salt, dissolving in 1·1 parts of water or 40 parts of alcohol at 15° C.; in 0·5 part of boiling water and in 43 parts of boiling alcohol. When heated the salt melts and afterwards gives off a portion of its oxygen, finally leaving a neutral residue completely soluble in water. Tests are given for the absence of potassium, calcium, sulphate and more than traces of chloride. Chlorate of sodium requires to be kept in well-stoppered bottles and should not be triturated with readily oxidizable substances. It may be as well perhaps to repeat the caution that "natrium chloratum, P.G." is chloride of sodium.

Sodii Hyposulphis ($Na_2SO_3 \cdot 5\,H_2O$), U.S.P.—"Large colourless transparent monoclinic prisms or plates, efflorescent in dry air, odourless, having a cooling, somewhat bitter and sulphurous taste and a neutral or faintly alkaline reaction." Soluble in 1·5 parts of water at 15° C.; or, with partial decomposition, in 0·5 part of boiling water; insoluble in alcohol. When rapidly heated to about 50° C. the crystals melt; when slowly heated until they have effloresced and afterwards to 100° C. they lose all water (36·3 per cent.), and at a low red heat the salt is decomposed. The aqueous solution dissolves chloride or oxide of silver and discharges the colour of solution of iodized starch or of solution of iodine. The hyposulphite of sodium is distinguished from the bisulphite and sulphite by the aqueous solution when treated with sulphuric acid evolving the odour of burning sulphur and giving a white precipitate. Tests are given for the absence of sulphate or carbonate. This salt has been omitted from the P.G.

Sodii Iodidum, U.S.P. (new); *Natrium Iodatum*, P.G.—The U.S.P. describes iodide of soda as occurring "in minute colourless or white monoclinic crystals, or a crystalline powder, deliquescent on exposure to air, odourless, having a saline and slightly bitter taste and neutral or faintly alkaline reaction." The P.G. simply says; "pulvis siccus, albus, crystallinus, aëre humescens." Both these descriptions would exclude the crystalline tables obtained by crystallizing the salt at the ordinary temperature, as these contain one-fifth (2 molecules) of their weight of water and effloresce in dry air. The U.S.P. gives the solubility as in 0·6 part of water, or in 1·8 parts of alcohol at 15° C.; in 0·3 part of boiling water. The P.G. says it is soluble in 0·9 part of water or 3 parts of spirit at 15° C. Tests are given for the absence of iodate and the limits of bromide, chloride and sulphate.

Sodii Pyrophosphas ($Na_4P_2O_7 \cdot 10H_2O$), U.S.P.—This is another salt that has been omitted from the P.G. simultaneously with its introduction into the U.S.P., where it is required in consequence of a modification of the process for pyrophosphate of iron. It is described as in "colourless, translucent, monoclinic crystals, permanent in the air, odourless, having a cooling, saline and feebly alkaline taste and a slightly alkaline reaction." Soluble in 12 parts of water at 15° C., or 1·1 parts of boiling water; insoluble in alcohol. When heated it loses its water of crystallization, and then fuses, and upon again cooling forms a crystalline mass. Its aqueous solution gives with excess of solution of nitrate of silver a white precipitate and a neutral filtrate.

Sodii Salicylas ($2NaC_7H_5O_3 \cdot H_2O$), U.S.P. (new); *Natrium Salicylicum*, P.G. (new).—The U.S.P. describes this important salt as in "small white crystalline plates, or a crystalline powder, permanent in the air, odourless, having a sweetish saline and mildly alkaline taste and a feebly acid reaction." Soluble in 1·5 parts of water or 6 parts of alcohol at 15° C.; very soluble in boiling water and in boiling alcohol. The P.G. defines it as in white crystalline anhydrous scales, having a sweet saline taste and soluble in 0·9 part of water or in 6 parts of spirit at 15° C. The other characters are practically the same in both works. When heated the salt gives off inflammable vapours and leaves 30 to 31 per cent. of an alkaline residue that effervesces with acids. Perchloride of iron added to an aqueous concentrated solution produces a red-brown and to a dilute one a violet colour. Sulphuric or hydrochloric acid produces in an aqueous solution a white precipitate that is soluble in ether. Freedom from organic matter is indicated by it remaining free from colour when shaken with 15 parts of sulphuric acid. Tests are also given for the absence of carbonate, chloride and sulphate.

Sodii Santoninas ($2NaC_{15}H_{19}O_4 \cdot 7H_2O$), U.S.P. (new).—The introduction into the U.S.P. of santoninate of soda also has been simultaneous with its dismissal from the P.G. It is described as in colourless, transparent, tabular, rhombic crystals, slowly coloured yellow by exposure to light, slightly efflorescent in dry air, odourless, having a mildly saline and somewhat bitter taste and a slightly alkaline reaction. Soluble in 3 parts of water or 12 parts of alcohol at 15° C., and in 0·5 part of boiling water or 3·4 parts of boiling alcohol. At 100° C. it loses its water of crystallization (18 per cent.), and at a higher temperature chars and finally leaves an alkaline residue. Hydrochloric acid produces in an aqueous solution a crystalline precipitate which is soluble in chloroform and gives with alcoholic solution of potash a scarlet liquid that gradually becomes colourless.

Sodii Sulphis ($NaSO_3 \cdot 7H_2O$), U.S.P.—"Colourless, transparent monoclinic prisms, efflorescent in dry air, odourless, having a cooling saline and sulphurous taste and a neutral or feebly alkaline reaction." Soluble in 4 parts of water at 15° and in 0·9 part of boiling water; sparingly soluble in alcohol. When gently heated it melts and loses its water (50 per cent.) and at a red heat is decomposed, leaving an alkaline residue. Hydrochloric acid added to an aqueous solution gives rise to the odour of burning sulphur, but the solution does not become cloudy, which distinguishes this salt from the hyposulphite. The iodine and starch test corresponds to 90 per cent. of pure sulphite of sodium.

Natrium Sulfuricum Siccum, P.G.—Besides the ordinary hydrated sulphate of sodium the P.G. includes a dried salt, and it is this that has to be used whenever "natrium sulfuricum" is ordered in powders in a German prescription. It is prepared by exposing the coarsely powdered sulphate to a temperature not exceeding 25° C. until it has become completely pulverulent and then drying it at 40° to 50° C. until it has lost half its original weight.

Sodii Sulphocarbolas ($NaC_6H_5SO_4 \cdot 2H_2O$), U.S.P. (new).—"Colourless transparent rhombic prisms, permanent in the air, odourless or nearly so, having a cooling, somewhat bitter taste and a neutral reaction." Soluble in 5 parts of water or 132 parts of alcohol at 15° C.; in 0·7 part of boiling water and in 10 parts of boiling alcohol. When heated the salt loses its water and forms a white powder; then emits inflammable vapour having an odour of carbolic acid and leaves a residue weighing 36 per cent. of the original weight, a filtered solution of which, acidulated with nitric acid gives a white precipitate with solution of chloride of barium. A dilute aqueous solution of the sulphocarbolate is coloured violet by a 10 per cent. solution of ferric chloride.

(*To be continued.*)

KAIRINE AND KAIROLINE: NEW ANTIPYRETICS.*

BY PROFESSOR FILEHNE.

The first named of these bodies, an alkaloid lately built up synthetically by Dr. Otto Fischer, lecturer on chemistry in the University of Munich, seems to be one of the most important of the recent additions to the materia medica. It appears to be really an ideal antipyretic, controlling febrile temperatures without injuriously affecting the system in any way; its action is directed solely to the lessening of the production of heat.

Its chemical origin is interesting. Quinine, as is well known, is a derivative of chinoline, a circumstance which led to the employment of the latter as a substitute for the former. The large proportion of hydrogen present in quinine, together with the results of certain recent investigations, have led chemists to regard the quinine molecule not as based on chinoline simply, but on a *hydrated* chinoline. Starting, therefore, from hydrated chinoline, Drs. Fischer and Konigs endeavoured to obtain, by synthetical means, other bodies having the antithermic properties of quinine. By hydration and oxidation processes, by the addition of methyl or methoxyl groups to the hydrated chinoline molecule, these gentlemen have succeeded in forming an extensive series of bodies, and their experiments are still directed to the same object. These bodies have been handed over to Prof. Filehne for examination; and thus, since the beginning of 1881, have investigations been going on to determine the directions in which are to be sought chinoline derivatives having the desired antithermic properties. These long sought for bodies, having no local action, but having the power of reducing the temperature to the normal

* *Berl. Klin. Wochenscher.*, No. 45, 1882. Reprinted from the *Glasgow Medical Journal*, October, 1883.

point, seem to have been found in those hydrated chinoline derivatives whose N-atom, besides its connection with two atoms of carbon in the chinolin formula, is united to the carbon of a methyl group or of another alcohol radical. One of these bodies is the oxychinolinmethyl-hydride of Fischer, named shortly *kairine.* Its formula is $C_{10}H_{13}NO$, that of chinolin being C_9H_7N.

When it had been recognized that the essential element in the process was the addition of methyl to the N-atom in the hydrated chinoline, the chinolinmethyl-hydride (*kairoline*) of Konigs and Hoffmann, and the chinolinethyl-hydride of Wischnegradsky, were tried and also found to have antipyretic properties. Kairoline is built up in precisely the same way as kairine, except that one atom of H is replaced by HO. As the preparation in a pure state of both of these last mentioned substances is costly, as they are volatile and have an unpleasant taste, they have not been so much or so fully tried as kairine.

The *hydrochlorate of kairine* is a clear, crystalline, greyish-yellow powder, readily soluble in water, and having a salt-bitter or somewhat aromatic taste. To some its taste is pleasant; to others it is very unpleasant, necessitating the administration of the powder in wafers. Water should be drunk freely after the powder, especially if the drug is not absolutely pure. This substance has been tried in a series of acute and chronic febrile diseases (typhoid fever, acute articular rheumatism, septicæmia, tuberculosis, acute pneumonia), and in all its antithermic action was found to be constant.

As regards dose, it is stated that in *healthy* adults doses of 1–1·5 gram have no physiological action and no effect on the temperature; further, they produce no unpleasant effects, such as headache, ringing in the ears, sickness, etc. In adult patients, or in debilitated subjects, the dose of 1 gram every two hours is not to be exceeded, otherwise a certain degree of cyanosis is apt to occur. In adult fever cases the most suitable dose is 0·3–0·5 gram every hour or hour and a half. The interval between doses of 1 gram should not exceed two and a half hours; between doses of 0·5 gram it should never be more than one and a half or two hours. To obtain a less pronounced effect the doses should be rereduced, not the interval. The effect of a 1 gram dose lasts no longer than three hours, that of 0·5 gram not longer than two and a quarter hours; and when the influence of the drug is exhausted the temperature again rises, with a feeling of chilliness amounting sometimes to actual rigour. A dose of less than 0·3 gram, given at once, has practically no effect on the temperature. A dose of 0·3 to 0·5, or 1 gram, lowers the temperature distinctly, by ½ to 2° C.; if another dose be given before the action of the former dose is over the temperature falls still farther; and if the dose be increased to 0·5 gram hourly it invariably follows, and without any injurious effect, that after the fourth dose, sometimes after the third, or even second, the temperature falls to the normal point, or even below it. Lower than 37°–36·5° C. (98·6°–97·7° F.), the temperature cannot be brought, even by continuing the administration of the medicine energetically. The action of the drug begins about twenty-five minutes after the dose of 0·5–1 gram is taken by the mouth; its action by hypodermic or rectal injections was not tried. The fall in temperature is more rapid the larger the dose. It is always accompanied by profuse sweating, and this lasts only so long as the temperature continues to fall, and no longer. When the temperature becomes normal or sub-normal, or when it has reached its lowest point in the individual case (it is possible, for example, by means of small doses frequently repeated, to bring the temperature, say from 40° C. to a constant level of 39° or 38·5° C.), that is usually after 2–4 doses have been given, the sweating ceases, and the temperature remains at its new level without further sweating—so long, of course, as the administration of the kairine is continued. These facts and the absence of sweating when the drug is given to healthy individuals, show that the fall in temperature is not secondary to the sweating, but that the latter occurs because the organism, so influenced by the action of the medicine as to demand a lower temperature, endeavours to free itself from the febrile excess of heat by a "critical" sweat; as soon, therefore. as the required temperature is reached the sweating ceases. Even during the continuance of the sweating, but especially after this has ceased and the effects of the lowered temperature are manifest, the patients feel much more comfortable; this is especially the case in croupous pneumonia. A lower temperature, a pulse normal in rate and stronger, slower respiration, diminution of the pain in the side—these are all circumstances which give to pneumonia patients the feeling as of immense improvement in their condition. As soon as the medicine is withdrawn, that is, two to three and a half hours after the last dose (according to the amount taken each time), the old order of things is resumed; shivering occurs, and the temperature rises to the point corresponding to the acuteness of the disease. Nevertheless, in cases of pneumonia (which can be kept quite free of fever throughout their whole course), it was noticed that if they were methodically treated with kairine for fifteen to twenty-four hours the influence of the drug was to some extent maintained even after its withdrawal. Further observations must show whether kairine has a specific action in pneumonia. During the use of kairine (and also of the other two bodies mentioned), the urine becomes dark green, but contains no sugar or albumen.

One disagreeable point in this treatment is that the medicine must be given so often, every two and a half hours at least, if we wish to anticipate shivering and rise of temperature; this disturbs the night's rest. This drawback may be entirely overcome by the administration of a full dose (1·5–2 grams) of *kairoline* the last thing at night; this keeps the temperature down for six hours, and the subsequent rise is gradual and without rigour. Before resorting to this method, however, various alterations and modifications of the administration of kairine should be tried to lessen the above-mentioned drawback. Thus, the rigour and rise of temperature may be brought to that period of the day when remission of temperature might naturally be expected if the case were not under antipyretic treatment, as the lower the point to which the temperatnre has to rise the milder the rigour; accordingly, medication may be suspended about midnight. Or, by gradual lessening of the evening doses the temperature may be allowed to rise gradually; thus, at eight p.m. 0·5 gram, and at nine, ten, eleven, and twelve, 0·25 gram; then the smaller the ultimate rise the less marked the shivering.

It is suggested that kairine might prove an excellent remedy in malarial affections, by giving a dose of 1 gram hourly for three hours before the expected attacks.

The other two bodies (kairoline and chinolinethylhydride) are identical in action. Single doses, such as would prove operative if kairine were used (0·3–1 gram), have no effect, nor has a dose of 0·5 gram hourly. But a dose of 1·5–2 grams produces decided effect, more slowly developed, but lasting about six hours. Sweating is less marked than with kairine; shivering on subsequent rise in temperature is absent or very slightly felt. Urine coloured the same as by kairine. The importance of these drugs for evening administration is obvious; but they are rarely pure, deliquescent, and very unpleasant in taste.

The difference in the action of kairine and kairoline may be accounted for in this way. According to chemical experience, all hydroxyl derivatives, not only of chinoline, but also of benzol, are more oxidizable than the corresponding bodies free of oxygen. Thus the quicker and slighter action of kairine, a hydroxyl body, may be explained, as the whole quantity taken comes into operation on the system immediately. On the other hand, it is conceivable that it is more quickly used up than the more resistent kairoline, which yields only gradually to the oxidizing influences of the organism.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 17, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

THE POSOLOGY OF NEW REMEDIES.

AN unusual amount of attention has been directed during the past few days to an article which appeared in the *Lancet* for the 3rd inst., bearing the names of Dr. SYDNEY RINGER and Dr. WILLIAM MURRELL, and entitled "Nitrite of Sodium as a Toxic Agent." Although we do not intend to take any part in the discussion that has been raised respecting this paper, believing that the merits or demerits of its form and substance are such as can be best and most fittingly adjudicated upon by members of the medical profession and are certainly unsuited for criticism in the columns of the daily newspapers, nevertheless, we think that sufficient interest has been excited to warrant our giving in these columns a brief *résumé* of the facts, especially since this will furnish an opportunity for referring to an allied subject which we think might at the present time be pressed home with advantage upon the attention of our readers. Drs. RINGER and MURRELL open their paper with the statement that nitrite of sodium, which has recently come more generally into use as a medicinal agent through having been recommended as a remedy for epilepsy, angina pectoris and other diseases of a nervous origin, is now supplied more pure than formerly, and that since nitrate of sodium, with which it was formerly contaminated, is a much less active drug, the administration of the pure nitrite of sodium in doses in which the impure form was formerly administered might produce disastrous results. Indeed recent experiments have satisfied them that pure nitrite of sodium is an active toxic agent, and as an indication of its activity and the symptoms it is capable of producing they publish for the benefit of the medical profession the observations made by them. The earlier experiments were made upon frogs and cats and proved the nitrite to be extremely potent, the injection of four c.c. of a ten per cent. aqueous solution under the skin of two cats, weighing respectively five and a half and six and a quarter pounds,—or about one grain to the pound,—being followed quickly by death with symptoms analogous to those manifested in poisoning by nitrite of amyl. The observations were then extended to human patients, eighteen adults having been ordered ten grains of the nitrite in an ounce of water, while sixteen others were ordered it in five grain doses. Without entering into details as to the exact symptoms, it will suffice to state here that the effects produced on the patients were in the words of the reporters, "not altogether satisfactory." With respect to the first eighteen it is said: "They came back protesting "loudly and required no questioning as to the symp- "toms. They seemed to be pretty unanimous on one point—that it was about the worst medicine "they had ever taken. They said that if ever they "took another dose they would expect to drop down "dead and it would serve them right." The symptoms complained of by the sixteen patients who took five grain doses "were those experienced with the larger dose," though presumably of less intensity. After this, thirteen patients were ordered three grain doses, but in only four of these cases was any complaint made.

It is this record of results that has been made the subject of hostile criticism. The subject was broached in a letter that appeared in the *Standard* of the 9th inst. from a Mr. BELL, who assumed that the experiments had been all made upon hospital patients, apparently without more acquiescence from the subjects in the later series than from those in the earlier, and vigorously denounced "the present increasing "mania for testing anything and everything on all "sorts of animals." This letter was the occasion of an editorial article in the same journal, which contained the same assumptions, but was more temperately written. One of these assumptions has however since been disposed of by the denial from the deans of University College and Wesminster Hospitals that any of the experiments were made upon patients in either of those two institutions. Further, Dr. MURRELL, in a letter, has pointed out that the dose administered was only half the quantity recommended by previous writers, and stated that it was only subsequently to the experiments that it was discovered how the question of dose might be affected by the fact that the nitrite of sodium in ordinary use was impure. The paper will probably be the subject of further explanation and discussion in the medical journals, and there are signs that it will lead to considerable difference of opinion, since already, with the object of "forestalling the outcry of antivivisectionists," the *Medical Times and Gazette* has condemned the publication of the paper as a "deplorably false move," whilst the *Medical Press and Circular* defends it. We do not, however, propose to follow this branch of the subject any further,—at least for the present,—for "when doctors disagree who shall decide?"

The point to which we wish now to refer briefly lies in another direction. Perhaps at no period in the history of the healing art has there ever been a more continuous crop of new remedies than at the present time; some of the medical journals may be fairly said to teem with them. Many of them consist of drugs already well known, but put to new uses; others are vegetable or chemical substances concerning the properties of which extremely little is yet known. In some instances, especially among the latter class, the substances are brought forward upon extremely frivolous grounds, unless, indeed, the prospect of gain to the introducers be deemed sufficient justification; in others, the very potency of the drug renders it a possible source of danger whilst so little is known about its physiological and therapeutic action. It is natural that a medical man wishing to try one of these remedies should seek to obtain all the information available respecting its properties and especially concerning the dose, and we have reason to know that pharmacists are frequently resorted to with this object. Such a course is indeed to be welcomed as exhibiting a reasonable dependence upon the intelligence of the pharmacist, and we try to show our recognition of this fact by keeping him *au courant*, to the best of our ability, with the published statements upon such subjects that appear to us to be trustworthy. Nevertheless, we would venture to remind our readers as to the necessity for extreme caution in the manner of communicating such information and suggest that they never should impart it in such away as to allow of the responsibility being shifted from the person who proposes to administer the drug. It is well known to all who have the opportunity of scanning the literature in which such remedies are advocated how loose the statements respecting the dose frequently are, and how unsuited for repetition without fuller information as to the conditions under which it has been advantageously administered. It is worthy of notice that in the case now under discussion, as Dr. MURRELL has pointed out, the largest dose which produced such disagreeable effects equalled only half the quantity recommended in a comparatively recent paper, and might *primâ facie* have been considered to be quite safe. Another illustration of our point may be found in a synthetically prepared derivative of chinoline that has recently been introduced under the name of "kairine," a further account of which will be found on another page. This substance appears to possess the property of lowering the temperature in fever cases to a marked degree, and it has been recently stated, without qualification and not for the first time, that kairine when "given in hourly doses of one gram, "after the employment of three to four grams, has a "more powerful and constant antifebrile effect "than quinine in doses of one and a half to two "grams." But we have reason to believe that its use in gram doses has been followed by disastrous consequences. Further, Dr. SHATTUCK, of Boston, recently reported a case where the administration of half gram doses to a "vigorous man" in the City Hospital produced cyanosis and cardiac depression, so that stimulants and heaters had to be freely resorted to, whilst on the same occasion Dr. DRAPER reported some cases and said that certainly in one of them the immediate effects of the kairine were dangerous to the life of the patient. Whether these results may find any explanation in the statement that older specimens of kairine may produce cyanosis and collapse we cannot say, the point which we wish to emphasize is that they illustrate the necessity for the exercise of caution in making statements with respect to such powerful and at present imperfectly studied substances. There is also the danger that doses which are not only safe, but beneficial, within certain limits, may be pushed to extremes. Thus, for instance, a medical journal recently quoted as a warning a case in which fifty grains of salicin were given every two hours, until three hundred grains were taken, and then it was made conditional upon the patient not being asleep. The next morning sixty grains were ordered to be taken every second hour and at midnight the patient died.

In accordance with our custom at this time of the year we have pleasure in recording the names of some of the pharmacists who have recently received municipal honours at the hands of their fellow townsmen. It is not pretended that the list is a complete one, but it includes such information as we have been able to obtain, either by direct communication or otherwise. Amongst the gentlemen who have been elected to the office of Mayor for the ensuing year are:—Mr. W. Ballard, Pharmaceutical Chemist, Abingdon, re-elected for the sixth time; Mr. A. H. Cox, Chemist and Druggist, Brighton, re-elected for the third time; Mr. H. Durden, Chemist and Druggist, Dorchester; Mr. J. Horsley, Chemist and Druggist, Hartlepool, re-elected the fourth time; Mr. F. J. Clarke, Chemist and Druggist, Lincoln; Mr. H. D. Simpson, Chemist and Druggist, Louth, for the third time; and Mr. H. Henley, Pharmaceutical Chemist, Lyme Regis, re-elected. In Scotland, Mr. John Babtie, Pharmaceutical Chemist, has been elected for the third time in succession Provost of Dumbarton, and Mr. William Gunn has been re-elected Chief Magistrate of the Burgh of Duns. In the last two instances the term of office is three years. In looking over this list one cannot help being struck with the evidence afforded that chemists and druggists are not only able to gain but successful in retaining public confidence.

* * *

In some cases that last week came before the Newport magistrates the point was again raised as to the application of the Sale of Food and Drugs Act in respect to the addition of colouring materials to articles of food. The charges under consideration related to the practice of imparting the usual colour to "German sausage" by means of "Venetian red," for which alleged offence summonses had been issued against three pork-butchers. The certificate of the public analyst stated that he had found this pigment in the proportion of 65 grains to the pound and that it had been added to conceal the presence of an excessive proportion of flour. On the other hand it was contended that the colouring matter was harmless and that it was an ordinary ingredient in such articles of food. Professor Attfield, who gave evidence for the defence, said that the addition of red oxide of iron to this kind of sausage and generally to the varieties of meat, fish, essence of anchovies, etc., which are commonly preserved in bottles and other vessels, is made simply and solely with the object of heightening the colour and appetizing appearance of such articles of food and in response to a popular fashion or demand, and that it is a fashion analogous to the colouring of cheese with annatto. The Bench accepted this view and dismissed all the summonses.

The new part of the 'Proceedings of the Philosophical Society of Glasgow' contains a paper by Dr. John Dougall, in which are recorded observations respecting the readiness with which milk absorbs gaseous and other emanations to which it is exposed, which although not new have an important bearing on the preservation of the public health. The experiments consisted in enclosing milk in a glass jar with some odorous substance, and after eight hours drawing off the lower stratum and testing it as to whether it had become impregnated with the substance. Every sample of milk was found to have contracted an odour from the substance to which it had been exposed. In the cases of musk and stale urine the smell is described as having been faint; in those of ammonia, chloroform and camphor moderate; in those of asafœtida, stale cheese and decayed cabbage, distinct; in those of paraffin oil, sulphuretted hydrogen, creasote, and human fecal matter, strong; in those of turpentine, onions, tobacco smoke, and ammonium sulphide, very strong; and in that of putrid fish, very bad. In addition the samples of milk that had been exposed to sulphuretted hydrogen, ammonia and ammonium sulphide gave evidence upon the application of chemical tests of the presence of those substances, whilst that which had been exposed to fecal matter gave the reactions for sulphuretted hydrogen. Dr. Dougall appears to attribute this absorptive property to the water which forms a natural constituent of the milk; but we think the analogous part played by fat in the process of *enfleurage* of perfumes points to another explanation.

* * *

In the annual report of the Chemical Examiners' Department, Calcutta, a copy of which has just reached us, reference is made to the death of a child through poisoning by strychnine, a decoction of "koochila" bark (*Strychnos Nux-Vomica*) having been supplied and administered instead of a decoction of "koorchee" (*Wrightia antidysenterica*), which had been ordered as a tonic and astringent. A similar accident happened in Calcutta about two years since. In connection with this subject Dr. Warden expresses his belief that India is the only British colony where there is no Pharmacy Act or law to regulate the sale of poisons. This belief is not yet, however, warranted by existing facts, although the time appears to be fast approaching when it will be, and it must be admitted that, at any rate, in respect to the larger towns, where Europeans reside in number, India ought not to remain an exception. The subject has already attracted the attention of the Indian Government, and in a resolution published last August the Lieutenant-Governor of Bengal said that "the general question as to the imposition of restrictions upon the sale of poisonous drugs demands and will receive separate consideration;" but up to the date of the report no orders had been issued on the subject.

* * *

So far as can be judged by the results of the cases in which human viscera were transmitted to Dr. Warden for examination, opium still remains the poison most frequently used in India for criminal purposes. Next to it comes arsenic, and then, after a considerable interval, aconite. In two stomachs examined in connection with abortion cases evidence was obtained of the presence of plumbagin, the acrid principle of *Plumbago rosea* ("lal chitra"). One curious case is reported as "suspicious," in which several persons, having found some sugar wrapped up in a plantain leaf in a prayer house, assumed that it had been offered by somebody in the name of the god and ate it. Shortly afterwards they were all seized with vomiting and purging and one died. No poison could, however, be detected, and it is possible that cholera was the cause of death; on the other hand, perhaps the deceased might have been alive now had he confined his communistic practices to more strictly mundane objects.

* * *

A dispensing difficulty discussed in our United States contemporary, *New Remedies*, with respect to the proper method of dealing with it, closely resembles one that is frequently the cause of perplexity to dispensers in this country. A pharmacist had a prescription presented to him ordering "Chlorine Mixture, ℥ij: S. 5 to 8 drops every hour as directed." Knowing that it was for a young child ill with scarlatina, he made a mixture according to a recipe in Griffith's 'Formulary,' consisting of chlorine water, lemon syrup and water. Next day, however, he was called to account for supplying a wrong medicine, the medical man saying that he meant a mixture containing potassium chlorate and hydrochloric acid, the formula for which was in the possession of a particular pharmacist. Being invited by the aggrieved pharmacist to express an opinion on the subject, our contemporary, whilst recognizing the inconvenience attending such practices by prescribers, very properly points out that to dispense in the absence of a definite formula for the "chlorine mixture" any other mixture that might be so called would be to assume the responsibility of its administration. In the case in question it is thought the dispenser did not act judiciously and that it would have been more prudent to have declined to put up a doubtful prescription, the decision resting with him whether it was in his interest to ask the prescriber's assistance or to refer the patient to the prescriber for more complete instructions.

* * *

We regret to have to record the death, on the 18th ult., of M. Edouard van der Heyden, the esteemed President of the Pharmaceutical Society of Antwerp, who also for several years has taken an active part in conducting the *Journal de Pharmacie* issued by that Society. The deceased was in the fifty-fourth year of his age, and the immediate cause of his death was a cancerous affection of the stomach.

* * *

On another page will be found a paper on "Seidlitz Powders," which we refer to here especially because it is the production of an apprentice who has put into practice a very good rule of trying to attain an intelligent acquaintance with the nature of the substances that pass through his hands during the routine of his daily work. Were more apprentices to follow the example of this young man we feel sure that there would be a sensible diminution in the feeling of "drudgery," of which we sometimes hear too much.

* * *

At the next meeting of the Chemists' Assistants Association, to be held at 53, Conduit Street, on Wednesday, November 21, a paper on "Glycerine and its Impurities" will be read by Mr. F. H. Alcock.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The second meeting of the sixth session was held in the rooms of the North British Branch of the Pharmaceutical Society, 119A, George Street, on Wednesday, 7th inst., at 9.15 p.m.; Mr. Claude F. Henry, President, in the chair.

After the minutes of the previous meeting had been read, the Secretary read the Prize Committee's report of the competitive examination for the apprentice members of the Association, which was held on October 19. Seven candidates had been examined, and the following were awarded prizes:—

1st *Prize*.—Mr. J. Parker Boyd, 58, George Street. (This prize takes the form of three months' instruction in practical chemistry under Dr. Stevenson Macadam.)

2nd *Prize*.—Mr. A. G. Sutherland, 119, George Street. (Griffith's 'Pharmacy,' Ince's 'Latin Grammar' and Macadam's 'Practical Chemistry.')

3rd *Prize* (Awarded by the President). — Mr. A. Rupell Bennet, 69, South Clesh Street. (Griffith's 'Pharmacy.')

The Committee reported that the papers submitted by the candidates were worthy of high commendation, and in no case could the candidates regret the appearance which they made.

The prizes were now presented by the President, the successful candidates being heartily applauded as they received their awards.

Mr. Peter Boa then gave a description of some "New Remedies" which he exhibited, the more important of which were convallaria majalis, ichthyol, kairine, naphthaline, paraldehyde and tannate of cannabin. In the course of his remarks, Mr. Boa advocated the institution of a Medical Committee of Investigation on New Remedies; because in many cases substances were found on a short trial to be comparatively worthless as therapeutical agents, one indirect result of their introduction being, that the pharmacist was left with unsaleable and often expensive stock.

A discussion followed in which several members supported Mr. Boa's suggestion. After a short interval for conversation, a paper on "Oleum Rusci" was read by Mr. MacEwan. This paper is printed on p. 381.

Mr. John R. Hill followed with an account of the toxic effects of *Cannabis Indica*, as experienced by an old member of the Association, which was listened to with great interest, and frequently occasioned loud laughter.

The Secretary then read the report of an Annual Pharmaceutical Competition Scheme, which had been drawn up by the Prize Committee.

The report was unanimously adopted.

In the course of the proceedings, votes of thanks were awarded to the Prize Committee, and to the gentlemen who read the papers.

The Secretary having given notice of several queries to be answered at next meeting, the proceedings were brought to a close.

HULL CHEMISTS' ASSOCIATION.

The annual meeting of the above Association was held at the Cross Keys Hotel, on Friday evening, Nov. 2. In the unavoidable absence of the President, Mr. Councillor George Myers, the Vice-President, Mr. Geo. Hoyles, occupied the chair.

The report of the Committee was read by the Secretary (Mr. C. B. Bell), which was considered satisfactory, nothing of any importance to disturb the trade having occurred during the past year. The adoption of the report was moved by Mr. Hoyles and seconded by Mr. Stoakes and carried unanimously. The Treasurer's balance sheet having been read was also unanimously agreed to.

The following were duly elected office-bearers for the next year:—President, Mr. George Hoyles; Vice-President, Mr. W. H. Hammond; Hon. Secretary and Treasurer, Mr. C. B. Bell; Committee—Messrs. John Oldham, F. W. Ellis, W. Price, J. S. Linford.

Votes of thanks were heartily accorded to the various officers for the services they had rendered during the past year.

HAWICK PHARMACEUTICAL ASSOCIATION.

The November meeting of this Association was held on Tuesday, November 6, when there was a good attendance; Mr. Maben, Honorary President, in the chair.

The minutes having been read and approved of, Mr. William B. Rawlinson read a paper on—

Seidlitz Powders.

In introducing the subject, the essayist stated that he had selected it in consequence of the advice of the Honorary President at the opening meeting of the Association, which was to the effect that each member should try and write a paper on the first thing he made next morning. He decided to follow this advice, and the first preparation he happened to make was seidlitz powders; hence this paper. Dealing first with his subject historically, he traced the origin of the word, its connection with a mineral water, and its subsequent connection with powders, which latter must have come into existence well on for a century ago. He then referred to the composition of the powders, their preparation, the papers in which they are wrapped and their preservation, giving also an account of the discovery and uses of Rochelle salt. He then continued:—

The usual way in which seidlitz powders are administered is by dissolving the contents of the blue paper in water and then adding the contents of the white. When this is done a brisk effervescence takes place, carbonic dioxide being given off in the form of gas. The resulting product will vary in accordance with the proportions of tartaric acid and soda: if the latter be in excess the solution will contain Rochelle salt, neutral tartrate of soda and bicarbonate of soda, and will have an alkaline taste; if the former be in excess it will contain Rochelle salt, neutral nitrate of soda and acid tartrate of soda, and the taste will be acid; if neither is in excess the resulting process will be neutral, that is, provided the Rochelle salt be neutral. Professor Attfield gives as a formula 3 parts (120 grains) of Rochelle salt, 1 part (40 grains) of soda, and 1 part (40 grains) of tartaric acid. Now, as 40 grains of the soda only require 35 of the acid to make a neutral salt, there is here an excess of acid to the extent of 5 grains, which he states is utilized on the formation of acid tartrate of soda, evidently forgetting that Rochelle salt is rarely neutral. A more common formula, however, gives the above proportions for the blue paper, and 35 grains of acid for the white, so that the result is certain to be neutral if not alkaline, while a third gives 2 parts of Rochelle salt and 1 of soda, which is certain to give a decidedly alkaline draught. I have already stated that seidlitz powders are not official in our Pharmacopœia. In the other three principal Pharmacopœias they find a place, the various formulas being as follows:—

	Soda tart. Grains.	Sodæ bicarb. Grains.	Acid tart. Grains.
United States Pharmacopœia "*Pulvis effervescens compositus*"	120	40	35
German Pharmacopœia—"*Pulvis acrophorus laxans*"	116	38	31
French Pharmacopœia—"*Poudre gazogène laxative*"	93	31	31

In my opinion seidlitz powders ought to be included in our own Pharmacopœia, and I trust the new edition will contain a formula for them. The reasons in favour of this are obvious. At present every chemist is allowed to use his discretion as to the composition of this popular medicine, with the result that at one shop an alkaline, at another an acid, and at a third a neutral powder is obtained, and even in some cases all three may be got at the same shop and at the same time. As the precise therapeutical effect of each of these powders is different, this will doubtless often be a source of annoyance, not to speak of perplexity to the seidlitz drinking public.

Before going further, let me refer to what is known as double strong or extra strong seidlitz powders. These usually consist of the same quantity of acid and of soda, but a larger proportion of Rochelle salt. This proportion varies, different chemists adopting different percentages, but a very common form is simply to double the amount of Rochelle salt. The double strong powders are in most cases used as a direct purgative, and it is therefore doubly desirable that an authoritative formula should be given for them. Another consideration that draws attention to this point is the fact that at present many chemists do not weigh their powders; they simply measure them, the result being that great variations are observed in the contents of both white and blue papers. This applies more especially to ordinary seidlitz, the usual practice in the case of double strong being to measure one portion and weigh the remainder. The effect of this random system is frequently found in the different sizes of powders obtained from the same shop. Now this should not be, and if the powders were official and the inspector of food and drugs did his duty it would not be. It has often been brought before the readers of our various journals that this loose practice exists and ought to be put down, and being somewhat curious to ascertain the actual state of affairs for myself, I obtained samples of powders from ten shops in different parts of the country, some of them being the best houses in Edinburgh. I procured three ordinary and three double strong powders from each, and accurately weighed the contents of every paper. Mr. Maben kindly undertook to estimate the relative proportions of Rochelle salt and bicarbonate of soda in the blue paper, and I have thus been enabled to give a pretty complete table, which is appended to this paper. Without going into a regular analysis of this table, I wish to direct your attention to one or two facts which are not apparent, as the powders are not given in the order in which they were purchased; each white paper, however, belongs to the blue paper of the same number.

As to the ordinary seidlitz powders, the average weight of tartaric acid was 38 grains, the lowest weighing 24 and the highest 53. The greatest difference in powders from one shop was 11 grains in one case and 10 grains in another. The average weight of the blue papers was 162 grains—the lowest being 107, the highest 245. The greatest differences in powders from one shop were 39, 32 and 28 grains. There were frequent instances where acid and alkaline powders were got from the same shop. In some instances the powders had been carefully weighed, but in others great differences in the weight render it quite apparent that measurement—and even that not very carefully done—had been adopted.

In reference to the double strong powders the average weight of the acid powders was 36 grains, the lowest 28, and the highest 68; greatest difference in powders from one shop, 17 grains. The average of the alkaline powders was 266 grains, lowest 187, highest 365; greatest differences in powders from one shop being 72 in one case and 60 grains in another. Alkaline and acid powders were also noted here in several cases, and it is curious to observe that what is given for the double strong powder in one shop would not pass for the ordinary powder of another. The same remark as to weighing and measurement applies here, but though there were quite as many variations in weight, these were not on the whole so extensive as in the ordinary seidlitz powders.

These anomalies are very striking and ought not to exist longer, and I trust that we may have in our new edition of the British Pharmacopœia a definite and authoritative recipe for both ordinary and double strong seidlitz powders.

Ordinary Seidlitz Powders.					Double Strong Seidlitz Powders.				
No.	Weight in grs. of tartaric acid.	Weight in grs. of soda mixture.	Relative proportion in grs. in soda mixture of		No.	Weight in grs. of tartaric acid.	Weight in grs. of soda mixture.	Relative proportion in soda mixture in grs. of	
			Sodæ tart.	Sodæ bicarb.				Sodæ tar	Sodæ bicarb.
1	33	146	109	37	1	32	256	213	43
2	34	136	97	39	2	36	331	276	55
3	44	240	172	68	3	33	305	241	64
4	36	160	120	40	4	36	294	240	54
5	36	160	120	40	5	34	260	216	44
6	30	160	117	43	6	28	295	236	59
7	52	167	125	42	7	60	187	146	41
8	43	133	100	33	8	45	290	242	48
9	36	162	116	46	9	35	220	173	47
10	35	110	62	48	10	30	216	177	39
11	34	159	120	39	11	31	269	224	45
12	38	173	127	46	12	35	250	208	42
13	39	252	180	72	13	36	355	280	75
14	37	158	119	39	14	38	300	245	55
15	36	160	120	40	15	34	260	216	44
16	28	148	109	39	16	30	295	236	59
17	52	197	147	49	17	68	190	148	42
18	42	129	97	32	18	45	287	240	47
19	36	162	116	46	19	35	220	173	47
20	24	117	65	52	20	33	200	164	36
21	34	142	106	36	21	32	286	238	48
22	34	175	128	47	22	35	259	215	43
23	34	254	181	73	23	50	365	288	77
24	37	160	120	40	24	36	302	247	55
25	36	160	120	40	25	33	260	216	44
26	26	170	125	45	26	30	300	240	60
27	53	165	124	41	27	60	192	149	43
28	42	135	101	34	28	42	300	250	50
29	36	164	117	47	29	36	222	174	48
30	27	107	60	47	30	31	224	182	42

Note.—As Rochelle salts may vary in alkalinlty, the proportions here given may not in all cases be strictly correct; the calculation is made from the alkalinity of Howard's sodæ tart.

After the reading of the paper, the subject was discussed by Messrs. Craig, Hewat, Hislop, and others, and, on the motion of the Chairman, a vote of thanks was awarded to Mr. Rawlinson.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Continued from page* 358.)

A note was then read on—

The State of Combination in which Morphia exists in Opium.

BY D. B. DOTT, F.R.S.E.

Who it was that first discovered (or guessed) that opium contains morphia sulphate, I have not been able to ascertain; the published references to the matter being few, and not very informatory. At a former meeting of this Conference (1879), Professor Flückiger gave it as his opinion that morphia is "present in opium as a sulphate, at least for the most part." This conclusion was arrived at from the observation, that an alcoholic solution of opium contains sulphuric acid which cannot exist as inorganic sulphate, and must therefore be present as alkaloidal salt. In the discussion which followed the reading of the Professor's paper, Mr. Naylor appears to have upheld the view that the morphia exists partly as meconate, and partly as sulphate; but the report of his remarks is obscure and ambiguous. The latter opinion I believe to be correct, though not for the reasons given by Mr. Naylor, who appears to found principally on the alleged fact that crystals of meconate and sulphate are formed in solutions of opium. Although I have obtained crystals of morphia sulphate from an opium extract, I never yet observed in it crystals of meconate.

The facts which render it almost certain that morphia exists in opium both as sulphate and meconate, are briefly as follows:—

1st. An aqueous extract of opium contains sulphuric acid in sufficient quantity to combine with the whole of the morphia.

2nd. The same extract contains meconic acid in quantity insufficient to convert all the morphia into meconate.

3rd. The extract contains inorganic and organic bases, with which the sulphuric acid will unite in preference to the morphia; and the remainder of the sulphuric acid will not suffice to combine with all the morphia.

Seeing then that the sulphuric acid, which is free to combine with the morphia is insufficient to unite with the whole of the alkaloid, it is evident that part of the morphia must exist as meconate. From the acid nature of opium solutions, and on account of the great difficulty (if not impossibility) of obtaining crystalline meconate from them, I formerly concluded, and still consider it probable, that the morphia meconate present in opium is the *acid* salt. This, however, is not absolutely certain, as the meconic acid may be partly combined with narcotine, papaverine, etc., while the colouring and extractive matters might prevent the neutral meconate from crystallizing. The subject is one by no means free from difficulty, and would require very many experiments to thoroughly clear it up. I have discussed the matter more fully in a paper read last session before the Royal Society of Edinburgh.

The President said the Conference was very grateful to Mr. Dott for this paper, but after what the author, an authority on such matters, had said respecting the difficulty surrounding the question as to the condition in which morphia existed in opium they could not expect much discussion.

A vote of thanks was passed to the author.

The next paper read was on—

Sweet Spirit of Nitre.

BY ALFRED CLAY ABRAHAM, F.C.S.

Although the term sweet spirit of nitre does not occur in the British Pharmacopœia, and consequently that name cannot strictly be applied to the preparation now official, the latter was undoubtedly intended as a substitute for the older preparation, and I shall apply the term indifferently to both. I need not enter into the history of this preparation, which will be found in Christison's 'Dispensatory,' and more recently in a comprehensive article by Warington in the *Pharmaceutical Journal*, [2], vol. vii., p. 7.

It will suffice to remind you that until 1826 the process adopted had been almost, if not quite, universally that of distilling together a mixture of nitric acid and spirit of wine. The strength and proportions of these ingredients differed from time to time very considerably, but neglecting secondary reactions (however important they may have been), we may, I think, consider that the necessary result would be the production of tolerably constant proportions of nitrite of ethyl and aldehyde. No doubt some of the more violent formulæ, *i.e.*, those in which strong nitric acid or that acid in large proportion was used would cause the oxidation to be carried much further. As to the probability of this I may refer to Mr. Alsop's experiments, which will be found recorded in the *Pharmaceutical Journal*, [2], vol. iii., p. 425. This gentleman found that by dropping the spirit gradually into the acid scarcely anything but acetic ether was formed. This would seem to show that it was by no means only the aldehyde which suffered decomposition. I should perhaps here say that what I am endeavouring to show is that the preparation so long known under the name of sweet spirit of nitre, and which obtained and maintained a certain reputation, was essentially an impure solution of nitrous ether and aldehyde, containing approximately an equal number of molecules of each of these compounds.

In the Dublin Pharmacopœia of 1826 a formula was given for the preparation of nitrous ether, in which the nitric acid was formed during the distillation by the action of sulphuric acid upon nitrate of soda.

In 1839 the Edinburgh Pharmacopœia gave directions for the preparation of nitrous ether from strong nitric acid of 1·500 sp. gr. and subsequent purification, first with milk of lime and afterwards by shaking with a concentrated solution of chloride of calcium and separating the ethereal liquid which rose to the surface. The London Pharmacopœia, however, never departed from the old process.

In the first British Pharmacopœia of 1864 an entirely new process was adopted, which consisted in distilling together nitrite of soda, sulphuric acid and spirit of wine.

The main objection to this plan was the difficulty and expense of preparing a satisfactory nitrite of soda, which when prepared, as directed, seldom, I believe, contained more than about 20 per cent. of the nitrite. Shortly before the publication of our present Pharmacopœia in 1867, Professor Redwood read a paper upon "Spirit of Nitrous Ether," a report of which will be found in the *Pharmaceutical Journal*, [2], vol. viii., p. 508. Professor Redwood's experiments showed, what I believe has never since been denied, that when nitric acid and spirit are distilled together, no nitrous ether to speak of is formed until the proportion of spirit has been reduced to about four times that of the acid, at which point the reaction becomes violent, and of course produces a number of secondary products, to none of which can the normal action of the preparation be imputed. The condemnation of the old nitric acid process was based upon these grounds.

The Dublin and Edinburgh processes he condemned for three reasons, viz.:—(1) The difficulty of carrying them out on the large scale; (2) The excessive cost, and (3) The alteration in character of the product. The nitrite of soda process was condemned on the grounds I have before named, and a number of other processes now forgotten were rejected for reasons which he states. Amongst the latter was the process of forming the nitric acid in the presence of the spirit by the use of a nitrate and sulphuric acid.

This was stated to be open to the same objection as the Edinburgh and Dublin processes, but in what way this was so Professor Redwood did not state.

Professor Redwood then described a new process which was shortly afterwards adopted in the British Pharmacopœia, and which is too well known to all to need any description. If I had been as well aware a few years since as I am now of what had been done by well-known chemists in attempting to improve this preparation I should have been discouraged from making any further experiments and you would probably have been spared the infliction of this paper. I was not, however, aware of what had been done and was therefore induced to consider why the pharmacopœial product so soon spoiled or at least became deteriorated, and why the old fashioned preparation still remained so largely in favour and had the reputation of keeping so much better.

I mention the questions which arose in my mind not because I have been able to solve them, but because they drove me to the conclusion that there must be something formed when following the official formula which had a destructive action upon the other ingredients. I was the more induced to favour what we may call the direct nitric acid method from a conviction that the explanation of the pharmacopœial process generally received was erroneous and that it was more correct to impute the moderate action and constant temperature peculiar to that process rather to the action of the sulphuric acid upon nitrate of copper, or to the increase of the boiling point by the admixture of sulphuric acid, than to the formation of nitrous acid.

My first experiment (*a*) was the following and was made to test the accuracy of my supposition that the production of nitrous ether was based upon the action of sulphuric acid upon nitrate of copper.

3 ounces of copper
and 9 fluid ounces of nitric acid

were caused to react, the result being of course a waste of one-fourth of the acid, which reduced the available quantity to $6\frac{3}{4}$ fluid ounces, *i.e.*, 50 per cent. more than ordered in the British Pharmacopœia.

Sulphuric acid, 3 fluid ounces,
Spirit rect., $1\frac{1}{2}$ pint,

were then mixed, added to the nitrate of copper previously formed and distilled.

The reaction proceeded with great regularity and the fluid ounce product was 4 pounds, 9 ounces $= 96\frac{1}{2}$, *i.e.*, 4 fluid ounces more than the British Pharmacopœia directs to be produced.

From this 3 to 4 per cent. separated when the Pharmacopœia test with solution of chloride of calcium was applied. This promised well, but as a green insoluble powder, which I took for basic nitrate of copper remained in the retort, I was induced to try using a smaller quantity of the acid.

3 ounces of copper,
6 fluid ounces of nitric acid,

were combined, and the product, containing the nitric radical equal to $4\frac{1}{2}$ fluid ounces of nitric acid, *i.e.*, the B.P. quantity, was treated as before. Product $87\frac{1}{2}$ fluid ounces which separated nothing with solutions of chloride of calcium. This certainly would not do, and as No. 1 had only one advantage over the Pharmacopœia, viz., the greater regularity of its distillation, and on the other hand required the use of much more copper, and twice as much nitric acid, I looked out for some base which would fulfil the following requirements viz.:—

1. Be cheap.
2. Constant in composition.
3. Easily decomposed at the required temperature by the sulphuric acid,
4. Exist either in the state of nitrate in commerce, or in that of some compound which could be converted into a nitrate without loss of nitric acid.

Calcium seemed to answer these requirements best, but I was afraid that it might liberate its nitric acid too rapidly.

The following was tried:—

$\left.\begin{array}{l}\text{Acid. nitric., } 4\frac{1}{2} \text{ fluid ounces}\\ \text{Calc. carb. præcip, } 3\frac{1}{2} \text{ ounces}\end{array}\right\}$ combined.
$\left.\begin{array}{l}\text{Acid. sulph., 3 fluid ounces}\\ \text{Sp. rect., } 1\frac{1}{2} \text{ pint}\end{array}\right\}$ mixed.
Sp. rect., 3 pints. In receiver.

The carbonate of calcium was placed in a flask of about a gallon capacity—although this is much larger than necessary—the nitric acid was poured gradually upon it and the flask then set aside for the contents to cool. I believe that in my first experiment the nitrate of calcium was left for several days, but this is quite immaterial.

The sulphuric acid was mixed with a pint and a half of the spirit, poured upon the nitrate and distilled into the remaining three pints of spirit.

The distillation proceeded with great regularity from the beginning to the end; the product was $86\frac{1}{2}$ fluid ounces of a liquid of specific gravity ·8453 at $60\frac{1}{2}$° F., and separated 3 to 4 per cent. by the chloride of calcium test.

This product appeared in every way equal to that made by the Pharmacopœia process, and as the quantity drawn over, viz., $86\frac{1}{2}$ fluid ounces, was 4 fluid ounces or nearly 5 per cent. greater than that authority directs to be recovered the result could not be considered unpromising. I should say that the first $82\frac{1}{2}$ fluid ounces were tested and found only to separate about 1 per cent., but the remaining 4 fluid ounces of product raised it to the strength I have named. This latter fact and some other indications which I had during the distillation showed that the quantity of spirit added with the sulphuric acid was too great and I, therefore, modified the form thus:—

$\left.\begin{array}{l}\text{Acid. nitric., } 4\frac{1}{2} \text{ fluid ounces}\\ \text{Calc. carb. præcip., } 3\frac{1}{2} \text{ ounces}\end{array}\right\}$ combined.
$\left.\begin{array}{l}\text{Acid. sulph., 3 fluid ounces}\\ \text{Sp. rect., 1 pint}\end{array}\right\}$ mixed.
Sp. rect., $3\frac{1}{2}$ pints. In receiver.

In this case the nitrate of calcium was used the day after it was made, but in other respects the same details as before were followed:—

Product, 4 pounds 10 ounces $= 87\frac{1}{2}$ fluid ounces.
Specific gravity, ·8463.
Separated, 3—4 per cent.

The distillation occupied less than one hour. I liked this process much better than the Pharmacopœia one, but it had one drawback which I imagined might be fatal to it as a manufacturing process on the large scale. The sulphate of calcium remaining in the retort forms a magma from which in quantity I imagined it likely that some difficulty might be experienced in distilling even as much as the Pharmacopœia directs to be drawn over, without applying such a heat as would perhaps injure the product or partially dehydrate the sulphate of calcium, and consequently water the product.*

To avoid this possible difficulty, I fell back upon my supposition, that possibly the sulphuric acid might so raise the boiling-point of the mixture of nitric acid and spirit as to reach the temperature necessary for the formation of the nitrite of ethyl.

The proportions of nitric acid, sulphuric acid and spirit ordered by the Pharmacopœia were therefore mixed and distilled into the remaining spirit. The product, perhaps through some neglect, was not satisfactory.

I suspect, however, that a continuous process in which the supply of spirit and nitric acid should be adjusted so as to maintain a regular and proper temperature would work well, although unsuited to a Pharmacopœia which must, when possible, give a process adapted as well to the small as to the large maker.

Since making these experiments, I see that the United States Pharmacopœia has adopted such a process as I

* Since writing, Mr. Michael Conroy has relieved my mind upon this point by very kindly preparing a large batch in Messrs. Evans, Sons and Co.'s laboratory. I have to express my obligation both to him and to them.

myself tried (form E.), but I have not tested its capabilities.

I have tried some other formulæ for the manufacture of this preparation, but their results do not justify me in occupying your time by recounting them.

And now, gentlemen, having mentioned such experiments as seemed to me of interest, I will, with your permission, repeat what I said before, viz.:—That the preparation which gained a certain reputation under the name of spiritus nitrici dulcis, was one produced by the direct action of nitric acid upon spirit of wine.

Nitrite of ethyl was long ago found to be a constituent of this, and it was assumed, on very slender grounds, I believe, that to it alone was due the medicinal activity of the preparation.

Rimmington says (*Pharm. Journ.*, [3], viii., 341) that nitrous ether when free from aldehyde and other oxidized products will keep well in well stoppered and full bottles for four to six months, but as samples *d* and B.P. (see table) have been kept seven months in bottles *not full*, exposed to bright light in a warm room, and, moreover, have had a number of small samples taken from them, as would be the case in dispensing, it would seem as if the aldehyde did not exert a very deleterious action. Mr. Rimmington also points out how valuable the nitrous acid formed in the stomach from the nitrite of ethyl may be in febrile diseases, but he forgets that acetates are *known* to do what he only suggests as a function of the nitrous acid and so fails to appreciate the value of the aldehyde, which we may fairly assume will be converted into acetic acid and afterwards into an acetate *when it reaches the blood*, where its action is required.

I believe we have as much right to say that aldehyde is the active ingredient as to credit nitrite of ethyl with being such. Holding these views, I have made no attempt to prepare a pure solution of nitrite of ethyl in spirit, and have indeed practically returned to the old process, so modified, however, as to eliminate the sources of loss and the impurities due to a very violent reaction. The British Pharmacopœia process has been supposed to produce less aldehyde than the old process, and proportionately, no doubt, this is true, because I suppose there is no doubt that most of the nitrous ether was formerly lost.

That this supposition with reference to the aldehyde is not correct, however, when the Pharmacopœia product is compared with the product of form *d*, is, I think, roughly shown by adding to both a sufficient quantity of caustic potash. The colour produced is almost exactly the same. I would venture to suggest that formula *d* is a better one than the pharmacopœial, for the following reasons:—

1. The product is 5 per cent. greater.
2. The cost is less.
3. The process is more analogous to the old one.
4. Occupies much less time.
5. The distillation is much more regular.
6. The proportion to be distilled is one-third less.

Advantages 4, 5 and 6 recommend it as a manufacturing process.

There are other points which may be noted in its favour, although we have no direct means of estimating their value.

When the impure nitrous ether produced by the Pharmacopœia process is mixed with the spirit and shaken, an evolution of gas always takes place, which will blow out the stopper unless it is removed.

The process which I recommend does not produce this result.

The residue in the retort when operating by the Pharmacopœia process has a very nauseous smell, forcing one to believe that some very complicated secondary reactions have been going on.

The residue of process *d* is perfectly sweet.

Of course these virtues would count for nothing if the product did not equal that produced by the present official process. That it does, however, I have satisfied myself and hope to be able to satisfy others, although my analytical investigations have by no means been carried out to the extent to which I should have wished, or, indeed, as far as they would have been had business permitted.

All tests have been comparative, that is to say they have been applied to the products of form *d* and the British Pharmacopœia, made on the same day with the same apparatus and ingredients. No satisfactory test for nitrous ether, when mixed with spirit, aldehyde, etc., has yet been devised. As far as I am aware those of Dupré and Muter, which will be found in the *Analyst*, vol. iv., p. 121, must, I think, estimate aldehyde, which could hardly escape oxidation, at least to some extent during the processes employed.

I have therefore simply titrated, when fresh and practically neutral, with liq. sodæ, and satisfied myself that the quantities required by both were practically the same.

The taste of the two preparations is indistinguishable, and when fresh they are equally neutral.

The sp. gr. of product from form *d* is certainly slightly lower, but this, if not merely due to the recovery of the 5 per cent. more spirit, could easily be rectified by using a dried nitrate of calcium.

With regard to the keeping properties of the respective preparations I must refer you to the table, but with regard to the amount of acidity I must admit a doubt as to whether the pharmacopœial product does not liberate less free acid when kept than the product of form *d*. Bicarbonate of potash did certainly seem to cause more effervescence with the latter than with the former. Thinking that this might be due to the more rapid decomposition of the nitrite of ethyl, I applied the following test, which, however, seems to me to be a more promising one for the general quality of the preparation than of any value for the purpose for which I originally applied it.

To an ounce of water I added a crystal of neutral iodide of potassium, 100 fluid grains of the sample and estimated the liberated iodine with volumetric solution of hyposulphite of soda.

The results, which I think are interesting, are tabulated, and fairly show, I believe, the natural loss due to time. One thing at least seems perfectly clear, viz: that the success of the B.P. process is not due to the formation of nitrous acid, but to the increased boiling point resulting from the presence of the sulphuric acid, which is gradually eliminated as the distillation proceeds by its action upon the copper, or upon nitrate of copper, and thus maintains a proper equilibrium.

The above test being dependent equally upon the nitrite of ethyl and the aldehyde, or the acetic acid formed from it, would seem a very suitable one for a preparation in which both have an equal claim to recognition.

And now, gentlemen, having, I fear, exhausted your patience, I have only to apologize for bringing before you a subject which to properly treat would require more time than I have been able to give to it, and I hope you will regard the formula which I have recommended, not as a perfected one, but merely as one sufficiently successful to justify further experiment.

In connection with this subject, I may be permitted to describe an arrangement which I have devised to overcome what to me was always a great difficulty, due to the utter repugnance which fresh spirit of nitrous ether has for being enclosed in a tube, and mixed with chloride of calcium solution.

This piece of barometer tube is or ought to be divided into three portions, each holding 50 fluid grains, and the lower one again divided into hundredths. The peculiarity consists merely in substituting for a stopper or cork a short piece of strong rubber tubing, which can be compressed by means of a strong screw pinchcock.

This allows of a certain amount of expansion, and obviates all difficulty.

		Product f. oz.	Sp. gr.	Separated per cent. when fresh.	Separated when three months old.	Separated when seven months old.	I liberated from KI. when fresh.	I liberated when seven months old.
	Cu 3 oz., HNO_3 3 f. oz., combined. H_2SO_4 4 f. oz., sp. rect. 1½ pint, mixed. Sp. rect. in receiver, 3 pints.	86½	·845	3–4				
b.	Cu 3 oz., HNO_3 6 f. oz., combined. H_2SO_4 3 f. oz., sp. rect. 1½ pint, mixed. Sp. rect. in receiver, 3 pints.	87½	not taken.	nothing.				
c.	HNO_3 4½ f. oz., $CaCO_3$ 3½ oz., combd. H_2SO_4 3 f. oz., sp. rect. 1½ pint, mixed. Sp. rect. in receiver, 3 pints.	86½	·8453	3–4				
d.	HNO_3 4½ f. oz., $CaCO_3$ 3½ oz., combined. H_2SO_4 3 f. oz., sp. rect. 1 pint, mixed. Sp. rect. in receiver, 3½ pints.	87½	·8463 at 57°	3–4	3	2	104	100
e.	HNO_3 4½ f. oz., H_2SO_4 f. oz. } mixed. Sp. rect. 1½ pint. Sp. rect. in receiver, 3 pints.	87½	not taken.	nothing.				
P.B.	HNO_3 4½ f. oz., H_2SO_4 3 f. oz. } mixed. Sp. rect. 1½ pint. Sp. rect. in receiver, 3 pints.	82½	·8456 at 57°	3–4	3	2	106	101

The above samples were all made by using a glass flask, heated on a steam funnel, as described and figured in the *Pharmaceutical Journal* of May, 1882.

I need hardly, in a paper of this nature, refer to the most unsatisfactory character of the Pharmacopœia tests, tests which if regarded as applicable to a preparation not new would condemn the most conscientious pharmacist in the country to an invidious police charge. Some latitude must be allowed or chemists will be obliged in self-defence to make the preparation originally considerably above the strength indicated.

The President moved a vote of thanks to Mr. Abraham. He said a vast deal might be said on this subject, but he hoped members would condense any remarks they had to make, bearing in mind that at present no one quite knew what it was they spoke of when referring to sweet spirit of nitre. He did not know that anyone could say that the original sweet spirit of nitre was a solution of nitrite of ethyl at all, or that it was a solution of aldehyde. It was quite certain none of the processes which had been proposed yielded a perfectly definite article. For anything they knew, the substance might owe its activity mainly to nitrous ether, to aldehyde, to other things, or to a combination of all. These matters had never been scientifically investigated by therapeutists. He had thrown out a hint once or twice that it would be extremely desirable if some gentleman well acquainted with therapeutics would say what was the action so far as he could ascertain it, of a solution in spirit of nitrous ether, and of a solution in spirit of aldehyde, and that might induce pharmacists to produce an article which should have a definite composition. With regard to the tests, there was none on which reliance could be placed which would give them information they did not at present possess. They could demonstrate the presence of nitrite of something in sweet spirit of nitre, and the presence of aldehyde, but he feared up to the present time there was no method of quantitatively estimating satisfactorily either the amount of aldehyde, of nitrous ether, or of any other substance. He hoped that a knowledge of this preparation would be extended sooner or later, and there was some hope it would be so, because a useful pamphlet had been published on the subject by Professor Eykman, of Tokio, an abstract of which had appeared in *New Remedies* of May, 1882, and the *Pharmaceutical Journal* of July 22, 1882, in which the author gave a method of estimating the nitrous ether in sweet spirits of nitre, or spirit of nitrous ether, or whatever else it might be called. That method depended on eliminating nitric oxide gas, and estimating its volume; it did not take any account of either nitrous or nitric acid present, but it was to be assumed that anyone experimenting would ascertain the absence of these substances. It was possible it might yield trustworthy indications as to the amount of nitrite of ethyl in the article experimented on, and he recommended it to those investigating this subject in order that they might arrive at some reliable data.

Mr. Williams thought it hopeless, as he had often said, to produce anything like absolute or uniform results by mixing together in a retort certain ingredients, and distilling something out of that retort. He would say no more on that matter, because all the researches of pharmacists tended to prove the same thing. He had attempted to make sweet spirit of nitre synthetically. He had made a 10 per cent. solution of pure nitrite of ethyl condensed in absolute alcohol, and the result was not, as far as flavour was concerned, sweet spirit of nitre. He had then made a 10 per cent. solution of pure aldehyde in alcohol, and the result was certainly not sweet spirit of nitre. Mixing the two together in equal proportions the result had no resemblance whatever to sweet spirit of nitre, and no one would accept it as the sweet spirit of nitre the public required. Chemically speaking, therefore, sweet spirit of nitre must be something different to what it was often assumed to be, a mixture in equal parts of nitrite of ethyl and aldehyde. The aldehyde was very objectionable, so offensive indeed that if present in any large proportion it would spoil the flavour of any sweet nitre if it contained anything like the proportion of 5 per cent. He had had lately to do with the body recently introduced to medical notice, called paraldehyde, in which three molecules of aldehyde were polymerized into one of the new body. This new body was believed to be a very potent and powerful medicinal agent. They did not know much about its real activity at present, but it promised to be a very important drug and chemical agent of the future. But it was remarkable that the flavour of this particular modification of aldehyde was so similar to that of sweet spirits of nitre that he believed it was to a great extent the real ingredient combined with nitrite of ethyl, which they had been seeking for. Pure aldehyde when brought into contact with a very small quantity of hydrochloric or sulphuric, or almost any acid, was converted, not by any combination taking place between the acid and the aldehyde, but by an internal re-arrangement of molecules and condensation, so that three molecules of the aldehyde were condensed into one molecule of the new body. This change might be seen going forward in the flask in which the operation was conducted, in the most beautiful manner. The aldehyde, which was so volatile that it could hardly be condensed, and so disagreeable that its vapour could hardly be breathed, and insoluble in water, and with a flavour that could not be tasted without offence, became a mild tasting body, boiling at 120° Cent., changed in all its nature, except probably in its medicinal activity, and perfectly soluble in water or solution of chloride of calcium. He believed this body was produced naturally by the ordinary process adopted in making sweet spirit of nitre, especially when the operation was conducted slowly. In carefully working with pure aldehyde he found it could not be entirely converted into paraldehyde in one operation; about one third of the aldehyde was converted partly into acetic ether, and partly acetone, and these two bodies had been distinctly separated in a pure state. He could answer for it, however, that a very small quantity of free acid was capable of converting a large portion of the aldehyde into paraldehyde, acetic ether, and acetone, while the nitrite of ethyl, which would also be produced, as part of the reaction of the Pharmacopœia process for making sweet spirit of nitre, would go to make up the complex body which they knew as sweet spirit of nitre.

Dr. Symes said the remarks of Mr. Williams were very suggestive; but if paraldehyde was the active ingredient in spirit of nitrous ether it could not be *sweet* spirit of nitre, because, as far as he could judge, paraldehyde when considerably diluted was anything but *sweet*. He wished to remark that there was a practical matter which affected them all, and that was that whilst their knowledge was so uncertain about sweet spirit of nitre, it did seem a great hardship to pharmacists that on the authority of an uncertain test gentlemen were frequently prosecuted and fined for not being able to produce a body which it was pretty clearly shown could never be produced with certainty twice alike.

The President remarked that the case to which he believed Dr. Symes referred was decided on analytical evidence, depending, not on the pharmacopœial tests, but on the permanganate test, quite a recently proposed method.

Dr. Symes said the point was that this body was not constant to any known test.

Mr. Moss said he did not know what the state of the law on sweet spirit of nitre in the United States was, but if he remembered rightly, in the report of the committee of revision of the U.S. Pharmacopœia, it was recommended that some such process as that of the B.P. should be employed; that copper, sulphuric acid and nitric acid should be distilled together in a retort, and something obtained from them; the something, whatever it was, was then to be mixed with a saturated solution of chloride of calcium in order to separate this same substance which was obtained in testing spirits of nitre by the pharmacopœial test. It would look as if in America they devised their process rather with a view of standing this test than from any notion they might have as to what sweet spirit of nitre ready was.

Mr. Naylor said he would not enter into the question of the manufacture or composition of sweet spirit of nitre, but he did think it very desirable that in the coming Pharmacopœia the method suggested by Dr. Dupré for the estimation of the nitrite radicle should be adopted. There was certainly a make of spirit of nitre obtainable, which, when examined by that method would at any rate correspond to 3 per cent. of crude nitrous ether. In the new U.S. Pharmacopœia the manufacturing method with copper was abandoned.

Mr. Whitley Williams said he believed that in sweet spirit of nitre there was a considerable proportion of things which gave nitrous acid, which were not in any sense of the term nitrites. Sweet spirit of nitre probably contained a considerable quantity of nitroso-aldehyde compounds.

Mr. Dott remarked that with regard to the physiological action of this drug, Professor Matthew Hay, of Aberdeen, confirmed his own opinion that the diuretic action of sweet spirit of nitre was due to the nitrous radicle in the compound; his experience with other nitrites agreed with that.

Mr. A. C. Abraham had listened with great pleasure to Mr. Williams's remarks, and was not surprised that his solution of nitrous ether was not like sweet spirit of nitre; he did not think anyone would expect that it would be. With regard to paraldehyde, he was extremely pleased to hear what Mr. Williams said. He had, indeed, only a few days since expressed to Mr. Conroy his suspicion that possibly paraldehyde was one of the active principles of sweet spirit of nitre. His attention had only recently been called to this body and his suspicion was not founded upon such a basis as Mr. Williams had mentioned; still whether paraldehyde or aldehyde, it was the same group of molecules whether in the treble or single state. After all, the action of sp. æther. nit. was not supposed to be so much sedative—while that of paraldehyde was—as diuretic, and he doubted whether, supposing paraldehyde was present, the value of the preparation might not be judged by the amount of nitrous acid liberated in following out the test he had suggested. The framers of the United States Pharmacopœia were to his mind considerably too radical. They had had a glycerine period, and now they had one which might have some other feature equally objectionable in it. In matters of this kind they should be cautious, and stick to the old processes as much as possible; they knew that the direct action of nitrous acid on spirit produced a preparation which was wanted, which had a certain efficacy, and he thought they should give a certain preference to that. He hoped that he had shown that it produced as much nitrous ether and aldehyde as the Pharmacopœia process, but it could easily be increased in strength in that direction if desired.

A paper was then read on—

An Examination of Some Samples of Pitch and Asphalt.

BY E. DAVIES, F.I.C., F.C.S.

Having had a sample of American asphalt sent to me, suspected of being stearine pitch, I found that very little information could be found in books with reference to either pitch or asphalt. I have, therefore, collected samples of all kinds of pitch or asphalt which I could obtain, and although I have been unable to meet with some kinds occasionally imported, as Cuban and Mexican, I trust that the notes which I have made will be found to have some value. No attempt has been made to analyse the organic matters in these varied products. They are no doubt mixtures of great complexity and, so far as manufactured pitch is concerned, of variable composition, according to the heat used in their manufacture. As my object was mainly the identification of the various commercial articles, I have only determined the ash, the sulphur, and the amount soluble in petroleum spirit sp. gr. 700. The last of these determinations does not admit of very great precision. In almost all the samples there is a substance highly fluorescent, and very slightly soluble in petroleum spirit, to completely remove which was impracticable without such prolonged treatment as was inconvenient. I therefore performed the extraction as follows:—50 grains of the sample, if possible in fine powder, was allowed to stand an hour with 1 ounce of petroleum spirit, and frequently agitated. It was then boiled for a short time, the solution decanted, and the residue boiled with 10 successive half ounces of petroleum spirit. All the solutions were filtered through a weighed filter, upon which the residue was finally washed and dried at 100° C.

The sulphur was determined by fusing with nitrate of potassium and carbonate of sodium, except in those cases in which the substance would not powder. These were treated with a large excess of pure fuming nitric acid, first at a gentle heat, and afterwards boiled, the solution largely diluted with water, almost neutralized with ammonia, filtered and precipitated with chloride of barium. The sulphur was determined in the part insoluble in petroleum spirit, in one of the Syrian asphalt, and in the ash of Trinidad pitch and Val de Travers asphalt.

The samples examined were three of coal-tar pitch, by three large makers. They vary in the amount soluble in petroleum spirit, owing, no doubt, to the extent to which the distillation was carried. These have a conchoidal fracture, and give a black powder.

Rosin Pitch.—Obtained in the distillation for rosin oils. This has a conchoidal fracture, but gives a brown powder, and is almost entirely soluble.

Stockholm Pitch.—This is a black mass, too soft to powder, and is very soluble.

Stearine Pitch.—A black mass, which will powder with difficulty, not so soluble as the two previous kinds.

Trinidad Pitch.—This is the natural product of the celebrated pitch lake of Trinidad. It is a brown, earthy-looking substance, giving a brown powder. About two-fifths of the organic matter is soluble, and the ash is almost entirely silicious.

Fine Syrian Asphalt.—A natural product, almost black, but giving a dark brown powder.

Low Syrian Asphalt closely resembles the "fine," but contains more earthy matters. These, with the Trinidad pitch, are remarkable for the high percentage of sulphur. The presence of sulphur in natural asphalt has been noticed before. The *Journal of the Chemical Society*, 1879, p. 896, contains an abstract of a paper by O. Helm, in which it is stated that Syrian asphalt contains 9·13 per cent. of sulphur, and a sample of American asphalt 10·85 per cent. The sulphur was almost entirely in combination with the organic matter. These figures are higher than those which I find, but no doubt there are variations. The sulphur was found to be in the fine Syrian 6·13 per cent., of which 3·74 per cent. was in the portion insoluble in petroleum spirit, and 2·39 per cent. in that soluble. The ash of the Trinidad pitch contains ·137 per cent of sulphur.

American Asphalt.—This is evidently a manufactured article, and not a natural product. It is a black, brittle substance with a conchoidal fracture, and gives a black powder. It is soluble to the extent of about two-thirds in petroleum spirit, and is quite different from stearine pitch, both in its appearance, brittleness, and in the percentage of sulphur. I cannot learn the origin of it, but it is shipped from San Francisco.

Val de Travers Asphalt.—This is a limestone, rather magnesian, soaked in a soft bituminous substance, entirely soluble in petroleum spirit. The limestone contains ·15 per cent. of sulphur as sulphate of calcium. The organic matter, therefore, contains only 2·74 per cent. of sulphur. I regret that my application for a sample of Seyssel asphalt was not successful.

Burgundy Pitch.—An examination of the only pitch recognized in the Pharmacopœia was necessary, if only to give this paper a better title to your consideration, but it is a substance of a totally different nature from the others treated of in this communication. It is a resin of a yellow colour, and, although easily pulverized, soon becomes a solid mass at the ordinary temperature of the air.

The accompanying table gives the results of the investigation for comparison:—

Description.	Soluble in Petroleum Spirit.	Insoluble.	Ash.	Sulphur.	Organic matter soluble in P. S.	Organic insoluble in P. S.	Sulphur in organic matter.
Coal tar pitch, No. 1	24·44	75·56	·20	·69	24·49	75·51	·69
,, ,, No. 2	18·70	81·80	1·06	·41	18·90	81·10	·41
,, ,, No. 3	15·86	84·14	·48	·59	15·94	84·06	·59
Rosin pitch .	86·94	13·06	·58	·26	87·45	12·55	·26
Stockholm pitch . .	91·46	8·54	·84	·015	92·23	7·77	·015
Stearine pitch .	71·05	28·95	5·50	·04	75·18	24·82	·04
Trinidad pitch .	36·24	63·76	37·76	3·47	58·22	41·78	5·35
Fine Syrian .	48·16	51·84	·68	6·13	48·49	51·51	6·17
Low Syrian .	49·68	50·32	2·64	5·65	51·02	48·98	5·80
American, No. 1	65·64	34·36	·60	·62	66·03	33·97	·62
,, No. 2	63·62	36·38	·26	·85	63·78	36·22	·85
Val de Travers .	9·76	90·24	90·24	·41	100·00	none	2·74
Burgundy pitch	99·04	·96	·14	none	99·18	·82	none

I have to acknowledge the valuable assistance rendered by Mr. Arthur Haddock in making many of the analyses.

The President, in proposing a vote of thanks to Mr. Davies, said some of the samples mentioned contained nearly 100 per cent. of organic and combustible matter. Some alarm had been created by the public press within the last six months respecting the relation of asphalt to fire, and it had been suggested that the laying of asphalt, so called, in the streets, and as a roofing for houses, or rather as the external coating of other roofing, was well calculated to set fire to the whole of a city. He feared possibly some support to this motion might be derived from Mr. Davies's research, because there could be no doubt that some of the asphalts to which he had alluded were very combustible. It was, therefore, important to bear in mind that what was known by the public as asphalt, and was used for paving and roofing purposes, was a substance containing something under 10 per cent. of true asphalt, and over 90 per cent. of absolutely incombustible matter, and that in fact it was practically impossible to set light to what was popularly known as asphalt, so that it might of itself continue in a state of combustion. Of course a little reflection by any one who knew the composition of this so-called asphalt would show that there was not the most remote danger connected with its use. No doubt asphalt pure and simple was combustible, and so was gunpowder combustible; but if the latter were mixed with 90 per cent. of sand or other mineral matter it would be exceedingly difficult to set fire to that mixture, and it would be still more difficult to set a light to the mixture of asphalt and mineral matter which was commonly used for paving and roofing.

A vote of thanks was passed.

Mr. Thomas Hugh Williams said some of the remarks which Mr. John Williams had made with regard to white wax, and which might with equal justice have been made with regard to sesame oil, might also be applied to Burgundy pitch. The compound met with in commerce under that name had very little right to be called Burgundy pitch, but was simply a mixture of resin, palm oil, and water, and the figures which had been put forward seemed to him very suggestive of such a mixture.

Mr. Conroy said chemists and druggists would not buy genuine Burgundy pitch, and, as a rule, would only have the fictitious article, which was of a much brighter colour than the genuine; he did not think the public would have it either.

Mr. Holmes said one chemist that he knew had told him he always used Burgundy pitch, but obtained it with difficulty, and his customers preferred it, because it was not so irritating, but had a more beneficial effect. Some years ago, having succeeded in obtaining a small quantity, he took from time to time all he could get of it, having tried in vain to get it from any other wholesale house.

The next paper was a

Contribution to the Pharmacy of the Pomegranate.

BY LOUIS SIEBOLD.

The great value of the root-bark of *Punica granatum* as a remedy for tapeworm is so well established as to need no comment. It is well known, however, that the administration of this drug often results in failure on account of the extremely nauseous astringent taste of its decoction and its consequent rejection by the stomach, a fact which renders it almost useless for ladies and children. The usual way of meeting similar objections in other cases, by substituting the active principles for the crude drug, does not seem to promise well in this instance, owing to the difficulties attending the isolation of these principles in a pure state and their proneness to decomposition (see C. Tanret's researches on pelletierine and the other alkaloids of the pomegranate, abstracted in the 'Year-Book of Pharmacy,' 1878, p. 43; 1879, p. 38; and 1880, p. 64). The question then arises, whether it is possible to produce, by a comparatively simple process, a pharmaceutical preparation of this bark, which, while possessing the full activity of the drug, is at the same time free from the nauseous taste and the unpleasant effects alluded to. Such a preparation, I believe I have succeeded in making. I do not wish to trouble the meeting with the various steps taken in working out the problem, nor with particulars of unsuccessful experiments in the direction indicated, but will at once lay before you the details of the process finally adopted.

Six ounces of the coarsely powdered root-bark are digested three successive times with 48 fluid ounces of water at 160° F., previously acidified with a few drops of acetic acid, each time for about twelve hours, during which the mixture should be frequently agitated and the temperature maintained at or near the point given. The strained infusions, measuring in all nearly 140 fluid ounces, are united, and gradually mixed with solution of sugar of lead until no further precipitate is formed on testing filtered portions; the whole is then filtered, the slight excess of lead removed from the filtrate by a current of washed sulphuretted hydrogen, the mixture warmed for some time to expel the excess of the gas and again filtered, and the perfectly clear liquor evaporated on a water-bath to the consistence of a syrup, at a temperature not exceeding 140° F. Evaporation *in vacuo* would probably be better still; but this I have not tried. Finally the small quantity of residue left is mixed with syrup of orange peel sufficient to produce a draught of about 2 fluid ounces. This draught represents a dose for an adult, and should be taken at once, first thing in the morning, the patient abstaining from food and keeping quiet for about four hours after the administration. A diet of meat and fish, without bread or farinaceous food of any kind, should be observed for the two days preceding the cure, and on the last day no food whatever should be taken after dinner. During this afternoon it is also advisable to clear the bowels by means of a mild purgative; if then the draught be taken at about two or three o'clock the following morning and sleep again resorted to after its administration, the patient will have done all he can to ensure success.

In eight out of nine cases in which the efficacy of this preparation was tested, the entire tapeworm was expelled within five hours after the consumption of the draught, and in one case only success was not complete. The eight cases comprise three of *Tænia solium*, and five of *T. mediocannellata*. In one of the latter instances not the slightest care as regards diet was observed, and, contrary to all instructions, the patient took a heavy supper the night before the administration of the draught, and yet the entire worm was expelled. In all the eight cases various tapeworm remedies had been tried previously, decoction of pomegranate root-bark being also among those employed without success, the head of the worm remaining, although the decoction in the cases alluded to was retained by the patient. It would thus appear that the preparation I have described, in addition to being free from all objectionable taste, may also be superior to the decoction of the bark in point of activity, owing, probably, to the entire absence of astringent principles, the abundant presence of which in the decoction is not unlikely to counteract the effect of the anthelmintic constituents.

The preparation obtained as above has a pleasant fruity flavour and is readily borne by the stomach. The most fastidious patient would take it without the slightest difficulty. The value of such a preparation appears to me the greater from the fact that all tapeworm remedies of repute share the nauseous taste and sickening effects of the decoction of pomegranate bark.

While admitting that the cases in which this new preparation has thus far been put to the test are yet not great in number, I think I am justified by the results in inviting the best attention of medical practitioners on the one hand, and of pharmacists on the other, to this subject. Those who are fully acquainted with the numerous failures in the treatment of cases of tapeworm by even the most renowned remedies, must long since have felt the want of a preparation combining efficacy with freedom from all unpleasant taste.

The President proposed a vote of thanks to Mr. Siebold for this admirable contribution to practical pharmacy. The value of the dose would seem to quite justify the pharmaceutical labour and care necessary for its preparation. It appeared that 6 oz. of material had to be treated with 7 pints of water, then concentrated into a very small quantity and made up to 2 fluid oz. for a dose. He did not see any objection to that, in fact it seemed an opportunity for pharmacists to develop their power; but still he should like to know whether the preparation kept well, or whether it must be prepared whenever it might be wanted.

Dr. Quinlan, having been accustomed to encounter the difficulty of expelling tapeworm, wished to bear testimony to the great value of this paper. There was no more troublesome affection to deal with, and up to the present time the remedy principally relied upon was turpentine, which was disagreeable, and occasionally dangerous, because if not at once eliminated from the system it might produce serious results. The pomegranate bark was an old Spanish remedy, which had rather fallen into disuse, and he was glad to see it revived, and to hear of this method for its preparation. He should immediately try it, and report the result to the medical journals.

Mr. Tanner asked if he understood Mr. Siebold rightly, that the extremely nauseous taste of pomegranate preparations was due to an organic acid.

Mr. Siebold said it was due to tannic and gallic acids.

Mr. Tanner also asked whether the removal of the surplus lead, which was effected by sulphuretted hydrogen, could not be sufficiently effected by some other means, either dilute sulphuric acid or soluble carbonate, because the appliances for using the sulphuretted hydrogen process might not be found in all pharmacies.

Dr. Symes said if it were not verging too much on the medical aspect of the question, he should like to ask Mr. Siebold whether the oil of male fern had been tried in the cases to which he referred. Dr. Quinlan had said the only remedy at their disposal was turpentine, but in his experience oil of male fern was very frequently employed.

Dr. Quinlan said he meant to say that the principal remedy on which physicians could rely was turpentine; they frequently used male fern and other remedies, but turpentine was always sure, and constantly in cases where they had tried other things they had to go back to turpentine.

Mr. Siebold said he was much obliged for the kind offer of Dr. Quinlan and should eagerly look forward to the result of his trials. As regards the time the preparation would keep, he had noticed no deterioration in the course of two months, but he had no experience as to how much longer it could be kept without injury. In the case he had mentioned all the usual tape-worm remedies had been unsuccessfully tried, oil of male fern among the number. He could not recommend the use of sulphuric acid in the place of sulphuretted hydrogen, for the removal of the lead, as any excess of this acid would, during the subsequent evaporation, injuriously affect the activity of the preparation, for this he had found in the course of his experiments to be the result of long continued heating in the presence of mineral acids. He was quite aware that the directions he had given were rather too tedious to allow of the preparation being made from a physician's prescription in the ordinary course of business; but he should like to see a wholesale house of repute undertake to produce the preparation on a large scale for the supply of dispensing establishments.

The next paper was on—

Scammony—a Novel Adulterant.

BY MICHAEL CONROY, F.C.S.

Perhaps no drug contained in the materia medica has received so much attention from dishonest dealers as scammony, but the adulteration hitherto practised has been so clumsily and ignorantly effected, and the articles used for the purpose have been so simple, that a few easy tests have sufficed for their detection. Among these tests the one mostly relied upon, is the extraction and estimation of the resin by means of ether. No longer, however, will the test be so simple, for a genius has arisen in the East who has found a plan of producing the gum otherwise than by the poetical manner of collecting the milky juice in mussel shells, so ably described by Mr. Maltass, of Smyrna. This scammony may not be of the same therapeutic value as that known to Theophrastus in the third century B.C., nor as that described by Hippocrates or Dioscorides, nor yet as what Helias, patriach of Jerusalem, sent to our king, Alfred the Great, but still it is not as bad as many other samples to be found in the market.

This sample which represented a direct importation from Constantinople, came into my hands a few days ago for the purpose of analysis. It consisted of several small pieces which had apparently been broken off large thick cakes, with the object of obtaining a representative specimen of the bulk, from which they were taken. These were of a uniformly dark ash-grey colour, breaking easily and presenting a resinous, shiny black fracture, indistinguishable from pure virgin gum. Triturated in a mortar the pieces were easily reduced to a buff coloured powder, somewhat darker than what is usually obtained from the virgin gum. This powder formed a very nice emulsion with water, and in other respects appeared quite satisfactory. To ether it yielded 83·8 per cent. of a nice amber-brown resin, and a decoction of the residue when cooled was turned blue by iodine, as is usually the case with nearly all commercial specimens. The starch thus indicated was found by the microscope to be wheaten. So far nothing arose to create suspicion, but on examining the resin obtained by the extraction with ether, I was at once struck by its peculiar smell, which recalled the odour of the resin prepared from the root by means of alcohol, pharmaceutically known as scammony resin. This caused me to powder another portion of the sample, which on comparison with a sample of true virgin powder, at once revealed the presence of the resin prepared from the root. There is no mistaking the distinctive odour of this resin, and its presence will reveal itself by its very peculiar and persistent leathery odour, while the true gum possesses quite as distinctive a sour, cheese-like odour; and there is no doubt that this parcel has been made up of some skillip scammony and resin prepared from the root. It is the first time that I have met with this adulterant, and since my examination of the parcel I have learned that though containing 83·8 per cent. of resin, it was offered at four or five shillings below the market value of virgin gum. Samples are on the table of both the gum and powder, together with a sample of true virgin powder for comparison.

A vote of thanks was passed to Mr. Conroy.

A paper was then read entitled—

Aconitine for Internal Administration.

BY T. B. GROVES.

From a perusal of an article "Preparations of Aconite," in No. 5, vol. i., of Dr. Squibb's *Ephemeris*, it would appear that aconite plays a more important part in medication on the other side of the Atlantic than it does in this country. Here the admitted uncertainty of action both in degree and kind of the official preparations of the drug seems to have had the effect of dismissing both drug and preparations from the medical armoury: there, on the contrary, this feeling serves but to stimulate research with the view of providing for medical practitioners a trustworthy preparation of a drug of admittedly high value. Pharmacists cannot but feel greatly indebted to Dr. Squibb for his able article on the subject, although his conclusions may not meet with universal acceptance. In fact, it seems to me that to decide, after all the labour that has been expended on the chemistry of the aconite alkaloids by Wright, Duquesnel, and others, on recommending for internal use a fluid extract of a root that varies so greatly in activity, is a distinct retrogression in pharmacy tending to render useless a vast amount of original research conducted with unusual care and completeness. It is true that Dr. Squibb has indicated a method of estimating by the sense of taste the quality of the root, but such a method, crude in extreme as it must be in any case, would be unable to distinguish between roots differing widely in their chemistry and physiology, like *A. Napellus* and *A. ferox*. In fact, the latter, owing to the less amount of acrid resin it contains, would give a less marked result than its less potent congener. It is not pretended that the subject has been exhausted. New varieties of root have from time to time made their appearance in the market, and though the chemist has essayed to perform his part in their examination, he has not been adequately seconded by the experimental physiologist. The legal difficulties in the path of inquiry in this direction may well account for the apparent and probably only apparent lack of interest among the medical profession in a class of remedies so potent for good or evil as the various alkaloids of the genus *Aconitum*.

Practically we may, I think, limit our attention to one species only of the toxic aconites. *A. Napellus* is that which has, I believe, been invariably ordered in the manufacture of what may be termed crude aconite preparations for internal use, and it is to it that the textbooks refer when treating of the physiological properties of aconite. Its alkaloid, nap-aconitine, has been examined and described by several experimenters, so that its identification when in a pure crystalline condition is comparatively easy. Moreover, its precise physiological action has been studied by Dr. Fraser, of Edinburgh, who compared its action with that of fer-aconitine (the so-called pseudaconitine of Von Schroff) who reported thereon to the British Association at the Bradford meeting in 1873. His results, which are given in short abstract in the Annual Report, point to the necessity of discriminating between the two alkaloids when used for internal administration. But can they be with certainty discriminated? Undoubtedly, and it is the more necessary to take precautions in this direction, owing to the fact which Wright has pointed out that *Aconitum Napellus* yields both nap-aconitine and fer-aconitine, the latter in very small proportion it is true but still enough to modify in a sensible degree the action of its companion alkaloid. That the more powerful *A. ferox* has frequently (probably as often as procurable) been employed for the extraction of commercial aconitine is unquestionable. The element of uncertainty thus introduced has perhaps had much to do with the neglect with which English practitioners have treated aconitine as an internal remedy; a neglect which is seen to be fully justified when it can be shown that of the commercial aconitines so-called many are wholly amorphous and therefore indefinite in character, whilst others are not only so, but are also contaminated with aconite alkaloids without toxic properties, and of little physiological activity of any kind.

Mr. Cleaver has pointed out the source of one such possible contaminant in *A. paniculatum*, which he states yields an inert alkaloid identical with that provisionally named picraconitine, which I extracted in quantity from a batch of so-called *A. Napellus*. I at first supposed it to be identical with atisine, the alkaloid of *A. heterophyllum*, but I was assured by Dr. Broughton, who saw my specimens, that such was not the case, an opinion afterwards borne out by the results of combustions carried out in the laboratory of Dr. Wright.

I would recommend to anyone setting about the preparation of nap-aconitine for internal administration to be very careful in the selection of his roots. If possible, they should be grown in this country, with guarantee from the grower that they are the produce of *A. Napellus*. Mr. Holmes will soon, I hope, be able to tell us more about the numerous varieties of this plant and their relative degrees of toxicity.

To him we also hopefully look for showing us how to recognize them by optical means, microscopic or otherwise, as well as how to distinguish between the dried roots of *A. Napellus* and *A. paniculatum*.

Having obtained by following Stas' general method of extraction the crude alkaloids of presumably true roots, the aconitine before it can be safely used for internal exhibition must be separated in a crystalline condition. This is not difficult, but it is wasteful, if such a term can be permitted in this connection. Ordinary skill only is required, helped by extraordinary patience. As I pointed out so long ago as 1866, the nitrate is the best of its salts to crystallize, a fact I had demonstrated two years previously. I have never failed in producing it in quantity averaging, perhaps, one third of the total yield of alkaloid. From the nitrate the pure alkaloid or any of its salts can be made without difficulty.

It fortunately happens that the nitrate of fer-aconitine is crystallizable only from a strongly acid solution. It is therefore necessarily excluded from the crop of crystals obtained from a neutral or nearly neutral liquid.

There remains the possible admixture of picraconitine, the nitrate of which crystallizes in forms so like those of nap-aconitine that by an ordinary observer they would not be distinguishable. Its bitterness is its most patent distinction. The poisonous aconitines are much less bitter. Moreover, its comparative solubility in dilute ammonia is characteristic; so that a nitrate of aconitine that yielded on precipitation with dilute ammonia a proportion of alkaloid much less than that due to its centesimal composition would deservedly be suspected. However, the best test of all would be the physiological applied to each batch of alkaloid by a competent experimenter, and were a series of preparations so guaranteed produced by a house of known reputation, I am confident that in the course of a short time they would be accepted by the medical profession as a valuable addition to the list of heroic remedies.

The PRESIDENT having moved a vote of thanks to Mr. Groves for this last contribution of his to the literature of aconite,

Dr. WRIGHT said he could only regret the retrogressive action of the American Pharmacopœia Committee on this question. Some two or three years ago, while the revision was in progress, he was applied to by Dr. Rice, the Chairman of the Committee, to draw up a kind of *précis* of the general chemical and physical characteristics of the various aconite alkaloids as far as then known, and he was in hopes that the information then extant would have sufficed to have convinced the Committee that there was quite a possibility and practicability of having one uniform alkaloidal preparation which might be prescribed, instead of an uncertain tincture such as was ultimately adopted. With reference to another point, that the nitrate of aconitine was a convenient sort of preparation, he should say that the hydrobromide was almost as convenient for various purposes, especially considering its sparing solubility, and was not open to an objection which nitric acid was open to, that a certain amount of decomposition rendered further purification necessary. He believed Dr. Stevenson was carrying out some investigations with regard to the physiological character of the various alkaloids, for at the time of the Lamson trial he supplied him with samples for the purpose, and he hoped that before long he would afford some valuable light on that subject.

Mr. WILLIAMS said he could hardly say much at so late an hour on this subject; but he was rather bound up to a form of this alkaloid, namely, the amorphous form, which had been prepared and used medicinally for upwards of fifty years, and with which he had been more or less connected through the late Mr. Morson. He could hardly agree with Mr. Groves, that they ought to change the form and go to a crystallized article, his own belief being that a crystallized aconitine was not physiologically so active as the aconitine produced or discovered many years ago by Dr. Turnbull. He could hardly give any opinion on Mr. Groves's suggestion, except to say that it was not in accordance with his present views.

(*To be continued.*)

Parliamentary and Law Proceedings.

PROSECUTION UNDER THE 17TH SECTION OF THE PHARMACY ACT.

At the Birmingham Police Court, on November 8, before Mr. T. C. S. Kynnersley, Stipendiary, Matthew Wheatley, drysalter, etc., of 142, Sand Pits, Birmingham, was charged with having sold on the 30th ult., to Alfred Short Wright, Assistant Secretary to the Chemists and Druggists' Trade Association of Great Britain, a certain poison, to wit, 1 drachm of laudanum (the same being a preparation of opium), not being distinctly labelled with the name of the article, and the name and address of the seller of the same, contrary to the statute in such case made and provided.

Mr. Henry Glaisyer, Solicitor to the Chemists and Druggists' Trade Association, who appeared for the prosecution, said the summons was issued under the 17th section of the Pharmacy Act, which made it unlawful to sell any poison either by wholesale or by retail unless the box, bottle, vessel, wrapper or cover in which such poison was contained be distinctly labelled with the name of the article and the word "poison" and with the name and address of the seller of the poison. The defendant in the case was Mr. Matthew Wheatley, a drysalter, who carried on business at 142, Sand Pits and King Edward's Road, who had no business whatever to sell poisons scheduled under the Act. The Secretary of the Chemists and Druggists' Trade Association, Mr. Wright, visited the defendant's shop on October 30 last, and purchased from a boy behind the counter one pennyworth of laudanum; he took a bottle with him, and the only label the boy put on the bottle contained the word "poison." The name of the poison was not mentioned, nor the name or address of the defendant.

Mr. Alfred Wright being called and sworn, gave evidence in support of the opening statement.

The Stipendiary, addressing the defendant: Have you any reasonable defence to offer?

The defendant: We do not keep laudanum in stock for sale at all; I use it sometimes for neuralgia. The boy had no business whatever to sell it.

The defendant was fined 20*s.* and costs.

Poisoning in a Hospital by Carbolic Acid.

Mr. F. Price held an inquiry on the 8th inst., into the death of Richard Schofield, who met his death from poisoning by carbolic acid, on the 5th instant, at Monsall Hospital, Newton Heath.

Sarah Schofield, wife of the deceased, said he entered the hospital on Sunday fortnight suffering from scarlet fever. She did see him alive afterwards.

Fanny Gilchrist, head nurse, said deceased was a patient under her charge. The medicine was prescribed by Dr. Tomkins, and was sent up from the surgery from the dispenser, and placed in the medicine cupboard prepared for the purpose in the lobby of the hospital. Carbolic acid was not usually kept there, but it got there sometimes after being used for disinfecting purposes. Such bottles were always labelled "Poison," and were very plain. The bottles were the same size, form and colour as the medicine bottle, except a few which were fluted. Deceased was under treatment and recovering rapidly, and able to go about up to the 4th inst. About nine o'clock on Sunday evening she told the nurse to give the deceased a dose of his medicine, and directly afterwards the nurse met her, when she looked at the bottle and found it was carbolic acid. She said, "You have not given him this?" She replied "Yes." She went immediately for Dr. Tomkins and told him. The gas was at full light opposite the cupboard from which the carbolic acid was taken.

Dr. Tomkins deposed to visiting deceased and applying the usual remedies. He was coughing slightly, and his breath had the odour of carbolic acid. The stomach pump brought back the acid, and afterwards the deceased recovered consciousness and seemed to get better. He sank on the following evening and died at ten o'clock on Monday night. It was a standing rule that no strong preparations of any kind should be kept in the medicine cupboard, there being a place specially appointed for them. The nurse in question was a probationer, and had only been three weeks in the employment. She had only given medicine two or three times before.

The Jury returned a verdict of "Death from misadventure by carbolic poison," and recommended a heavy censure of the hospital officials.

The Foreman said they would be very sorry to put the girl on her trial for manslaughter, but the case was so serious that it almost merited it. It was certainly necessary that in an institution where people were sent to be specially cared for they should not be subjected to such carelessness as that which had occurred.

The Coroner then censured the officials, and said the jury had taken a merciful view of the case. It was doubtful whether they would not be doing their duty in sending the two nurses to the assizes for causing the death of the deceased by manslaughter. The police might take a different view from the jury, and it might be that they would yet have to appear before the magistrates on a grave charge. The medical officer promised to take greater care in the future in respect to poisons, and said they would be locked up in a separate chest.—*Manchester Courier.*

Attempted Suicide.

At Plymouth, on Monday, Thomas Francis, a fisherman, was charged before the Plymouth bench with attempting to commit suicide on Thursday, by taking poison. About eight o'clock on Thursday evening prisoner went to Mr. Adams, chemist, Exeter Street, and asked for some poison to kill rats on board his master's boat. Mr. Adams put to him several questions which he satisfactorily answered. He was, therefore, served with a threepenny packet of vermin killer, and signed his name in a book. About half-past ten he was in the Fisherman's Rest drinking, and then told his niece that he had taken poison. She did not pay much attention to him, and when he left the house he fell down on the pavement. He was carried to the hospital and attended by Mr. Carter, the house surgeon. Prisoner was conscious, but unable to walk, and complained of pains in his head and stomach. He was placed in bed, and about the middle of the night exhibited symptoms of strychnine poisoning. He was very ill on Friday, but recovered on Saturday.

Prisoner said he was drunk on Thursday, and did not know what he had done. He was remanded for a week. —*Western Morning News.*

Poisoning by Carbolic Acid.—A Coroner's Opinion as to a Chemist's Duty.

The Plymouth Coroner (Mr. T. C. Brian) held an inquest on the 12th inst. relative to the death of Amelia Heathershire, a married woman, who died from taking poison, at the Hospital, on Saturday afternoon.

Silas Robert Lillicrap, landlord of the Royal Exchange Inn, Vauxhall Street, stated that he knew the deceased. About 2.30 p.m. on Saturday she came into his bar sober and looking well, and asked for "a drop of gin." She had a basket with her and took a small bottle from it. It was a green glass bottle, and on the label was printed the words "A lotion." She replaced the bottle in the basket. Witness went upstairs and was absent about five minutes. When he returned to the bar deceased gave him the glass, and he remarked that it smelt of tar. The woman replied, "It is nothing, it is all right." Witness then went to the brewhouse, and on returning found deceased lying on the floor speechless. Mr. Adams, chemist, was sent for, and advised her removal to the hospital.

Mr. William Adams, chemist, 141, Exeter Street, stated that between noon and one p.m. on Saturday deceased came to him. She smelt of drink, and asked for a small quantity of laudanum to make her sleep as she was in trouble. She seemed distressed and pressed much to have the laudanum. She said she knew how to take it, as she had lived with a doctor who was accustomed to use it, and witness need not be afraid of what she would do with it. Witness said he thought she had been drinking. She replied that she had not taken anything for three months, adding that her daughter had given her a great deal of trouble. Witness told her he could not supply her with laudanum and he did not think any other chemist would. She then said that she was determined to destroy herself, and would get laudanum somewhere, even if she got a pennyworth at a time. Between three and four o'clock he was called to the Royal Exchange Inn, and on going there recognized the deceased, who smelt of carbolic acid. He saw that she was in a state of collapse, and was dying.

Mr. Edw. Maclachlan, assistant to Messrs. Balkwill and Co., chemists, Old Town Street, deposed to the deceased coming into their shop about two o'clock and asking for twopennyworth of carbolic acid for using upon bedsteads. She said she knew it was poison. Witness supplied her with the acid in a bottle (produced), which she had with her. He labelled it as poison. She appeared quite sensible, but on leaving the shop was unsteady in her walk.

Dr. G. Carter, house surgeon of the South Devon and East Cornwall Hospital, stated that when deceased was brought to the institution she was quite unconscious and almost pulseless. He gave her the usual antidotes for carbolic acid, and used the stomach pump. She expired at five o'clock the same afternoon. After death the bottle and two pawn-tickets were found in her clothing by the nurse. The cause of death was poisoning by carbolic acid. Dr. Carter said he did not believe carbolic acid was scheduled among the poisons mentioned in the Act of Parliament.

Mr. Balkwill, who was present, desired to give evidence, and stated that he was present in the shop when deceased came in, and heard her ask for something to poison bugs. She said she had tried everything to get rid of them, but quite ineffectually. As she went out of the door she staggered a little. Mr. Maclachlan asked him whether he thought he had done right in serving her with the carbolic acid. Witness thought that after her explanation he was quite justified in supplying the woman. Carbolic acid was not scheduled as a poison, and the bottles it was sold in were not a'l blue fluted, as those for other poisons were.

The Coroner said that no doubt deceased had a feeling of regret and remorse at having returned to her drinking habits, and, moreover, she was annoyed at the marriage of her daughter. Credit was due to Mr. Adams for not allowing the woman to buy any laudanum. There was no doubt that when he refused to supply her with laudanum she went in a bold manner to Mr. Balkwill's. He thought that when deceased told Mr. Adams she was determined to take her life, he should not have let her leave the shop so easily.

A Juror said it was the opinion of several members that the Coroner had spoken too severely of Mr. Adams. They thought he had acted discreetly and kindly towards the deceased.

The Coroner remarked that he would take care that anyone who threatened in his presence to commit suicide should not leave his presence so easily.

The Jury returned a verdict "That deceased committed suicide whilst in a state of temporary insanity," and exonerated the chemists from all blame.—*Western Morning News.*

Poisoning by Phosphor Paste.

On Tuesday Mr. W. J. Payne, City Coroner, held an inquiry at the Coroner's Court, Golden Lane, regarding the death of Joseph Holloway, aged 47, who committed suicide by taking a quantity of phosphorus paste. The deceased was a coffee-housekeeper. For some time past he had been very much depressed, as a young lady, with whom he was acquainted, had threatened to institute proceedings against him for breach of promise of marriage. As his business had fallen off very much lately, he greatly feared that the action would ruin him, and he had expressed himself to that effect. On Wednesday last the case was tried in the Court of Queen's Bench, and a verdict was given for the plaintiff, but for nominal damages only and no costs. The deceased was very much pleased with the result, but told his sister that before the trial came on he, fearing the result, had taken a quantity of phosphorus. He, however, did not appear to be ill, but on Thursday last he complained of pains about the body, and a medical man was called in. The deceased attempted to hang himself a short time before the trial came off.

Dr. Adams said he was called to attend the deceased, who was suffering from the effects of poison, and that he had taken some phosphorus paste. He died on Saturday last from the effects of the poison. He informed witness that he had taken it the day before the trial came off. Several days would elapse before the poison would take effect.

The Jury returned a verdict to the effect "That deceased committed suicide while suffering from temporary insanity."—*Times.*

Correspondence.

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

Tincture of Nux Vomica prepared from the Extract.

Sir,—As the experience of Mr. Hick in the preparation of tincture of nux vomica from the extract appears to differ somewhat from mine, I shall feel obliged if you will allow me to say a few words in extension of the remarks I made in the discussion following the reading of Messrs. Dunstan and Short's excellent "Report on the Pharmaceutical Preparations of Nux Vomica," to which your correspondent refers.

It is now fourteen or fifteen years since I tried this process and abandoned it for the reasons stated. Further, I consider it bad pharmaceutical practice to prepare a tincture by solution of the extract, when it can be prepared with equal facility from the crude drug, for it must be within the experience of all practical pharmacists that no extract will again perfectly dissolve in the menstruum by which it was extracted; the heat and exposure necessary for evaporation having wrought some change in it, usually of a detrimental character. Your correspondent admits that about one-twenty-fourth part remains undissolved, and this in the recently prepared tincture; but he does not state what amount is subsequently deposited on the bottom and sides of the containing vessel. His plea that greater uniformity is secured by the use of the extract is, I think, scarcely tenable, for this and other reasons presently to be stated. I will now pass on to the consideration of the formula with which he proposes to replace that given in the B.P., and at the outset would warn those pharmacists who may feel disposed to adopt it, that the result will be a preparation having certainly less than half the strength of a carefully made B.P. tincture. Mr. Hick does not give the data from which he arrived at the result that a solution of 3 grains of ext. nuc. vom. in 1 fluid ounce of spirit represents tinct. nuc. vom., B.P., nor does he tell us whether a tincture so prepared has the greenish-yellow colour that a well prepared tincture should have. On referring to my notes of this drug, I find that nux vomica yields on an average 15 per cent. of extract in a hard and dry condition, representing, probably, 20 per cent. or more of the extract, as usually sent out by wholesale houses (Mr. Hick does not tell us the condition of the extract he uses, nor whether he prepares it himself). A simple calculation will show that on this datum 1 fluid ounce of B.P. tincture should contain something like 7 grains of hard extract, and not 3 grains as your correspondent seems to think; a sufficiently alarming discrepancy, I think, to guard one against the substitution of one formula for the other. An actual experiment made by evaporating to dryness at 100° C. 1 fluid ounce of B.P. tincture gave $6\frac{1}{2}$ grains of extract, or more than double the quantity he proposes to use.

I am surprised to hear, and doubtless others will be also, that "the B.P. formula is so troublesome that few retail chemists make their own tinct. nux vom.;" let us hope it is not true.

Tottenham High Cross. A. G. Tanner.

Ignoramus.—The spirit could be recovered by distillation.

Chemicus.—Apply to the Registrar under the Dental Act, 299, Oxford Street, W.

Minor.—We believe the business is fairly prosperous in the colony mentioned. The English Minor qualification entitles the holder to registration without further examination in all British colonies where at present Pharmacy Acts are in force.

A. B.—You will find the recipe you require and some remarks concerning it in the *Pharm. Journal* for April 28 last, p. 884, and May 17, p. 936.

Communications, Letters, etc., have been received from Messrs. Proctor, Landerer, Bennett, Saul, Waldheim, Wells, Samuelson, Apprentice.

RECENT DONATIONS TO THE MUSEUM OF THE PHARMACEUTICAL SOCIETY.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

I. VEGETABLE TALLOW FROM SINGAPORE.

Mr. R. Jamie of Singapore, in a letter accompanying some interesting donations lately presented by him to the Museum, has called my attention to this substance as possessing the valuable property of not readily turning rancid. He remarks concerning it—"The vegetable tallow never turns acid, and when the white kind is got, which is seldom, it makes very good ointment, simply with the addition of olive oil." At the ordinary temperature this tallow is a white friable solid, softening into a pasty condition when rubbed between the fingers and ultimately melting sufficiently to be rubbed in without leaving the hand very greasy. It has a very slight nutty odour and taste. It would seem therefore to be peculiarly suitable for camphor balls, suppositories and pessaries; for the latter its slowness in melting seems to peculiarly fit it.

Mr. E. Fielding at my request has made a few preliminary experiments as to its melting point and solubility in various solvents. He reports as follows: "At 65° F. it remains a little solid; between 82° and 104° F. it has the consistence of flour paste; it fuses at about 118° F., but remains transparent and liquid at 112° F. It is soluble in about an equal weight of cold ether; it is sparingly soluble in cold acetic ether and acetone, but very soluble in these liquids when heated, the greater part being precipitated on cooling; it dissolves in half its weight of cold chloroform, but mixes with one third of its weight of the same liquid when heated. In bisulphide of carbon, either cold or hot, it is extremely soluble. In cold benzol it is soluble to the extent of about 1 in 4. In hot benzol and petroleum spirit (hexane or heptane) it dissolves in all proportions, but the solution gelatinizes on cooling. It is very soluble in cold turpentine and dissolves in it when heated in all proportions. In alcohol it is soluble to the extent of about 1 in 30 when cold or 1 in 20 when hot, and in isopropyl alcohol it dissolves to the extent of about 1 part in 25 when cold, and 1 part in 4 when hot." Mr. Fielding thinks it may be compared in many respects with the fat of *Pentadesma butyracea* (*Clusiaceæ*), which should, however, judging from its natural order, be more nearly allied to kokum butter (*Garcinia purpurea*).

According to a cutting from the *Java Bode* newspaper, sent to me by Mr. Jamie, the vegetable tallow, known as Minyak Tangkawang, or Minyak Sangkawang, is obtained from the seeds of one or more trees of the genus *Hopea*, found in the S. and E. division of Borneo, chiefly in the neighbourhood of Qualla Kapuas, and on the west coast in the districts of Sambas and Mampawa. The Dyaks call the fat Kakawang and the tree which yields it Upu Kakawang. This tree is one of the giants of the forest. Several species of the genus appear to be used. Of these *Hopea splendida*, the Tongkawang Tonggul, is also called by the natives Dammar Tangkawang (because the bark yields a dammar ?). The timber is used by the Dyaks for making their prahus, as it is proof against the influence of water. The bark also yields a red dye. This tree grows on alluvial fat clayey ground on the banks of great rivers. *Hopea aspera* grows on the higher mountain tracts, principally on the declivities of Mampawa, and is distinguished by the hairiness of the stems.

The preparation of the fat is very simple. When the ripe fruit falls on the ground, it is collected and allowed to germinate a little in a moist place. It is then dried in the sun until it becomes brittle. The fruit is then deprived of its shell and put into a rattan or bamboo basket suspended over boiling water. When it has been well steamed, the fruit becomes soft and plastic like dough. The fat is then expressed by squeezing the doughy mass in a cloth and is poured into joints of bamboos, by which it receives the cylindrical form in which it is met with in commerce. Some Dyak tribes press the fruit by means of two beams. But it is probable that by neither of these processes is all the fat obtained.

The trees begin to yield when they are about eight or ten years old and the crops are somewhat irregular, but every four or five years an extraordinarily large crop may be counted upon, the fruit being ripe in December and January. According to 'Spon's Encyclopædia' (p. 1413), about ten species of *Hopea*, yielding oil seeds differing much in size, are recognized by the natives of Borneo, three of these being common in Sarawak. The fat is also prepared in Java and Sumatra. By the natives the tallow is used for culinary and lighting purposes.

Although the tallow has not as yet been turned to account in pharmacy in this country, there is no reason why its fitness for medical purposes should not be experimented upon, the fat being a regular article of commerce. As far back as 1856, 651,586 kilos were imported into Singapore, and now several thousands of piculs go yearly to Singapore and are exported thence to England for use as a lubricating agent. For this purpose it has proved most valuable, especially for steam machinery, far surpassing even olive oil. In Manilla it has been employed in the manufacture of candles and found to be very valuable for this purpose. There are doubtless many other purposes in the arts to which the fat might be applied. It contains glycerine and about 95 per cent. of saponifiable matter which has less oleine in it than animal fat. The tree is certainly also worthy of the attention of colonial planters since it yields fat, dye, timber and probably also resin, and the demand for the fat alone, when it is better known and prepared in a pure state, will probably far exceed the native supply.

THE NEW PHARMACOPŒIAS FOR THE UNITED STATES AND GERMANY.

(*Continued from p.* 383.)

Strychnia and its Salts.—There is but little agreement in the German, United States and British Pharmacopœias respecting these compounds. The B.P. includes strychnine only; the U.S.P. includes strychnine and its sulphate; and the P.G. has dismissed the alkaloid and retained its nitrate. The description of the alkaloid in the U.S.P. corresponds to that in the B.P.; the descriptions of the two salts are as follows:—

Strychninæ Sulphas ($(C_{21}H_{22}N_2O_2)_2H_2SO_4 \cdot 7H_2O$), U.S.P.—"Colourless or white shining prismatic crystals, efflorescent in dry air, odourless, but having an intensely bitter taste, which is still perceptible in highly dilute (1 in 700,000) solution, and of a neutral reaction." Soluble in 10 parts of water or in 60 parts of alcohol at 15° C., in 2 parts of boiling water, or in 2 parts of boiling alcohol; soluble also in 26 parts of glycerine, but insoluble in ether. This salt on account of its great relative solubility in water is no doubt convenient for some purposes; it has been pointed out, however, that the same object may be attained by the use of a minute quantity of acetic acid with the alkaloid. The salt ordered is the neutral sulphate, but it has been stated that sulphate of strychnine of continental manufacture is usually an acid salt; as, however, this crystallizes with only two molecules of water, the proportion of alkaloid (70 per cent.) would not be very widely different from the proportion (75 per cent.) in a neutral sulphate with seven molecules. However, it has been variously asserted that the neutral sulphate crystallizes with only five or six molecules of water.

Strychninum nitricum, P.G.—"Crystalline needles, colourless and very bitter. Soluble in 90 parts of cold water, in 3 parts of boiling water, also in 70 parts of cold or 5 parts of boiling spirit."

SULPHUR.—In addition to precipitated and sublimed sulphur, the U.S.P. and P.G. include "washed sulphur." Iodide of sulphur has been omitted from the P.G., but is retained in the U.S.P.

THYMOL ($C_{10}H_{13}HO$), U.S.P. (new); THYMOLUM, P.G. (new).—This antiseptic compound has been introduced into both the new pharmacopœias. The U.S.P. describes it as occurring in large crystals of the hexagonal system, nearly or quite colourless, having an aromatic thyme-like odour, a pungent aromatic taste, with a very slight caustic effect upon the lips and a neutral reaction, and liquefying with camphor. Soluble in about 1200 parts of water, or 1 of alcohol at 15° C., in 900 parts of boiling water, and freely in ether, chloroform, benzol, benzin, glacial acetic acid, fixed and volatile oils and boiling alcohol. Sp. gr. 1·028 as a solid, but lighter than water when melted. Melts at about 50° C., and boils at about 230° C. Mixed with half its volume of glacial acetic acid and then with an equal or somewhat greater volume of sulphuric acid, and gently heated it gives a bright reddish-violet colour. Freedom from carbolic acid is indicated by water saturated with thymol not giving a blue colour with solution of ferric chloride. The P.G. says in addition that it is soluble in 2 parts liquor sodæ (sp. gr. 1·160). Dissolved in 4 parts of sulphuric acid it forms a yellowish liquid that becomes a beautiful rose colour when gently warmed. If this solution be poured into ten volumes of water and digested with excess of white lead, the filtrate is coloured a beautiful violet blue by a small quantity of ferric chloride. Bromine vapour passed through an aqueous solution throws down a white sediment.

VERATRINE.—According to the description in the B.P., "pale grey, amorphous;" in the U.S.P., "a white or greyish-white amorphous, rarely crystalline powder;" in the P.G., "pulvis albus, laxus." In addition to the solubilities given in the B.P., the U.S.P. says it is soluble in 2 parts of chloroform, in 96 parts of glycerine and in 56 parts of olive oil. Some colour tests for its recognition are also given. With nitric acid it forms a yellow solution; with sulphuric acid it first assumes a yellow colour, with a greenish fluorescence, then becomes intensely scarlet, and eventually violet. Heated with hydrochloric acid it dissolves with a blood colour. The P.G. adds that if a solution of veratrine be spread in a thin layer and powdered sugar sprinkled on it the colour is first yellow, then green, afterwards blue, and at the end of an hour begins to disappear. The U.S.P. speaks of veratrine as "an alkaloid or mixture of alkaloids," and this agrees with the statement of Bosetti (*Pharm. Journ.*, [3], xiii., 799) that commercial veratrine is a mixture of cevadine and veratridine.

ZINC.—Of the compounds of zinc the acetas, chloride, oxide and sulphate are common to the B.P., P.G. and U.S.P. The P.G. has omitted the ferrocyanide and lactate, which are not in the B.P., and the valerianate which is, but is alone in retaining the sulphocarbolate and a crude oxide. The U.S.P. has included the bromide, iodide and phosphide, which are not in the B.P. or P.G. The following are the principal characters of the zinc salts not in the B.P.:—

Zinci Bromidum, U.S.P. (new).—White or nearly white, very deliquescent, odourless granular powder, having a sharp, saline and metallic taste and neutral reaction. Very soluble in water and in alcohol. Strongly heated it fuses and then volatilizes with partial decomposition. It is not quite obvious why this salt has been made official.

Zinci Iodidum, U.S.P. (new).—The physical characters of this salt are identical with those of the preceding.

Zinci Phosphidum (Zn_3P_2), U.S.P. (new).—Minutely crystalline friable fragments, having a metallic lustre on the fractured surfaces, or a greyish-black powder, permanent in the air, having a faint odour and taste of phosphorus; insoluble in water or alcohol, but completely soluble in hydrochloric or sulphuric acids, with evolution of phosphoretted hydrogen. This salt has been recommended as a convenient medium for the administration of phosphorus, and it has been included in the non-official lists issued by the Paris and Dutch Societies. But it has been pointed out that it is advisable to commence with very small doses, not exceeding one-twentieth of a grain of the phosphide.

Zincum Sulphocarbolicum, P.G.—Colourless, transparent prisms or tables, easily soluble in 2 parts of water or alcohol, and forming a faintly acid liquid, which is coloured violet by ferric chloride.

NOTE ON AN ANILINE DYE ADULTERATED WITH SUGAR.*

BY H. C. DRAPER.

A sample of magenta dye, purchased from an English firm, was found to contain crystalline matter insoluble in alcohol. The writer, on examination of the bulk of the dye, found that, mixed with the characteristic crystals of rosaniline chloride, was a large number of small cubes of a darker colour. These on further examination proved to be crystals of *sugar* "faced" with roseïne, and many of them so slightly coated that the dye was easily removed by rubbing them with the fingers. As the sugar crystals could be readily distinguished by inspection, they were picked out by hand from a weighed quantity of 10 grams, and it was found that they amounted to no less than 75 per cent. of the whole.

A fresh quantity of 10 grams of the dye exhausted with absolute alcohol left a sugar residue equal to 59·5 per cent.

It would be interesting to know to what extent this somewhat ingenious form of adulteration is carried.

* Read at the November Meeting of the Dublin Scientific Social Club.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 24, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

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

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

ESTABLISHMENT OF PHARMACEUTICAL COURTS OF HONOUR IN GERMANY.

Seventeen years have now elapsed since, in a paper read before the Pharmaceutical Conference at Nottingham, Mr. Ince dealt with the ethics of pharmacy in a way that at the time attracted considerable attention and gave rise to much subsequent discussion. One section of that paper was devoted to the subject of the behaviour of the pharmacist with regard to those in the same line of business as himself and was pervaded by the sound common sense which constitutes one phase of true wisdom as well as by the charity which "is not easily provoked, thinketh no evil." That essay still preserves some vitality, notwithstanding the journalistic mountain that has been piled upon it since its production, for it is still sometimes referred to, although probably very seldom read; the latter is, however, a fact to be regretted, for had the spirit of the counsel given in it a more frequent opportunity of becoming diffused, we might be spared the task of reading every year yards of depressing manuscript, in which pharmacists sometimes formulate charges against their competing brethren as dark as the ink in which they are written. We are far, however, from saying that such charges are always without foundation; for, unfortunately, now-a-days the competition involved in the struggle for existence is so keen that the ethical sense is in danger of becoming dulled, and a man's capacity of judging as to his duty towards his neighbour is apt to show signs of being impaired. It is not so very long ago that an eminent pharmacist who, some years previously, had read an admirable paper on the subject before an important pharmaceutical association, was expelled from the same association for a breach of pharmaceutical ethics. But similar grievances appear to exist also in places where such an explanation could not be put forward; for they occur even in Germany, where at least pure pharmacy is supposed, comparatively, to be protected by the State from the rough winds of competition. However this may be, the subject has now been long under consideration of the leading pharmacists of that country, and at a convention of delegates held in connection with the recent annual meeting of the German Pharmaceutical Association in Wiesbaden it was resolved to institute in connection with every district branch of that body an *Ehrenrath*, or council of honour, to which charges and disputes among its members, involving points of ethics, could be referred for decision, and a series of regulations as to the constitution and functions of these councils was drawn up and agreed to.

According to these rules each of these councils of honour will consist of five members, who, together with three deputies, are to be elected by means of voting papers from among the pharmacists belonging to the respective branches of the Association; the term of office is to be for five years, and each councillor must reside in the district over which the council he belongs to exercises its influence. It can be well understood that circumstances may arise which would render a seat in a council of honour very undesirable, and apparently in anticipation of such cases it is provided that acceptance of the office by a person who is elected is to be deemed obligatory, and an out-going member after serving a term may be elected to serve for another five years. Moreover resignation is to be dependent upon the consent of the other members of the council, who, however, may allow it if the reasons given are deemed sufficient. Each council is to elect its own President and Vice-President, whose duty it will be to convoke and preside over the meetings, the proceedings at which are to be considered private, whilst only such resolutions are to be deemed valid as are passed when five members of a council are present. The judgment of these councils of honour is to extend to all acts of members of the German Pharmaceutical Association which are alleged to be in contravention of its statutes, or injurious to the Association or an individual member of it, or to the community of pharmacists in general. As instances of such offences are specified: (1) injurious arrangements with medical men, such as for reciprocal recommendations, the supply of the specialties of a medical man, the composition of which is kept secret from other pharmacists, attempts to bribe medical men by presents, or partnership arrangements with medical men; (2) agreements with quack doctors and makers of secret remedies; (3) conduct towards customers which would tend to make them suspicious of other pharmacists; (4) neglect of obligations towards pupils; and (5) the giving of untrustworthy testimonials to assistants and pupils. Any member of the Association who wishes to have an inquiry set on foot concerning one of the above or other similar offences is at liberty to move a council of honour, but must put his charge in writing and show that it is well founded, the decision lying with the council whether an inquiry shall be instituted or not. Ordinarily the inquiry would take place before the council for the district to which the accused belongs; but the President of the Association will have the power, upon the application of the accused or of the local council, to order the case to be heard in another district. When, however, an inquiry is once commenced it can only be closed by a decision by the council on the question submitted to it, and will not be affected by the withdrawal of the accused person from the Association. Every council engaged in an investigation is to have the power to collect information and evidence, and to receive testimony orally or in writing, and every member of the Association is to be considered bound to answer truthfully all questions asked by a council. The accused, who may nominate another member of the Association to represent him, is to be entitled to receive, at least ten days before the time appointed for the hearing, an abstract of the motion, together with a statement of the grounds upon which it is based and the evidence that has been tendered in support of it. After consideration of the evidence, the decision of the council of honour may take the form of a rejection of the proposition, an open verdict, a requirement that a given scandal shall be removed, or a recommendation to the President of the Association that the offender be excluded according to the bye-laws. When a resolution has been arrived at it is to be communicated in writing to the President of the Association and to the person who has been accused, and the latter will have the right to appeal from it to the general meeting of the members.

From the foregoing summary it will be seen that the establishment of these councils of honour may mark a very important epoch in the history of pharmacy in Germany, and their proceedings, so far as they are revealed, will be watched with interest by pharmacists in other countries. The scheme was not without its opponents in the country where it is intended to come into operation, and in England, where so many influences tend to render pharmacists an undisciplined body, it will to many appear to be an extremely ambitious one. Certainly, there is a great probability that the decisions of the courts of honour will occasionally provoke considerable impatience and resentment, and if the law of libel in Germany at all resembles that of this country, considerable tact and discretion in the conduct of inquiries and the rendering of decisions will be required to ward off occasional unpleasant consequences. Of course very much will depend upon the support rendered by the members in general to those upon whom a decidedly unpleasant duty will devolve; but so far as we may judge from the fact that the proposition to institute these councils was supported by the votes of ninety-three out of a hundred and fifteen delegates from sixty-nine "circles," there is a widely-spread present desire to give them a fair trial. Success will not only be a boon to the pharmaceutical body in Germany, but it will prove the existence of an *esprit de corps* and homogeneity of sentiment among the pharmacists of the empire far exceeding that which is found in this country.

SIR WILLIAM SIEMENS.

At the commencement of the present week not a few readers of this Journal were looking forward to the rich intellectual treat of hearing an address from one of the greatest masters in applied science that the world has yet known, on the occasion of the opening evening meeting of the Society of Arts on Wednesday. But when that time arrived the lips which were to have spoken were for ever silent, Sir William Siemens having died suddenly and unexpectedly only forty-eight hours previously. Carl Wilhelm Siemens—or, as he preferred to be called after his naturalization in this country, William Siemens—was born in the kingdom of Hanover, in the year 1823, and his career is a bright illustration of the advantages of the sound system of education which has now obtained in Germany for many years and has contributed so much towards placing the people of that country in the front rank among the nations. Although perhaps the most gifted of an extraordinary family of brothers, it may be safely assumed that the powers of his mind were augmented by early scholastic discipline and that his brilliant inventive faculty was made many times more productive of good to mankind by the happy combination of scientific teaching and practical work which constituted his early education. Passing from the Gymnasium at Lubeck to the Polytechnic School at Magdeburg, and thence to the University at Gottingen, where he studied chemistry and physics under Wöhler and Himley, it seemed as if he only needed his subsequent experience in the famous engineering works of Count Stolberg to fit him, as far as education could, for the part he was to play in the world. It is curiously significant of the effect of this training that all the branches of it might be said to have been blended in his first contribution to applied science in this country, which was an improvement in electro-plating worked out by himself and his brother Werner. It is probably impossible, in consequence of the friendly reticence of the brothers, to define the exact share of the deceased in the labours which have made the name of Siemens a household word throughout the world, but there can be no doubt as to its variety, value, and far-reaching influence. The regenerative furnace, which made other good work in the manufacture of steel possible, and the inventions in connection with the practical utilization of electricity, are boons that will probably long continue to profit the human race. The versatility of the mind that could turn from the volatilization of metals in an electric furnace to the taming of the same fluid to the task of ripening strawberries, or from the construction of a thermometer that would register temperature at the bottom of the sea to settle the problem of the measurement of the temperature of the sun or to put forward and defend an ingenious speculation as to the maintenance of that source of heat, is productive of wonder in proportion as the nature and extent of the problems worked out by it are realized. It is no exaggeration to say that posterity will pronounce Sir WILLIAM SIEMENS *primus inter pares* amongst the band of foreigners who have repaid Old England for her hospitality by adding glory to her history.

Sir WILLIAM SIEMENS received many proofs of the high value set upon his labours, beyond that remuneration which follows success in business. He was twice elected President of the Society of Telegraph Engineers; he at different times held the same office in the Institution of Mechanical Engineers, the Iron and Steel Institute and the British Association; and at the time of his death he was Chairman of the Society of Arts. Only a few months since Her Majesty recognized his merits by conferring upon him the honour of knighthood. His death appears to have been due to an injury to the heart, the result of a fall in Hamilton Place whilst returning home from the Royal Institution about a fortnight ago.

It will be seen from the official announcement on another page that since the publication of the list of approved candidates for the election of annuitants from the Benevolent Fund, which takes place next month, information has been received of the death of Mrs. Rebecca Brand, whose name stood third on the list. We understand that the voting papers had already been printed, including, of course, Mrs. Brand's name; but, in order to prevent votes being wasted, the name will be marked through and the word "dead" stamped in the margin before they are issued.

* * *

One of the most interesting and instructive sights in connection with the recent meeting of the American Pharmaceutical Association at Washington is said to have been the large collection of materia medica in the National Museum, which appears to have been brought together under the auspices of the Government. It is reported to include specimens of nearly all the drugs in all the pharmacopœias of the civilized world, care having been taken that samples of average quality, suitable for educational purposes, shall predominate, rather than those that are unusually fine. When different kinds and grades are met with in the market, as in the case of gum arabic, opium or cinchona bark, all of them are shown as far as possible. Of more doubtful use is a series of pharmacopœial preparations. The organization of the Museum was the work of Dr. J. M. Flint, who received every assistance from Professor Baird, the Director of the Smithsonian Institution and National Museum. Many interesting specimens and much valuable information respecting them were obtained through the consuls of the Republic in foreign countries; but a large proportion of the official drugs appear to have been given by Messrs. Schieffelin. The question of the desirability of rendering this collection as complete as possible was brought before the members of the American Pharmaceutical Association by the President, and at his suggestion a resolution was passed to the effect that the National Museum should become the depository of the materia medica specimens belonging to the Association and all that may come into its possession.

According to a statement published in some of the French political papers the inspection of pharmacies in France during the current year has extended to 72,232 establishments, of which 9152 were in the department of the Seine, and the expense has been 296,474 francs. These numbers, however, would appear to be probably inclusive of visits to other places than pharmacies. An accompanying semi-official notice intimates that these inspections, as at present conducted, are considered to be both costly and useless, and that the Minister of Commerce is contemplating the substitution of the mixed commission of medical men and pharmacists, which at present performs the duty of inspecting pharmacies, by a single commissioner for each circumscription. The *Union Pharmaceutique* points to the fact that in the Bill of M. Naquet, which has received the endorsement of the Government, provision is made that the inspection in each department shall be conducted by a single inspector, who would be a pharmacist not in practice and residing in the department; but that this plan has been objected to, as not securing impartiality, by the executive of the General Association of Pharmacists, which has proposed that it should be amended so that each inspector whilst making his rounds in his department should be accompanied by the inspector of a neighbouring department.

* * *

The appeal of Liebig's Extract of Meat Company in their action against Mr. Anderson, in which the Company sought to restrain the use of the name "Baron Liebig's Extract of Meat," and also of a photograph of the late Baron Liebig with the words "Brand—Baron Liebig," has been dismissed with costs. The Lords Justices Cotton, Lindley and Fry were unanimous in dismissing the appeal without calling on the counsel of Mr. Anderson. It is to be hoped that an end to litigation has thus been reached, so that the trade in this useful article of food may in the future progress without embarrassment.

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The "obituary" column in the *Times* of Monday last contained an announcement of the death, on the 14th inst., at Tunbridge Wells, of "Louisa Ann, widow of the late J. Pereira, Esq., M.D."

* * *

A list of Corrigenda to the United States Pharmacopœia, 1880, has been issued, and we understand that copies of it may be obtained on application to the publishers.

* * *

We have pleasure in stating that Mr. Samuel Goss, Pharmaceutical Chemist and Local Secretary to the Pharmaceutical Society, has been elected an Alderman in the Corporation of Barnstaple.

* * *

At the next meeting of the School of Pharmacy Students' Association, which will be held at 8 p.m. on Thursday, the 29th inst., Mr. T. S. Dymond will read some "Notes on Benzoic Acid," and a Report upon Practical Pharmacy will be made by Mr. R. A. Cripps.

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The next meeting of the Chemists' Assistants' Association will be held on Wednesday evening, November 28, when a paper on "Essential Oils, their Derivation and some of their Uses" will be read by Mr. W. A. Wrenn.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

EVENING MEETING.

The first meeting of the thirtieth session was held in the Society's Rooms, 119A, George Street, Edinburgh, on Wednesday evening, 14th inst., at half-past eight o'clock. Mr. John Nesbit, President of the Branch, in the chair.

After the transaction of some preliminary business, Mr. Nesbit proceeded to deliver the following—

Presidential Address.

Gentlemen,—It has pleased the Council of the Branch to place me in a position of grave responsibility, and one I had great hesitation in accepting, that of President for the ensuing session. I had the more hesitation in doing so on looking over the names of the many eminent men who have preceded me, men who will ever rank as the foremost of their day and generation in the annals of pharmacy. I am deeply sensible of my own inability to properly perform the duties appertaining to the office, and must rely on the assistance and indulgence of my fellow councillors, as well as of the other members and associates of the Society, and hope the session we are just commencing may be both a profitable and successful one.

I may congratulate the Branch on the recent change in the constitution of the Council, which has been as nearly as possible assimilated to that of the Society. It now consists of twenty-one members, fourteen of whom retire annually, but are eligible for re-election.

It is hoped that this increased representation will give a wider interest in the work of the Society and thus promote the best interests of pharmacy.

It appeared to me that we could not better spend a part of this evening than by discussing those interests which affect more or less every member of the Society, and to those I purpose directing your attention as briefly as possible.

We have it reported on undoubted authority that pharmacy on the other side of the Tweed is in a very depressed state; we may, however, congratulate ourselves, that it is, on the same authority, more prosperous in Scotland. It may not be out of place for us to consider the cause or causes that may lead to such a marked difference. Trade has certainly not suffered less here than in other parts of the country, and we may safely say that the incomes of every class, from the peer to the peasant, have suffered, in Scotland as well as in England, a considerable diminution during the last few years. If we have suffered less than other trades, and less than our brethren further south there must be some reason not far to seek for our greater prosperity. These reasons will be apparent in my further treatment of the subject.

Professor Attfield in a very able address recently delivered at Southport, at the opening of the Pharmaceutical Conference, shows very clearly the causes that have led to much of the depression. That address is a continuation of the one delivered at Southampton, in which the duties performed by the pharmacist to the State were discussed, while in the Southport address he shows distinctly the return which the State ought to make to the pharmacist for the proper performance of those duties. He shows that in many parts of the country, grocers, storekeepers and a host of other traders have commenced to deal in drugs. These men have no knowledge of the articles in which they are dealing, and, in consequence, the quality is very inferior, though, in many cases, more tempting to the eye of the inexperienced than the best quality, and the price is generally so low as to be merely a bait to catch customers for more profitable transactions. Others, again, who have no qualification, have opened shops in appearance chemists' shops, but they evade the law by not using any of the titles the qualified man alone is entitled to. This class professes not to sell any of the scheduled poisons, but it is generally understood they do not hesitate to do so when they can with safety to themselves. Medical men also have taken more to dispensing their own medicines than formerly, very possibly impelled by a decrease in their own professional incomes. It is not, therefore, surprising that those who have spent years in acquiring a knowledge of their business and have invested all their capital in it should suffer when subjected to such unfair competition. In consequence, almost every pharmacist has had his business much depreciated in value, and in some cases capital and means of livelihood have been entirely lost.

The remedy proposed, and with which I cordially agree, is to prohibit general dealers and other unqualified persons from dealing in drugs, with the exception of a few of the ordinary kinds and those used for domestic purposes. Such a remedy would be perfectly consistent with free trade. We do not ask a monopoly, but only that equal justice shall be measured to us as to other professions. We want no limit fixed to the number of those entering our profession. On the contrary we are ever ready to welcome every addition to the register. Every person must, however, have shown his qualification as a security that he is able to perform those duties to the public which ought only to be undertaken and can only be properly performed by a skilled pharmacist. Is it not, therefore, unjust to those who have at great outlay of time and money procured the qualification, to allow others, who do not even pretend to know anything of the goods in which they are dealing, to assume the same functions and undertake the same duties? The State imposes penalties on those assuming any of the titles of the pharmacist, and has thus admitted that those only who are qualified ought to deal in drugs. We may, therefore, fairly ask that unqualified men evading the law be subjected to the same penalties.

This affords us sufficient ground of appeal to the House of Commons to have the present Act amended so as to fulfil its original purpose.

We can easily adduce instances in which the State affords protection to class interests, and very justly so, as it is done in the interests of the public. We find that severe penalties are enforced against men who are unqualified assuming the functions of medical or legal practitioners. We have also in our merchant shipping service, which is the very embodiment of Free Trade, and which, in consequence, surpasses that of all the other nations of the world in extent and efficiency, just the kind of protection we want. Before a man is allowed to become the commander of a vessel, he must show to the Board of Trade that he has undergone a regular training and passed through the various grades of seamanship, and that he has a thorough acquaintance with the laws of navigation. No evasion is permitted. A man is not even allowed to navigate his own vessel unless he holds a certificate certifying that he is qualified. These precautions are taken to secure as far as possible the safety and the lives of the crew and passengers; not for the purpose of giving a monopoly to captains. We do not in consequence of these protective regulations hear that either medical men, or lawyers, or commanders of our vessels are in the least degree scarce or that they are able on account of this apparent monopoly to exact from the public large fees for their services. Neither would we be able to charge exorbitant prices for our drugs or for our services, as there is not and will never be in this country any limit to the number of men who may acquire the qualification and come in and share with us the grand "El Dorado" the public think we inhabit. Were we to seek to limit the number entering our profession, as in some continental countries, then we would be seeking a protection which will never be accorded to any class in this country.

In regard to the proposal to supply medicines in sealed packages to village shopkeepers, that seems to me unnecessary. There are advantages and disadvantages in a country life, and not the least of the latter is the inconvenience of having sometimes to send several miles for a medical man; alongside of that must be placed the inconvenience of a chemist being also at a distance. My experience of the country, which is not inconsiderable, is that the poorest of families provide themselves with a supply of such medicines as they can safely use in case of illness, a practice which might be followed by dwellers in cities to the great advantage of themselves and the slumbers of their chemist.

Prior to the passing of the Pharmacy Act, 1868, it was not uncommon to see in little village grocery shops tincture of rhubarb and laudanum standing side by side; but since the Act came into operation the laudanum bottle has disappeared, and, so far as I know, without any inconvenience to the public. On the contrary, its disappearance is rather an advantage. Its sale in many cases only encouraged the habit of laudanum drinking, it being sold to all comers, and no questions asked. If a few more articles were similarly prohibited I do not think our country friends would be seriously inconvenienced. At all events, the advantage of getting drugs of the best quality and always in a fresh state from the nearest pharmacist by means of the parcels post would more than counterbalance any inconvenience that might be experienced in the loss of the present source of supply.

Having discussed the salient points in Professor Attfield's address, we will now endeavour to discover the difference between pharmacy here and on the other side of the Tweed. In London and the large towns in England we find establishments which are model pharmacies, in which our profession occupies the place our Society has always aimed at obtaining for it. These exist by the dispensing of prescriptions which, is really the "Be all and end all" of pharmacy. Another and a larger class exists where few or almost no prescriptions are dispensed. These exist by supplying such drugs as are required by the public in domestic practice and the sundries kept more or less in all pharmacies, and not infrequently by trespassing on the province of the medical man. On the other hand medical men largely invade our special province, not only by dispensing for their own patients, but frequently by keeping open shop, for which latter they are only in rare instances qualified. We gladly admit their qualification for their own special department, the practice of medicine, but it is well known that they have little or no training to enable them to practise pharmacy.

In Scotland the case is somewhat different, unless in some places on the west coast. In Edinburgh and most other large towns medical men do no dispensing. Even in country districts they prefer to be relieved of work of that kind. Consequently we frequently find in country villages pharmacists who derive their incomes chiefly from dispensing the prescriptions of the practitioners in the neighbourhood. Many such small establishments exist throughout the country, where more prescriptions are dispensed in one day than in a month in much larger establishments in England. This alone would account for much of the prosperity attributed to us.

We, however, have some recognition by the Government, which so far as I know is altogether wanting on the other side of the border. As a rule our parish doctors are only paid a yearly salary for attendance on paupers, in which medicines are not included, as they are supplied by the local chemist and paid for monthly by the Parochial Board at moderate dispensing prices. The Board of Supervision representing the Government insists on this arrangement as far as possible, and it is perfectly entitled to do so, as whatever amount is paid in the shape of medical relief by the parish is half refunded by the Government. So far as I know such an arrangement has never been attempted on the other side of the Tweed. The parish doctors there universally supply medicines, which on medical authority are usually of the commonest and cheapest kinds. It is unfair to the pauper that this system should exist. The medical man considers the salary he receives as a fee for his professional services, and the medicine he supplies simply as a deduction from it; hence the poor pauper suffers. No doubt such dispensing in the aggregate would not be of much value in a money point of view to the chemists throughout the country, but it would have a considerable effect in doing away with medical dispensing; when it was seen that paupers required both a doctor and chemist, the classes above would be quietly educated to get for themselves the same advantage.

Moreover, we do not find that our large hospitals give medicines to all comers as in England. Our Edinburgh Infirmary, which may be considered the foremost in Scotland, has in the course of the year some sixteen thousand out-door patients, who are prescribed for by the physicians in attendance, but are required to procure their medicines from their own chemists and at their own expense. The same system is pursued in other towns in Scotland, and may be recommended to the governors of similar institutions in London, as a direct means of lessening the occasion for those urgent appeals for money so often to be seen in the *Times* and other newspapers. It would also help in promoting that thorough and manly independence of character so characteristic of all classes in Scotland, and not less so of the working man than of any other.

Wherever pharmaceutical work is to be done it should certainly be committed to a qualified man. Our successive Governments have only, however, recognized this in the army and navy on rare occasions. There is necessarily with such large bodies of men a large amount of dispensing done, as well as large quantities of medicines consumed. The dispensing is supposed to be performed by the medical men of the various regiments, but it is really done by the common soldiers, who can have no knowledge of the nature of the drugs and preparations they deal with. To get men to perform duties they have no knowledge of and no special qualification for may have the appearance of economy, by saving the salary of a qualified dispenser, but it is not really in accordance with the teachings of our political economists. How far such a proceeding may be a disadvantage in times of peace, how far it may affect the health or even the lives of our soldiers we have no statistics to show; but in times of war the disadvantage of there being no permanent staff of pharmacists is frequently too apparent, not only in the want of a proper supply of drugs, but also in the want of dispensers. Those of us who are old enough to remember the Crimean war know with what hot haste dispensers were selected and despatched to the seat of war,—not, however, till the army had suffered considerably from the want of them. Medical stores, which it would have been the duty of the director of a pharmacy staff to provide, were in many cases sadly deficient. Opium was frequently not to be had, while men were dying of diarrhœa and dysentery. Lime water was, however, as I have been informed, to be had in great abundance, it having been sent from London carefully secured in pint bottles. Such management is the reverse of economical, to say nothing of the dictates of humanity.

Various proposals have been made for the regulation of the patent medicine trade. There can be no dispute that the Pharmacy Act ought to make no exception in regard to those containing poisons. A Government stamp does not make a poisonous preparation harmless, and certainly does not convey to the public any idea that caution is necessary in the use of such preparations. It has been suggested that the stamp should be discontinued, as it is accepted by the public as a guarantee not only of the quality, but of the wonderful virtues of the preparation it covers. I altogether disagree with such a proposal. We find our Government derives a large revenue, and rightly so, from taxes on wines and spirits and also tobacco. Now I would place patent medicines in the same category, and instead of discontinuing the stamp would at least double its price, and instead of printing over it the name of the manufacturer, would put the following or something to the same effect: "This stamp is no guarantee of the quality or virtues of the medicine." Many of these preparations contain very poisonous drugs, and I would insist on the names of all poisonous ingredients being distinctly stated on the label, instead of the too common practice of labelling them with the name of some simple and harmless domestic remedy,—such as aniseed, horehound, linseed, etc.,—which is very misleading. How far it may be justifiable to allow such compounds to be sold at all is questionable. We know that very serious results frequently ensue from their habitual administration to young children. Much of the infantile mortality of our large towns doubtless arises from this cause, and much also of the weakness of intellect becoming more and common in our adult population. I would, therefore, suggest that the formula of all such preparations be registered,—their composition and freedom from danger to the public reported on by a joint committee of medical men and pharmacists before a licence be obtained by the manufacturer for their sale.

Every member of our Society must have seen with satisfaction the action taken by the Pharmaceutical Council in asserting our rights to assist in the framing of a new Pharmacopœia. Had the Bill of the Medical Council become law we have every reason to believe that our claims would have been admitted by the Legislature. If a Pharmacopœia were only, as has been asserted, a doctor's prescription book, then we could have no claim to be represented on the Committee. It is to my mind quite different from a mere hospital formulary or those handsome compilations so freely circulated by our friends from the other side of the Atlantic. It is a statutory work for the use and benefit of the public, and not for any particular section of it. It ought to contain a list of the drugs and chemicals in ordinary use, to describe the physical and chemical properties, and give tests for indicating their purity and strength. It ought to contain formulæ and instructions for making such galenicals as are always in demand. These ought to be of a simple nature, representing the various drugs and chemicals in the most convenient and efficient form for administration or ready combination by the instructions of physicians.

If this view be a correct one, then it must be admitted that medical men as such are entitled to no more than a share of the work of framing it.

The Medical Bill will no doubt be reproduced during the next session of Parliament. It will therefore be necessary for us to take the same steps as we did in the last session to have our rights recognized.

Should our efforts be crowned with success then I would suggest that a permanent committee be appointed for the purpose of revising or making additions as occasion may require. All would reap the advantage of such an arrangement, none more than ourselves, as our doubts in regard to the strength of new preparations always being introduced would be considerably lessened by the publishing of recognized formulæ. Another advantage would be the bringing of the Pharmaceutical Council into closer contact and more intimate relationship to the Medical Council.

We are a branch of the medical profession, but a branch almost separated from the trunk. Anything, therefore, that would create a better understanding between the two bodies would be for the advantage not only of ourselves but also of the public. Such a body would also be able to advise the Government in regard to the licence to be granted to manufacturers of patent medicines containing poisonous ingredients. The pharmaceutical portion of the committee could report on their composition,—the medical on their safety and usefulness to the public.

I will now only allude to pharmaceutical legislation. An impression seems to prevail even in our own ranks that we have always initiated legislation. Such a view is quite erroneous.

The first formation of our Society, in 1841, was due to an attempt made by the College of Physicians to legislate for us. Prior to that time no combination existed among chemists, each man followed his own course independently of his neighbour. In that year, however, the famous Hawes's Bill was introduced, which proposed, among other medical reforms to license an entirely new class of pharmacists, who would gradually have superseded those in business, many of whom were men not only eminent in their own calling, but also in their scientific attainments and social position. Such men were not likely to sit idly by while a Bill was being discussed in Parliament which would, if it had become law, replace them by men who might have no knowledge of pharmacy, but had only received the imprimatur of the College of Physicians. Such an attempt at spoliation led to a combination of the trade. Petitions were sent to both Houses of Parliament from all parts of the country, with the result that the Bill was withdrawn. That combination continues to the present day, for shortly after it formed itself into the Pharmaceutical Society, receiving a Royal Charter, and in 1852 an Act of Parliament confirming its rights, but giving it no privileges. Again, the 1868 Act was the result of pressure springing out of a communication from the Medical Council to the Government suggesting that some enactment was required to ensure competency in those practising pharmacy. We were, therefore, again compelled either to legislate or be legislated for. A Bill was consequently promoted by our Society, and another by the Society of Chemists and Druggists. We have it on the highest authority that a house divided against itself cannot stand and we find that neither of the Bills became law, but instead we received a Poison Bill, a compromise between the two parties which may have been of service to the public, but certainly of doubtful advantage to us. It is, however, unfair to attach blame to our Society for the result, as that time it only represented a small portion of the trade. Had the various sections of it gone forward as a united body, on the lines of the Bill of the Pharmaceutical Society, no doubt the result would have been different, and it is questionable whether the Act would have required amending at this early date.

We are again attempting legislation, not, however, at the call of the Medical Council, but this time in response to the demands of the public expressed through the Government to have poisons placed under still greater restrictions. The Draft Bill, if it were to become law, would not give us all we are entitled to but would place us in a much better position than we are in at present. The chief of its advantages would be that the dispensing of prescriptions would be left entirely in our hands. In it we do not claim the exclusive right to deal in some of the poisonous chemicals largely used in the arts and manufactures, but we claim the right for the protection of the public to see that those dealing in them label them "poisonous." A deal of opposition has been offered to this clause which seems to me groundless. Such chemicals are not used in medicine only, and therefore as pharmacists we have no right to a monopoly in their distribution. Few pharmacists would, I venture to think, care to leave their dispensing counters to supply a gallon of spirit of salt or oil of vitriol; besides, we have not the exclusive right to their sale at present, and to ask for such would wreck the prospects of our Bill.

The apprenticeship clause will be of great service by preventing disappointment to young men entering the business, and will permit of them applying themselves to the acquirement of a knowledge of their profession instead of studying what ought to have been learnt at school.

Legislation is at best a slow and uncertain process.

The Council of our Society have in consequence taken steps to enforce a curriculum. It may seem a hardship to young men to be compelled to pass six months at a School of Pharmacy after having served an apprenticeship. Yet we find that there are few young men in Scotland who do not endeavour to fit themselves for their responsible duties by attending courses of lectures in a university town.

The adoption of the scheme will ensure for the chemists of the future a better social position and more pharmaceutical work. We must ever bear in mind that the watchword of our Society has been "Education and Qualification." I would only, in conclusion, suggest the addition, "Union," and urge on you all to use your influence to bring within the pale of the Society those who are now without. For if we appeal to the Legislature as one man, there can be no doubt that we shall be successful in obtaining our legitimate demands.

Mr. J. B. Stephenson, in moving a vote of thanks to the President, said that he felt that those present would join with him in appreciation of the address. He considered it fortunate that it was not usual, nor did he think it proper, to criticize a presidential address, for in this case so many points had been touched on that one could scarcely attempt to criticize them all. He felt that he could give general support to the views expressed. He thought that Mr. Nesbit had done wisely in drawing attention to the difference, or causes of difference, between English and Scotch pharmacy; that was a matter worth looking into. Referring to pharmaceutical legislation he said that the Pharmacy Acts Amendment Bill would meet many of the hardships complained of by pharmacists, and everyone connected with the profession should, therefore, back up the efforts of the Society to get not only that Bill enacted, but to aid in obtaining the demand which they had made when the Medical Bill was brought into Parliament last session, and he could not imagine that their demand would be refused, considering the approval which the proposed Pharmacopœia Clause had received from members of Parliament and medical practitioners.

Mr. J. R. Young seconded the vote of thanks and agreed with the remarks which had fallen from Mr. Stephenson regarding the address. The point which had particularly struck him was that regarding the privilege which Soctch pharmacists have in dispensing medicines for parochial boards. Apart altogether from any consideration of the business advantages or disadvantages of this system, he felt that it embodied a sound principle, namely the recognition of the province of the pharmacist. He hoped that steps would be be taken to have the similar rights of English pharmacists clearly laid before the proper authorities; if the right were conceded parochial medical practitioners would be relieved of work which can only be irksome to them; it would be beneficial to the paupers, and parochial funds would not suffer, since Government meets a share of the expense. He thought that this was a most important matter, and one which should not be overlooked.

Mr. J. L. Ewing supported the motion and asked indulgence for what might appear to be a criticism of the address. He could not help expressing the opinion that the patent medicine stamp should be abolished, for to a certain class of the public it conveyed an impression or guarantee of the value of medicines which came under the tax. The revenue would suffer but little were the tax repealed, for he had gathered from Mr. Hibbert that the amount is so paltry, that its loss could not be considered an obstacle to the reform. Another matter which he would like to refer to was the increase in the number of pharmacies in Scotland, and taking Edinburgh as an example he thought that the number was quite out of proportion to the population. His position as convener of the local price committee had given him some acquaintance with the increase in Edinburgh during the past seven years, and he found that there were at least thirty-seven new shops opened in Edinburgh and Leith during that period. The number had thus so far outrun the proportion of the population, that they had one pharmacy for every eight hundred inhabitants. If this state of affairs continued he felt that the life of the pharmacist would indeed be one of labour and toil, but not of remuneration.

The motion having been heartily responded to by the meeting, Mr. Nesbit returned thanks and called upon the Secretary of the Branch to read his report of the donations received during the recess. These donations comprise the following:—

To the Library:—

'Proceedings of the Vermont Pharmaceutical Association,' 1882. *Two copies.*

'Proceedings of the American Pharmaceutical Association,' 1882.

'Report of the Smithsonian Institution,' 1881.

'Annual Report of the Philadelphia Alumni Association,' 1882.

From the Respective Publishing Committees.

Richter's 'Typo-nucleus Theory.'

From Mr. Peter Boa.

To the Museum:—

Large cube of barbaloin, specimens of strychnia arseniate, nitrate and sulphate and pure alkaloid.

From Messrs. T. and H. Smith and Co., Edinburgh.

Specimen of oil of sweet birch (*Betula lenta*) and salicylic acid prepared from the same.

From Mr. Kinninmont, F.C.S., Glasgow.

Specimens of yellow prussiate of potash,

From Mr. Alexr. Napier, Edinburgh.

Specimens of pure aldehyde, cannabinum tannicum (Merck), cotoin, paracotoin, hippurate of soda and beta-naphthol.

From Messrs. Clark and Pinkerton, Edinburgh.

Herbarium specimens of indigenous medicinal plants.

From the Curator, Royal Botanic Gardens, Edinburgh.

Specimens of *Camellia oleifera* products, illustrative of a paper published in this Journal, July 14, 1883. From Mr. Hugh McCallum, Hong-Kong.

Mr. Gilmour moved a cordial vote of thanks of the donors.

The following paper by Mr. George Burrell, Montrose, was then read by Mr. MacEwan, in the unavoidable absence of the author:—

A Few Hints to Young Pharmacists.

Advice is somewhat like the articles the pharmacist is familiar with, more pleasant to give than to take, and yet like those articles it has its peculiar province and usefulness. Those who are encased in a robe of self-complacency may think it as superfluous as a tonic would be to one whose appetite and digestion are sound and vigorous; but to the modest, anxious, inquiring young man, who has a healthy desire to better himself in person and in circumstances, and whose conceit has been nipped in the bud by coming in contact with high models, the utterances of experience are not without value.

That class do not listen to the opinions of older men with a self-satisfied smirk, nor show any desire to sneer at those who may not be familiar with modern scientific terminology, the mere scaffolding of knowledge, but having found that flabby cram will not impart robustness to the understanding, and that the mind needs something more substantial than complicated formulæ to live upon, they gladly receive whatever may minister to their intellectual growth. To such I venture to address the following remarks.

It is, some would say, a mere truism to affirm that work is our appointed task, that we must live by the sweat of our brow; and yet the very familiarity of this maxim is apt to make us overlook its deep significance. Healthful and sunshiny labour can be easily and pleasantly portrayed in a glow of poetic beauty, especially by one sitting in an easy chair, with a comfortable dinner in the prospect, and everything cosy about him; but to the man who has so many cubic yards of broken stones to accomplish to meet his weekly needs, and who is pretty familiar with home cares and short commons, it presents a different aspect. At the same time, in spite of all sentimentalizing and grumbling, it is an established fact, that the stone-breaker, and every man, is happier when working, than when idle.

Hear what the most powerful thinker of modern times, says on the subject:—

"A man perfects himself by working. . . . Even in the meanest sorts of labour the whole soul of a man is composed into a kind of real harmony the instant he sets himself to work! Doubt, desire, sorrow, remorse, indignation, despair itself, all these like hell-dogs lie beleaguering the soul of the poor day-worker, as of every man; but he bends himself with true valour against his task, and all these are stilled, all these shrink murmuring far off into their caves. The man is now a man."

This is the key-note of much of Carlyle's healthiest teaching.

Let us now consider what the work of the young pharmacist is.

Having attained to the dignity of Minorhood, the door of exclusion is opened and the great highway of life which he has to traverse lies before him. He cannot now make a bicycle of his text books and compendiums, and patent contrivances for quick and easy intellectual locomotion; his mind has emerged from the feeding bottle process, and like a child who instinctively kicks and sprawls until he gets rid of the fat which clogs his tiny muscles, our young pharmacist casts off all mental coddling, and steps out on his own legs.

In very truth his real education now commences, which will end only with his life.

In due time he meets with the inevitable obstacles—disappointments, slow progress, small drawings, bad debts, rash purchases, long hours, occasional sleepless nights, dyspeptic twinges, unreasonable customers whom he is obliged to humour, capricious patrons inclined to lord it over him a little, unruly apprentices, unreadable prescriptions, cutting prices, measures and funnels going to smash, jealous and sometimes not over scrupulous *confrères*, and so on.

By the time he has encountered most or all of those difficulties, he has found that the teaching of George Street and Bloomsbury Square has to be supplemented by a sterner and deeper philosophy.

His Majesty the Public, whose servant he has become, however appreciative of honest endeavour, is at the same time somewhat exacting, and is apt to forget that the pharmacist has a digestive apparatus and a soul like other men; hence untimely calls at meal and sleeping hours and frequent interruptions of religious duties.

I have advisedly presented my subject, at this stage, in a sombre point of view, to serve as a back-ground to the brighter tints which I can legitimately throw in. Although the training of the pharmacist is not intended to fit him for the highest walks of scientific research, he yet has abundant scope in his particular department to develop and exercise every faculty. If he cannot penetrate to the inner sanctuary of the Temple of Science, he may get a glimpse of it from the outer courts. Every article he deals in invites his careful study, and every preparation of the Pharmacopœia may suggest a fruitful train of interesting speculation; every vegetable within whose tissues medicinal virtue lurks, and every chemical which helps to assuage pain or prolong life, are subject to his skill. Moreover, the exercise of his duties calls into activity a happy combination of intellectual acumen and manipulative dexterity. I do not envy the man who depends entirely on "the quick forge and working-house of thought," for if his career be brilliant, his life is too frequently short. Pure brain-work of the highest class may secure enviable prizes, but it is generally accompanied by much physical torment. A great deal of Carlyle's comfort depended upon his potatoes or oatmeal being properly boiled, and there is no doubt the gloom which overspread so many of his reflections had its origin in the life-long dyspepsia which almost maddened him.

If you want to think out a subject keep your fingers employed in some little job not needing much care, such as cutting labels (not round ones though); and when tired with thinking take the pestle, or spatula or test tube and do a little work. Manual occupation seems to assist the action of the mind somewhat in the same way as an instrumental accompaniment does the voice in singing; and it might be an interesting subject of investigation to determine how far the delightful conversational powers of our dear lady friends depend on the ceaseless activity of their fingers. When you have any leisure in the shop, make it a rule to read nothing but professional books *there*—except, of course, on Sunday, which should have its appropriate studies. We have an old, large and interesting pharmaceutical literature, in addition to the current and old numbers of the *Pharmaceutical Journal*, the *Chemist and Druggist*, the 'Year-Book of the British Conference,' and kindred publications, which afford plenty of healthy reading to keep you abreast of the day and to give you hints of great practical value.

Acquire the useful habit of noting any thought suggested by your work or reading, for I believe many fruitful ideas are lost by not being registered at their birth. The 'Chemist and Druggist's Diary' is very handy for that purpose. While doing everything in your power to perfect your skill as a pharmacist, do not forget you have the character of an intelligent man to sustain, and for that purpose you have the grandest literature in Europe to help you. Intercourse with the "mighty dead" is the solace of life, and no one need weary when he can at will commune with Shakespeare, Milton, Bacon, and the long and brilliant array of authors who have succeeded them, and whose works are accessible to all.

As our calling requires not only a considerable amount of scientific knowledge, but also an intimate acquaintance with mercantile principles, it is sometimes difficult to make these two elements co-operate advantageously. Our charges do not, like the fees of medical and legal practitioners, rise with our reputation, but are regulated by the "prices current," and by the kind and amount of competition we encounter.

It is this mixture of the merchant with the scientist that gives rise to the most difficult questions we have to determine. If we were adequately remunerated for the amount of skill and care we are obliged to exercise, we might dispense with many articles which anyone can buy and sell; but under present circumstances we are debarred from that and obliged to defend ourselves from the incursions of outsiders by overlapping, to a certain extent, their territory.

It is certainly unjust, that one man should be obliged to go through an expensive course of scientific training to secure a legal qualification to sell poisons, while another with little more than the knowledge of the three R.'s, and no compulsory qualification, should be allowed to sell both *unscheduled* poisons, and compounds containing articles included in the *scheduled* list!

This raises the vexed patent medicine question in which so many are vitally interested. Shall we, by giving up a *part* of the profit, keep that branch of our trade, representing a turn-over of probably a million and quarter sterling or more; or by sticking to the full prices surrender the whole or most of it to outsiders? Shall we allow grocers and others to tempt our customers to buy articles on which they have a large profit, by supplying them with patents, etc., at a little above cost price?

We can sell quack medicines without being quacks—can we *make* as well as sell them, without endangering our pharmaceutical integrity? In short, to many, the real question may be—shall we *live* by unbending to a certain extent our scientific dignity, or shall we *die* in the odour of pharmaceutical sanctity?

My own opinion is, the most dignified, most legitimate and wisest course to follow, would be to agitate for the abolition of the patent medicine stamp. This tax is not only a paltry one for a great country to exact, but it is also an *immoral* one, inasmuch as Government places its imprimatur on the basest as well as on the most unobjectionable compounds. By its removal, secret medicines would stand on their own merits, and the pharmacist would have a fair field for his skill and ingenuity; while the public would be relieved of an unjust imposition and be supplied with safe and efficacious remedies, for half the price they pay for so many which are worthless and mischievous. I am sure that policy would secure the powerful aid of our medical friends, and save us the experience of the *reverse* of Pharaoh's dream—the sleek and well-fed grocer gobbling up the traditionally lean apothecary!

Great and laudable efforts have been made to raise our status, by giving a more scientific complexion to our calling and securing thereby a more efficient discharge of our duties and a consequent increase of confidence on the part of the public; and it is left to the young pharmacist to carry on and perfect what his predecessors have so well and laboriously inaugurated. The memory of the late Jacob Bell and the other public-spirited founders of the Pharmaceutical Society, will be held in enduring and grateful remembrance by those who have benefited so largely by their labours. The examinations which our young men have to go through, may appear to them too much like a hurdle-race where there are as many stumbles as successful leaps; but by and by, they will regard these trials of their mettle with the same feelings an old man thinks of the cricket matches of his youth.

I would recommend every young pharmacist to join the Pharmaceutical Society. Many complaints have been made of the little the Society has done, and the much it has left undone; as if an association comprising so small a proportion of chemists and druggists could do what the combined strength of the whole body might find it difficult to do. A large membership would encourage the Council to show a bold front when circumstances required it; while it would more truly represent the general opinions, and more powerfully foster the common interests. Many become members without any prospect of personal benefit; but they have the satisfaction of being connected with an association recognized and respected by all whose opinion is of any value. The man whose mind is cooped up in his own mortar will have no more influence than its pestle. In the meantime we are too much like a crumbly pill-mass, in need of something adhesive to make us *roll.* Hearty and intelligent co-operation is that something, and so long as that is wanting, we may show some kind of *motion*, but there can be *no go.* The young pharmacist must work incessantly, to perfect himself in his profession, and his constant endeavour should be, either to improve an old preparation, or to devise a new one. That will prove an effectual protection against the assaults of outsiders, and he will find that in raising his *own* status he will most efficiently help to elevate the character of the whole body. It will never do to rely entirely on legislative interference, which at best is but a compromise between conflicting interests; what we want is *justice* not *protection.* A legal qualification implies an *illegal dis*-qualification, and it is but common justice that those who have the former should not suffer from the encroachments of the latter class, especially when the public welfare is so largely affected by the distinction. The crisis through which our trade is at present passing, clearly indicates the necessity of a large and powerful combination, without which, I fear, a vast number must submit to absolute extinction. At the same time it must be remembered, we are suffering, like other commercial interests, from the present general depression, which we have reason to think is passing away.

The time also may come, when the quack successors of Pontius Pilate who are bawling out "What is Truth?" and answering the question by pitching a thirteen pence halfpenny box of their pills into the stomach of the doubter, will give place to the unpretentious pharmacist, who will do his honest work, without fuss and brag.

Mr. Young said he had great pleasure in moving a vote of thanks to Mr. Burrell, whom he had known for forty years as a pharmacist who took considerable interest in the affairs of his profession; in fact, he seemed to be a Nestor in pharmacy. He felt that the young men could, with every confidence, receive Mr. Burrell's advice, which was given in a style of his own, rugged no doubt, but sage and trustworthy and very entertaining.

Mr. Baildon seconded the motion.

Mr. Hill expressed the pleasure which he had had in listening to the paper, and he felt that he could speak for other young men in saying that the advice was so given that it would not be received with a smirk, but with that consideration which was due to a man of Mr. Burrell's wide experience in pharmacy. At the present time, he remarked, a crisis in pharmacy has been reached and that cohesion which has been referred to was now more desirable than at any other time. He was not one who took the pessimist view of the situation—that pharmacy is "going to the dogs." This cry proceeded mainly from those who were outside of the Pharmaceutical Society, those who held that it is only the mercantile and not the scientific part of pharmacy which requires cultivation. This he believed to be a mistake, for scientific principles were the basis of the profession, and it was only the scientific part which would carry the other through the crisis. He could scarcely agree with Mr. Burrell's remark that the pharmacist could not hope to enter the inner courts of the Temple of Science, for many of the most eminent chemists had begun their studies, and often made their greatest discoveries, while they were connected with pharmacy. Scheele and Liebig were of this class. He felt that the younger members would appreciate Mr. Burrell's hints.

Messrs. Boa and Henry endorsed the remarks of the other speakers, and the President of the Branch said that it would give him great pleasure to convey to Mr. Burrell the vote of thanks which had been accorded to him.

The meeting then adjourned.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Tuesday, November 7, at 11, Harcourt Street, Dublin, the President, Mr. Brunker in the chair.

Present:—Messrs. Harry Napier Draper, J.P., F.C.S., Vice-President, William N. Allen, Henry Bennett, Thomas Collins, M.R.C.S.E., William Hayes, John Evans, L.A.H., George H. Grindley, Edward M. Hodgson (Treasurer), Robert Montgomery, L.A.H., M.R.C.S.E., Robert Simpson, William F. Wells, jun.

The minutes of the annual meeting of the Society and of the last monthly meeting of the Council were read and confirmed.

Letters were read from Mr. Robert T. Herron, L.P.S.I., Armagh, and from Mr. James Williamson, solicitor, relative to the recent prosecution of two persons named Gray for selling drugs without possessing the necessary qualification. The defendants had been convicted and fined £2 in each case with £1 costs—in all £6. The letters requested the Society to forego their claim to a portion of the penalty, and to allow the entire to be retained by Mr. Herron to defray the expenses attendant on the prosecution, which it was stated would amount to the entire sum recovered.

The President said the Society had permitted Mr. Herron to institute the prosecution in their name, on the understanding that they should be at no expense in the matter. Mr. Herron now, however, wanted them to go further, and to concede to him the portion of the fine to which they were entitled by statute. It was for the Council to consider whether they would concede that application.

Mr. Hodgson said the Society was entitled under the 36th section of the Pharmacy Act to two thirds of the fine, and Mr. Herron to the remaining third. The Society had consented to allow Mr. Herron to institute this prosecution in their name at his urgent request, in order to put down the illegal vending of drugs which he complained of as being carried on by unqualified persons in his neighbourhood. It was a very proper proceeding, and the offenders had been fined; but it was very doubtful whether the Council had any right to forego the statutory right conferred on the Society to two thirds of the penalty.

Mr. Allen: Is there any direction in the Act of Parliament as to how the fines shall be disposed of?

Mr. Hodgson: The Act says that one third is to be paid to the person who shall be the means of bringing the offenders to justice, and that the remainder shall be paid to the Treasurer of the Society to be by him applied in carrying out the purposes of the Act.

Mr. Wells apprehended the section had application only to cases in which the Society were themselves prosecuting.

Mr. Hodgson said that was a mistake. The statute did not appear to contemplate that the Society should be prosecutors at all. The police were to prosecute for infringements of the Act, but two thirds of the fine should go to the Society and the remaining third to the person who was the means of bringing the offenders to justice. He apprehended the proper course would be that the two thirds of the fine should be handed over to the Council, and they then could consider whether any portion of it should be given to Mr. Herron to defray the expenses of the prosecution.

Dr. Collins said it was the duty of the Council to encourage members of the Society—especially members in the country—in prosecuting persons guilty of infringing the Act; and he thought it would be treating Mr. Herron harshly if the Council insisted on retaining the money and left him to defray the expenses out of his own pocket.

The President apprehended that in the absence of any bye-laws dealing with the subject the Council had no choice but to require two thirds of the fine to be remitted to their Treasurer in pursuance of the Act of Parliament. At the same time he was of opinion there was a good deal in what had fallen from Dr. Collins, that it would be a great pity to throw cold water on the efforts made by country members to put down the dispensing by unqualified persons. Such efforts ought to be encouraged.

Mr. Hodgson disclaimed any intention of throwing cold water on the efforts made to prosecute infringements of the Act. He merely wished that the Council should keep within their duty as defined by the statute.

Dr. Montgomery said under the circumstances of the present case he would be inclined to allow Mr. Herron to retain the entire fine, as it appeared he had been at such expenses in the prosecution; but he thought the Council should be cautious how they acted in the matter, lest it might be supposed they were making a precedent for future cases.

Mr. Draper said the proper course would be for the Council to require in the first instance the entire two-thirds of the fine to be remitted to the Treasurer, and, subsequently, Mr. Herron's application for a portion of the money might be taken into consideration. The Council were most anxious to encourage their members and to assist them in every way in putting down the illegal dispensing by unqualified persons. Such assistance was one of the strongest inducements which could be afforded to licentiates to support the Society.

Professor Tichborne said the amount of the penalty fixed by the statute, section 30, for infringing the Act was £5, and he did not understand why in the present and other cases it had been reduced by the magistrates to £2. According to his reading of the Act the magistrates had no power to reduce the penalty.

The President believed the magistrates sitting in petty sessions had the power of mitigating fines in all cases unless expressly precluded from doing so by statute.

Mr. Allen proposed and Mr. Draper seconded the following resolution, which was agreed to:—

> "That Mr. Robert T. Herron be informed in reply to his letter of October 11, that the Council cannot entertain his application, they having no alternative under the 36th section of the Act. The Council will, however, take into consideration Mr. Herron's application for a grant towards expenses incurred by him."

A communication was read from Mr. John P. Short, L.P.S.I., of Kells, relative to establishments carried on by unqualified persons.

The President said the letter did not mention the names of any of the parties referred to, and he apprehended the proper course would be to ask Mr. Short to report the circumstances of any cases which had come under his notice, for the information of the law committee. The Registrar was directed to communicate with him to that effect.

A letter was read from Mr. P. J. Finnegan thanking the Council for acceding to his request as reported in the proceedings of last monthly meeting.

A report of the Law Committee was received and adopted and a series of queries relative to the interpretation of the term "person keeping open shop" were ordered to be laid before the Solicitor-General for Ireland.

Mr. Hodgson (Treasurer), pursuant to notice, moved—

> "That the original members of the Society be *requested* to pay the same annual subscription as the elected members of the Society."

He apprehended the notice might require some slight alteration in its wording as there was no doubt the Council could not require the original members to contribute to the funds of the Society, they having been constituted members by Act of Parliament, and it being beyond the province of the Council to require any contribution from them unless they were willing to give it. What he wished was that the members in question should be applied to, and asked to contribute to the funds of the Society, as from its financial position it was desirable that as much support should be obtained for it as possible. He (Mr. Hodgson) as one of the original members was quite willing as far as he was personally concerned to pay the same contribution as the elected members. The Society required larger funds than they had at their command, in fact an inspection of their balance sheet would show the absolute necessity of doing something to increase their income.

The President thought the resolution might very well be adopted in the terms drawn by Mr. Hodgson in the notice of motion. The notice merely proposed that the members be "requested" to pay the subscription; he thought it was quite within the province of the Council to make such a request. It would of course be optional with the members to comply with the request or not as they deemed proper.

Professor Tichborne said the question was whether the resolution should apply to those members who did not take an active part in the Society. There were only five of the original members on the Council now.

Mr. Hodgson said that was so; some of the original members had passed away, but some were still living who were not members of the Council.

Mr. Draper agreed with the Treasurer that it was most important for the Council to endeavour to increase the income of the Society and although he was not very hopeful of the motion being carried out to any considerable extent, he so entirely sympathized with the object in view that he would second it.

The motion was then agreed to.

Professor Tichborne, pursuant to notice, moved—

"That a Committee be appointed to report to the Council on the future supply of the Journal to members of the Society and as regards the reporting of the proceedings of Council."

The matter did not require any lengthened discussion, as it was in fact only carrying out what the Society arranged to do at their annual meeting. It was proposed to appoint a small committee of three members to see whether they could get the Journal supplied any cheaper and also to see how their funds stood, and what difference the supply or non-supply of the Journal would make. He would suggest that the committee be requested to report to the Council at its January meeting.

Mr. Hayes seconded the resolution, which was carried. The committee to include Mr. Allen, Mr. Hodgson, and the proposer and seconder.

The President said it would be well that the licentiates of the Society should know that an impression which was very general, namely, that the original members were supplied gratuitously with the Journal, was incorrect. He had received some letters from which it would seem that such an impression was entertained, but it was quite erroneous.

The reports of the Examiners for the October examinations were laid before the Council. Of ten candidates who presented themselves for the Preliminary examination, eight passed and two were rejected. Nine candidates presented themselves for licences, of whom eight passed, and the Examiners had referred the case of the remaining candidate to the Council to decide what should be done.

The President said the gentleman in question had failed to make the minimum marks in pharmacy, and according to the rules must be rejected. The Examiners think (and in his opinion justly) that they should have some discretion by vote of the majority in rejecting candidates, even where the minimum marks have been obtained, and should not be tied up by a hard and fast rule.

The Registrar was directed to inform the candidate in question that he was rejected.

The President proposed the admission of the following as members of the Society:—Mr. Cunningham, 11, Upper Baggot Street; Mr. J. S. Short, Upper Baggot Street; and Mr. Donovan, Shelborne Road, Ball's Bridge.

Mr. Hayes proposed the admission of Mr. Crinion, of 67, Talbot Street.

Mr. Hodgson proposed the payment of several accounts, amounting altogether to £118 10*s.* 3*d.*, for requisites supplied for the new offices of the Society.

The motion was agreed to and the Council adjourned

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The third general meeting of the thirty-fifth session was held at the Royal Institution, on Thursday evening, November 8, 1883. The President, Mr. Edward Davies, F.C.S., F.I.C., in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations were announced:—The Smithsonian Reports for 1881, from the Smithsonian Institution, Washington, U.S.A.; eleven pamphlets on Chemical and Philosophical subjects, from the Royal University of Norway, Christiania, Norway; the November number of the *Analyst*; the *Chemical News* for October (four numbers); the *Pharmaceutical Journal*, for October 27 and November 3, from the Society; and 'The Proceedings of the Liverpool Architectural Society—Session 1881–1882,' from the Society.

Mr. A. C. Abraham read a letter he had received, addressed to the Secretary of the Association, from Mr. George Hamilton, of Liscard, drawing attention to a letter of his, on "Colliery Explosions and High Tides," which appeared in the *Liverpool Mercury*, of December 22, 1881, as bearing on the recent colliery explosions.

Mr. Davies, Dr. Symes and Mr. Abraham having discussed this question, the President called upon Mr. Alfred Smetham, F.C.S., to read his paper on "Soap Manufacture and the Soaps of Commerce." The paper will be printed in a future number of this Journal.

Dr. Symes proposed a vote of thanks to Mr. Smetham for his very interesting paper, which was seconded by Mr. A. C. Abraham.

The discussion was continued by Messrs. Parkinson, Conroy, Tinniswood, Mason and Davies, and Mr. Smetham having briefly replied, the motion was put from the chair and carried by acclamation.

There was a considerable attendance of gentlemen connected with the soap trade, who listened to the proceedings with much interest.

The President announced that the annual associated *soirée* would take place on December 19, and that the Honorary Secretary would be glad to receive the names of intending exhibitors thereat.

REGISTERED CHEMISTS' TRADE ASSOCIATION OF LIVERPOOL.

The annual dinner of the Liverpool Registered Chemists' Trade Association was held on Thursday, November 15. The President of the Association, Mr. Charles Symes, Ph.D., occupied the chair.

After the toast of "The Queen and Royal Family" had been drunk, the Chairman, in proposing the toast of the evening, "The Registered Chemists' Trade Association of Liverpool," coupled with the name of Mr. Hocken, Honorary Secretary, remarked that the Association sprang into existence some eight years ago, for it was thought for a city like Liverpool to be without any organization to represent the interests of their trade in any emergency was a discredit. After shortly recounting the good which the Association had already done in maintaining the rights of chemists and druggists, he went on to say that they still wanted a larger number of the members of the trade throughout the city to sympathize with them, for after all, unity was strength. He was pleased to couple the name of the Secretary with the toast, because that gentleman had devoted a large amount of his time to their interests.

Mr. Hocken, in responding, said that all that he had done had been done with hearty goodwill, and with the desire to make the Association a success. He was pleased to see such a large representation of the trade present, but, as he also saw a number of non-members of the Association, he was happy to be in a position to cordially invite them to become members.

The toast of "The Pharmaceutical Society of Great Britain" was given by Mr. Mackinlay, and responded to by Mr. Warhurst. "The Chemists and Druggists' Trade Association of Great Britain," "The Liverpool Chemists' Association and other Kindred Societies," "The Wholesale Trade," and "The President" were proposed and responded to in a hearty manner.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION.

The fifteenth annual meeting took place on Monday evening, Nov. 12. Mr. W. Wilkinson, Vice-President, in the chair.

The annual report was read by Mr. Benger, Honorary Secretary, and the statement of accounts by the

Honorary Treasurer, Mr. Woolley. Officers were re-elected, Mr. W. Elborne, of Owens College, being associated with Mr. Benger as joint Honorary Secretary.

A cordial vote of thanks was passed to the Council of the Pharmaceutical Society for weekly copies of the *Pharmaceutical Journal* and for a collection of cinchona barks.

On the motion of the Chairman, seconded by Mr. Benger, it was resolved to alter the title of the Society to "The Manchester Pharmaceutical Association," and it was decided to hold the first ordinary meeting of the session at the Owens College, permission to do so having been kindly given by the college authorities. On this occasion an address will be delivered by Mr. W. Elborne, Lecturer on Pharmacy in the college, and visitors will be afforded an opportunity of inspecting the new pharmaceutical laboratory and materia medica collection.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on November 15, Dr. Perkin, F.R.S., President, in the chair.

The following certificates were read for the first time:—Messrs. W. P. Bloxam, G. C. Chambers, A. Cobb, A. E. Ekins, F. P. Haviland, W. H. R. Kerry, F. Keeling, J. J. Pilley, J. Phillips, M. Percy, A. W. Rogers, A. Smithells, W. J. Saint, G. Smith.

It was announced that a ballot would take place at the next meeting, December 6.

Mr. C. O'Sullivan then read a paper—

On the Estimation of Starch.—The author has used the method described below during the last eight or ten years for estimating starch in cereals and malted grain. The method may be briefly described as follows:—The finely ground grain is successively extracted with ether, alcohol (sp. gr. ·90) and water at 35°–38°. The starch in the washed residue is gelatinized by boiling with water, cooled to 60° and converted by diastase into dextrin and maltose; if a quantitative determination of these two products be made, the starch originally present can be calculated. The author describes the method as follows:—About 5 grams of the finely ground flour are introduced into a wide-necked 100 c.c. flask and just saturated with alcohol, sp. gr. 0·82; 20 to 25 c.c. of ether being added. After standing several hours with occasional shaking the ethereal solution is decanted through a filter, and the residue in the flask washed with ether. To the residue there is added 80–90 c.c. of alcohol, sp. gr. 0·90, and the mixture warmed to 35°–38° for a few hours; the alcoholic solution is then decanted through the same filter and the residue washed with alcohol (sp. gr. 0·90) at 35°–38°. The residue in the flask and on the filter is washed into a 500 c.c. beaker and the beaker filled with water; in about twenty-four hours the solution is decanted through a filter and the residue washed with water at 35°–38°. The residue in the beaker and on the filter is washed with a short camel-hair brush and a fine jet into 100 c.c. beaker. The whole is then boiled for a few minutes in the water-bath, with constant stirring, to gelatinize the starch, the beaker and its contents are cooled to 62°–63° and about 0·03 gram of diastase added; the digestion at 62° is continued for an hour. The beaker is then boiled for eight to ten minutes; the solution filtered into a 100 c.c. measuring flask; the residue carefully washed with successive small quantities of boiling water and the whole made up to 100 c.c. at 15·5°. The ether frees the grains from fat, etc., the alcohol (·90) removes the sugars, albumenoids other than casein, etc., whilst water at 35°–38° dissolves out the amylams. Dextrin and maltose are the sole products of the action of diastase on starch. The diastase is prepared as follows:—Two to three kilos of finely ground pale barley malt are mixed with sufficient water to saturate and cover the whole. After standing three or four hours the mass is squeezed with a filter press. If not bright the liquid is filtered. To the clear solution alcohol, sp. gr. 0·83, is added as long as a flocculent precipitate falls; as soon as the supernatant liquid becomes milky the addition of alcohol is discontinued. The precipitate is washed with alcohol 0·86–0·88, dehydrated with absolute alcohol, pressed and dried *in vacuo* over sulphuric acid until its weight is constant. Diastase thus prepared is a white, friable, easily soluble powder which retains its activity for a considerable time. Five grams of barley flour thus treated with 0·03 gram diastase gave 100 c.c. at 15·5°, having sp. gr. 1·01003, which represents 25·39 grams of solid matter (taking 1·00395 as the sp. gr. of a solution containing 1 per cent. of starch products); 9·178 grams of this solution reduced 0·241 gram cupric oxide and 200 mm. of it gave a deviation in the Soleil Wentzke-Scheibler saccharimeter of 21·1 divisions. Thus we have $0·241 \text{ gram} \times ·7256 = 0·1748$ gram maltose in 9·178 grams; in the 100 c.c. or 101·003 grams there are 1·923 grams maltose; 1 gram of maltose in 100 c.c. gives a deviation in 200 mm. of 8·112 division, and 1 gram of dextrin in 100 c.c. gives 11·56 div. so $1·923 \times 8·02 = 15·422$, the optical activity of the maltose, and $21·1 - 15·422 = 5·678$, the optical activity of the dextrin, therefore in 100 c.c. there are $\frac{5·678}{11·56} = 0·491$ grams of dextrin. We have, therefore, in the 100 c.c. maltose, 1·923 gram; dextrin, 0·491 gram; diastase, 0·03 gram = 2·444 gram out of 2·539 solids as indicated by the sp. gr.; of this deficiency of 0·095 gram, 0·083 proved to be α-amylam which had not been washed out. One part of starch yields 1 part of dextrin and 1 part of starch yields 1·055 maltose. The starch represented by the above numbers is, therefore, dextrin = 0·491, maltose $\frac{1·928}{1·055} =$ 1·822, or a total of 2·213 grams of starch from 5 grams of barley. Barley thus contains 46·26 per cent. of starch, a second experiment gave 46·38 per cent. The author gives many other determinations in detail:—Barley malt contains 39·9 per cent.; wheat, 55·4 per cent.; wheat malt, 43·26 per cent. and 43·53 per cent.; rye, 44–46 per cent.; rice, 75·77 per cent.; maize, 54–58 per cent.; oats, 35–38 per cent. In some experiments the author estimated the starch in a sample of pure starch containing 89·36 per cent. of dry starch. He obtained 87·72 per cent. and 89·54 per cent. The author states as the result of his experience with the method, that the difference in results obtained by any two observers need not exceed 0·5 per cent. of the total starch.

Dr. Armstrong said the paper was one of great value and the amount of work involved was not by any means represented by the length of the paper. The progress of physiological chemistry must depend upon the accuracy of the means at our disposal of estimating the various constituents. Such researches must contribute a great deal to the investigation of vital problems.

In answer to Dr. Armstrong, Mr. O'Sullivan stated that methylated spirit could be used in the extraction of the flour.

Dr. Percy Frankland then read a paper—

On the Illuminating Power of Ethylene when burnt with Non-luminous Combustible Gases.—The ethylene was prepared from methylated spirit and strong sulphuric acid, and purified by passing over various absorbents; it contained CO_2, 0·05; O, 0·94; C_2H_4, 97·52; N, 1·49. The non-luminous combustible gases experimented with were hydrogen, prepared as usual from zinc and sulphuric acid, carbonic oxide from potassium ferrocyanide and strong sulphuric, and marsh gas. The product obtained by heating sodic acetate and soda lime was so impure that the author was obliged to prepare pure marsh gas by decomposing zinc methyl with water. The illuminating power was determined by an Evan's photometer, a Referees' burner and sperm candles being used; a sample of the gas was always taken at each determination and analysed. The illuminating power of ethylene, supposing 5 cubic feet per hour could be burnt, was found to be 68·5 candles. The illuminating power of ethylene when mixed with hydrogen shows an almost uniform diminution from 68·5 to zero when 90 per cent. H is used; a mixture containing 25 per cent. of ethylene had an illuminating power of twenty candles. In every case the illuminating power of mixtures of ethylene and carbonic oxide were found to be less than that of the corresponding mixtures of ethylene and hydrogen. With marsh gas it was found that mixtures rich in ethylene had about the same luminosity as those containing hydrogen and carbonic oxide, but that the iluminating power of mixtures rich in marsh gas greatly exceeded that of the corresponding mixtures with the two other gases. The intrinsic luminosity of the ethylene, calculated for a uniform consumption of 5 cubic feet per hour, continually increases as the percentage of marsh gas arises. Thus the ethylene in a mixture containing 92 per cent. of marsh gas gives a light of 175 candles, calculated for 5 cubic feet consumed per hour. The high illuminating power of coal gas, considering the small quantity (4·51 per cent.) of illuminating hydrocarbons that it contains, is probably explained by this great value of marsh gas as a diluent. The explanation of this behaviour of marsh gas is to be looked for in the quantity of heat developed in its combustion. Thus 1 mol. of H yields 68,924 units of heat; of CO, 67,284 units; of marsh gas, 209,008 units. The author promises some further experiments on the effects of incombustible diluents.

Dr. Frankland many years ago had made somewhat similar experiments, and had then stated that marsh gas was a diluent and gave no illuminating power to coal-gas. He experimented with a fish-tail burner. There seemed to be no doubt that the apparent rise of 4 to 5 candles in the illuminating power of coal gas by the wonderful "Referees' burner" was largely due to the development of the illuminating power of the marsh gas. For lighting purposes much marsh gas was objectionable, from the CO_2 produced and the quantity of heat developed; but where gas was used for heating purposes the case was quite different, and a large percentage of marsh gas was most advantageous, owing to its great heating power.

Mr. G. S. Johnson then read a paper—

On the Products of Decomposition of Aqueous Solutions of Ammonium Nitrite.—The main points of interest observed are as follows:—No oxide of nitrogen is formed by alkaline solutions of pure ammonium nitrite. Nitrogen is evolved from such solution at temperatures below 100° C., the evolution is facilitated by the presence of spongy platinum. Pure nitrogen can be obtained by adding crystallized cupric chloride to solutions at the ordinary temperature. If solutions of ammonium nitrite be acidulated 40 per cent. of nitric oxide is evolved. The author states that 2 per cent. of the gas evolved by the action of cupric chloride consists of nitrogen in a peculiarly active state, setting free iodine from hydriodic acid, and forming ammonia when mixed with hydrogen and passed through a red hot tube with spongy platinum. This active nitrogen is decomposed at a red heat and is not produced if the temperature of the solution is raised above 90°.

Dr. Armstrong suggested that the nitrogen should be made in some other way; he did not think that passing the evolved gas over red hot copper ensured the absence of oxygen. The quantity of ammonia formed was extremely minute; it seemed also excessively improbable that such an active form of nitrogen should exist.

Dr. E. B. Schmidt then read a short paper—

On the Estimation of Iron by Potasssum Bichromate.—The author recommends the above process; but states that zinc should not be used to reduce the iron, as it interferes with the end reaction with potassium ferricyanide. He prefers Kessler's method of reduction with stannous chloride. The author considers the reduction with sulphite of sodium tedious.

Mr. Riley said that the bichromate method was almost universally used for the estimation of iron; the difficulty when zinc was employed was also well known. Numerous analyses were constantly being made in his laboratory, the reducing agent employed being sodium sulphite. The whole subject was thoroughly discussed by him in a paper published some time back in the *Chem. Soc. Journ.* (1877, vol. ii., p. 24, and 1862, xv., 311).

The Society then adjourned to December 6.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

The first meeting of the present session was held on Thursday, November 15. Professor Attfield, F.R.S., President, in the chair.

The election of officers for the session was proceeded with. Messrs. F. Ransom and R. J. MacDermott were appointed as scrutineers to examine the voting papers. The following members were elected as officers for the present session:—Vice-Presidents, Mr. H. G. Greenish and Mr. T. S. Dymond; Honorary Secretary and Treasurer, Mr. Wyndham R. Dunstan; Assistant Secretary, Mr. F. W. Short; other members of the Executive Committee, Messrs. F. McDiarmid, W. H. Ince, R. W. C. Pierce and P. L. Huskisson.

Mr. Joseph Ince then delivered an address upon "Science: its Abuse and Use," which will be printed in the next number of this Journal.

At the conclusion of the address, Mr. R. W. Giles proposed and Dr. Senier seconded a vote of thanks to Mr. Ince, which was supported by the President and Secretary, and Messrs. Parker and Ransom, and upon being put to the meeting was carried unanimously with much acclamation. The meeting, which was very largely attended, then adjourned.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Concluded from page* 398.)

The next paper was on—

The Composition of Easton's Syrup.

BY ROBERT H. DAVIES, AND EMIL B. SCHMIDT, PH.D.

During a recent examination of some samples of this syrup, the proportion of alkaloid present was found, in some cases, to differ from that prescribed in such a marked manner that a more detailed examination was undertaken with a view of drawing the attention of pharmacists to the variations of strength occurring in this preparation.

Easton's syrup professes to contain "about 1 grain phosphate of iron, 1 grain phosphate of quinia, and $\frac{1}{32}$ grain phosphate of strychnia in each fluid drachm. This statement is made by Mr. Squire,* and a formula given for making the syrup, which is called "Dr. Easton's formula."

Proportion of Quinia Phosphate.—If the directions given here are carefully followed, the product will measure between 24 and 24½ fluid ounces, and will contain the quinia phosphate derived from 192 grains of sulphate. Approximately, then, 1 grain sulphate of quinine has been used in the production of 1 fluid drachm of syrup. The formula of quinia phosphate corresponding to the soluble or neutral sulphate would be $(C_{20}H_{24}N_2O_2)_3,(H_3PO_4)_2$. We may assume with a high degree of probability that this is the phosphate present. One hundred grains of sulphate would yield nearly 87·5 grains of phosphate; therefore under the most favourable circumstances the syrup could not contain more than 0·875 grain of phosphate of quinia per fluid drachm. The amount of

* 'Companion to the British Pharmacopœia,' 13th edit., p. 148.

this latter in a sample of syrup prepared in accordance with Dr. Easton's formula, deduced from the amount of alkaloid extracted, was 0·814 grain per fluid drachm, that is, 6·51 grains per fluid ounce, whereas in various other samples of commerce the amount of phosphate of quinia was as follows:—

Sample of Syrup.	A	B	C	D	E	F	G	H	J	N	Own.	Theory.
Grains of phosph. of quin. per fluid oz.	1·57	7·83	6·54	6·58	4·95	3·15	5·80	7·13	2·72	4·59	6·51	6·87

A certain sample, which was prepared in accordance with the Pharmacopœia of the United States, yielded alkaloid corresponding to 8·56 grains quinia phosphate per fluid ounce.

Mode of Estimation.—10 c.c. of the syrup were mixed, in a separating funnel, with 20 c.c. dist. water, 3 c.c. liq. ammon. fort. added, and, after shaking, 25 c.c. of a mixture of equal volumes of chloroform and ether, and the whole agitated for three or four minutes. After complete separation of the aqueous and chloroformic solutions the latter was drawn off, and passed through a small dry filter into a weighed beaker. When this treatment had been repeated with 20 c.c. of the ether-chloroform mixture to extract any remaining alkaloid, the united ethereal liquids were evaporated by immersing the beaker into a warm water-bath. The residue was finally dried in the air-bath at 100° C. and weighed.

The residual alkaloid should be resinoid in character; if crystalline, it is highly probable that the quinine employed was contaminated with other alkaloids. When dried at 100° C., it should weigh 0·128 gram of which 0·0057 gram is to be deducted for strychnia, leaving 0·1223 gram from 10 c.c. syrup, which corresponds to 6·51 grains of phosphate of quinia per fluid ounce, the quantity which was experimentally obtained from a carefully and freshly prepared sample of syrup. The alkaloid extracted from the same commercial specimens varied from 0·034 gram to 0·152 gram per 10 c.c., the theoretical yield being 0·135 gram per 10 c.c.

Proportion of Ferrous Phosphate.—In producing the 24 fluid ounces of syrup by Dr. Easton's formula, we are directed to decompose 300 grains sulphate of iron with 360 grains phosphate of soda. Mr. Squire mentions that the quantity of sodium phosphate is not sufficient to precipitate the whole of the iron. As a matter of fact, if the 300 grains were entirely converted into phosphate, they would only form 128 grains of ferrous phosphate, $Fe_3, 2PO_4$, which would give a maximum of $5\frac{1}{3}$ grains per fluid ounce, instead of the 8 grains as given in the formula. But even that amount of $5\frac{1}{3}$ grains per fluid ounce is most probably not reached, since in the process of decomposition a quantity of sulphuric acid becomes liberated, which doubtless prevents a portion of the ferrous phosphate from being precipitated.

Mode of Estimation.—We have not succeeded so far in separating iron in the ferrous condition from any that may be present in the ferric state. The results given as ferrous phosphate assume that the whole of the iron present is present as this salt.

Five c.c of the syrup are evaporated on a water-bath in a platinum dish, then carefully incinerated, the ash extracted with hot hydrochloric acid, and washed on a filter; the ferric chloride in the hot filtrate is reduced by solution of stannous chloride, which is added until the solution becomes colourless. Excess of this reagent is removed by the addition of mercuric chloride, and the amount of ferrous salt determined by titrating with a half decinormal solution of potassium bichromate.

The amount of iron present in the samples examined would be equivalent to the following proportions of ferrous phosphate.

Sample.	A	B	C	D	E	F	H	J	Own.	Theory.
Grains of ferrous phosph. per fluid ounce . . .	0·97	1·99	12·32	8·46	7·2	8·72	6·89	8·72	4·7	5·3

The amount present theoretically is 5·3 grains, and that found in the sample made by us, was 4·7 grains per fluid ounce.

Proportion of Strychnine.—The small proportion in which strychnine is present in this preparation, rendered it necessary to depart from the usual mode of extracting and weighing the alkaloid. We had recourse therefore to a colorimetric method for the approximate estimation of this alkaloid, when it is present in very small quantity.

The alkaloidal residue from 10 c.c. of syrup was dissolved in 31·25 c.c. of water acidulated with sulphuric acid, 1 c.c. normal acid was employed, and 5 drops of this solution were added to 4 c.c. of concentrated sulphuric acid tinted yellow with potassium bichromate. The depth of colour produced after standing five minutes, was then compared with the colour produced by known quantities of very dilute solution of strychnia of known strength in the same sulphuric acid coloured with bichromate.

This method was devised about two years ago by Mr. Oscar Eckenstein, in conjunction with one of us. By operating as above it is possible to detect strychnine in one drop of a solution of strychnine one-fiftieth the strength of the official liquor strychniæ, that is containing 1 of strychnine in 5500 about. As a quantitative method it leaves much to be desired.

The results yielded led to the following conclusion:—

Sample.	A	B	C	D	E	F	G	H	J	N	Own.	Theory.
Grains of strychnine in 4 fl. oz..	1 to 1·2	3	·8 to 1	·6 to ·8	·8 to 1	·6 to ·8	·6 to ·8	1·2	·6 to ·8	·6 to ·8	·8	1

The sample prepared by us showed ·8 grain in 4 fluid ounces; by this test theoretically 1 grain should be found in this quantity.

In connection with these results it must be borne in mind that the method as a quantitative one is only approximately correct.

The only sample with which we would find fault on account of the strychnine is sample B., where it would appear that about three times the amount is present that ought to be found.

Phosphoric Acid.—Qualitative testing for sulphates having shown that these were not present in any case in more than traces, and chlorides being proved absent, the total free acid was estimated by means of volumetric solution of soda, and the proportion which might be considered to be in combination with the alkaloids present having been added, the whole calculated as phosphoric acid.

A singular circumstance is to be observed in effecting this estimation: when about five-sixths of the soda solution necessary has been added, and indeed, from this period until the end of the operation, the liquid distinctly reddens blue litmus paper, and at the same time colours red litmus paper blue. To the blue paper the liquid behaves as an acid solution, whilst to the red paper it is alkaline in character with almost equal distinctness. It is impracticable to employ a solution of litmus, and, using litmus paper, the operation may be considered finished when both colours undergo, as far as possible, the same amount of modification.

Ten c.c. of the sample diluted to 50 c.c. required from 4 to 11 c.c. of normal solution of soda; this corresponded to the following proportions of phosphoric acid present.

Sample.	A	B	C	D	E	F	G	H	J	Own.	Theory.
Grains phosphoric acid in 1 fl. oz. .	19·36	20	33·56	46·24	49·24	43·44	48·24	46·6	47·76	37·68	38

A sample made by us yielded 37·68 grains per fluid ounce, and the theoretical amount is 38 grains.

The results given above, together with the specific gravity of each sample, have been tabulated for convenience. The samples examined were obtained in the ordinary way of business from makers or retail dealers In our opinion their varied composition points conclusively to the desirability of some official and authoritative formula for the manufacture of this important preparation.

Table of Composition of Easton's Syrup.

Sample.	Theory.	Own sample.	A.	B.	C.	D.	E.	F.	G.	H.	J.	N.	
Quinia phosphate	6·87	6·51	1·57	7·83	6·54	6·58	4·95	3·15	5·8	7·13	2·72	4·59	Grains per fluid ounce.
Ferrous phosphate	5·3	4·7	0·97	1·99	12·32	8·46	7 2	8·72	—	6·89	8·72		Grains per fluid ounce.
Phosphoric acid	38·03	37·68	19·36	20.00	33·56	46·24	49·24	43·44	48·24	46·6	47·76		Grains per fluid ounce.
Strychnia	1	·8	1to1·2	3	·8 to 1	·6to·8	·8 to 1	6to·8	·6to·8	1·2	·5to·8	·6to·8	Grains per 4 fluid ounces.
Specific gravity		1270	1326	1296	1324	1331	1306	1309	1288	1314	—	1288	

A vote of thanks to the authors having been carried,

Mr. PLOWMAN said it appeared from the perusal of this paper that no method had been proposed for separating the cinchona alkaloids one from the other. The residue from the mixture of chloroform and ether had been taken as pure quinia, and this seemed to him to be a serious blemish in the paper.

The next paper was on—

THE ODOROUS PRINCIPLE OF HENBANE LEAF.

BY A. W. GERRARD, F.C.S.

A few years ago some fresh henbane leaves I received particularly attracted my attention by their unusually strong but very characteristic odour. As nothing appeared to be known or published concerning this odorous body, I felt a desire to attempt its extraction and investigate its characters. The leaves being required for the preparation of hyoscyamine I could not follow the usual method of distillation for fear of injury to the alkaloid, so I attempted the separation of the odorous principle by the following process, which proved a success.

Process of Extraction.—The leaves in separate portions were washed in about a litre of ether until 10 pounds had been treated, this yielded a chlorophyll coloured fluid, which was allowed to spontaneously evaporate, giving as a residue a semifluid green extract. The extract washed with water to remove adhering alkaloid or other matters was set aside. After the lapse of some months the extract was noticed to have deposited some crystals showing a brilliant irridescence, likewise some granular matter. Deposition was allowed to continue until it appeared arrested. The solid matters were now separated by straining and gentle pressure, and the soft residue purified by several solutions in and separations from ether. In this way I obtained 2·6 grams of substance, which on examination proved to be the odorous principle of henbane.

Properties.—It forms a pale yellow unctuous semi-crystalline mass, having the appearance of a stearoptene. Its odour was that of henbane, at the same time suggestive of butyric acid. Its reaction to litmus was acid, taste acid and slightly acrid; like many essential oils its vapour exercised a bleaching action on cork. It was freely soluble in alcohol, ether, chloroform and carbon disulphide. Heated, it fused and volatilized; its vapour burnt with a yellow smoky flame, leaving a slight carbonaceous residue, which entirely disappeared on further heating. Examined with a lens numerous crystalline plates were observed. It was heavier than water; its sp. gr. taken by floating in sulphate of magnesium was found to be 1061. With strong sulphuric acid it gave a brown colour; strong nitric acid did not appear to affect it.

My suspicions from its odour were that this body might be an ether or compound of butyric acid. A portion was saponified with soda, then treated with hydrochloric acid in excess; the clear acid solution on separation smelt strongly of butyric acid, and gave, when neutralized and treated with cupric sulphate, the green precipitate characteristic of cupric butyrate. The foregoing characters give evidence that the odorous principle of henbane is a butyric ether, or it may be a butyrin, several of which are described in Watts' 'Dictionary of Chemistry' as having properties in general with the body I have obtained.

In addition to the odorous principle I found in the ether residue some fixed fat and a pungent tasting resin.

Practical Bearing on the Pharmacy of Tincture of Henbane.—It is well known that some tinctures of henbane give a turbidity when diluted with water, whilst others do not; also that the tincture gradually loses its green colour, forming a dark deposit. As regards the former it has been stated that the difference is due to the use of annual and biennial henbanes, a tincture of the latter only giving turbidity. This statement is not the fact, as I have found the tincture from both varieties when freshly made equally give turbidity; it is true that a difference is sometimes observed, and may be attributable to the period at which the plant has been gathered, and the extent to which the odorous principle and fat has developed. Many samples of tincture of henbane almost entirely lose their property of becoming turbid with water; this is generally the result of age, for such a tincture will be found to have lost its original green colour and changed to a brown, with formation of the usual dark deposit. Thus deposition and disappearance of turbidity are simultaneous and proportionate. As to the nature of the deposit in the tincture I believe if examined it will be found to consist of a mixture of odorous principle, fat and chlorophyll, the separation of which is slowly effected by the agency of the water in the proof spirit; if this be so, then it is an argument for the use of a stronger alcohol in making tincture of henbane.

A vote of thanks was passed to Mr. Gerrard.

The last paper read was entitled—

SUGGESTIONS FOR COMBINATIONS OF COLLODION.

BY J. B. BARNES,

Pharmaceutical Chemist.

Having witnessed the good effects of the compound solution of salicylic acid and collodion when applied to corns, as recommended by Dr. Traill Green,* I am disposed to believe that the use of collodion as a medium for the topical application of several other substances might be advantageously extended; already we are familiar with such preparations as collodium epispasticum and collodion stypticum, for which Mr. Martindale, in the 'Extra Pharmacopœia,' gives formulæ as well as

* *Pharm. Journal*, April 28, 1883, p. 884.

for collodium c. oleo crotonis, collodium iodi, and collodium iodoformi.

The advantages of combinations of collodion are that, unlike ointments, they remain fixed for some time to the part applied, and are cleanly. It remains, however, to be proved whether the remedial effects of the several substances in combination with it will be obtained; collodion must retard the action more or less of all of them, but at the same time it is reasonable to expect some of those under consideration may be found useful. It is not for the pharmacist to determine the strength of such combinations,—that has to be decided by the prescriber,—but it is within the province of the former to discover by experiment the proportions suitable for combination.

I find when wood tar is mixed in the proportion of 1 drachm by weight with 4 of collodion a perfect solution is effected, which, when applied to the body, dries quickly and leaves a smooth covering.

Coal tar collodion may also be prepared by mixing, in the same proportions, an alcoholic extract of coal tar of the consistence of syrup with collodion; it is fluorescent in appearance, and forms a good covering when applied to the skin. The addition of 30 grains of iodine to the fluid ounce of either of these preparations does not affect its consistency or adhering properties.

Oleum picis juniperi, when mixed in the proportion of 1 by weight to 5 of collodion, dissolves and forms an application which when applied to the skin dries quickly, leaving a good covering.

Oil of gurgun, in the proportion of 1 by weight to 3 or 4 parts of collodion, also dissolves and forms a good varnish.

Oleic acid and Peruvian balsam, each in the proportion of 1 by weight to 4 of collodion, form good varnishes when applied to the skin, which require ether to remove them.

The following also form suitable combinations for painting on the skin, adhere firmly and do not crack. Glacial acetic acid, 1 part by weight; flexible collodion, 4 parts; carbolic acid, in crystals, 1 part to 4 of flexible collodion; creasote, 1 part by weight to 7; and essential oil of mustard, 1 part by weight to 7 of flexible collodion.

Belladonna collodion may be prepared by macerating 60 grains of the alcoholic extract in a fluid ounce of flexible collodion for twenty-four hours and decanting the clear liquid; when spread upon the body it leaves a smooth surface.

Aconitia, atropia, hyoscyamia and veratria dissolve very readily in collodion, the latter alkaloid in the proportion of 8 grains to 7 fluid drachms of flexible collodion and 1 fluid drachm of oleic acid; when applied to the skin leaves a smooth covering, which does not rub off.

Morphia does not dissolve in collodion, but when in combination with oleic acid it does; 5 or 10 grains in a fluid drachm of the acid with 7 drachms of flexible collodion forms a covering which adheres firmly to the skin.

Ammoniated mercury, iodide of lead and precipitated sulphur, each of them mixed with flexible collodion in the proportion of 1 drachm to 7 and 4 or 5 drops of castor oil, form mixtures which adhere firmly to the skin.

Oleate of mercury mixed with collodion in the proportion of 1 to 4, when extended on the surface of the body, leaves a smooth almost transparent covering.

In the preparation of the oleate 1320 grains of oleic acid was diluted with three volumes of ether; 420 grains of dry binoxide of mercury was added, and the mixture shaken occasionally for four days until the orange colour of the binoxide had disappeared, the white creamy compound was allowed to evaporate without the application of heat. The dilution of the oleic acid with ether prevents caking, the oleate of mercury so obtained is of a yellowish-white colour, of the consistence of vaseline.

Oleate of zinc mixed in the proportion of 1 part to 4 of collodion forms a convenient mixture for topical application.

Iodide of cadmium dissolves in flexible collodion, 1 drachm mixed with 7 fluid drachms of the collodion and 4 drops of castor oil, gives a colourless bright solution, which, when painted on the skin, leaves a smooth white covering.

I have not been successful in preparing a smooth transparent collodion of iodide of sulphur, the iodine dissolves out and the sulphur subsides; 50 grains of iodide of sulphur treated with ether yielded 10 grains of sulphur, the exact proportion given in the Pharmacopœia as obtainable when 50 grains of the iodide is boiled with water and the iodine driven off.

My sample of this substance obtained from a firm of well-known manufacturing chemists was now mixed in the proportion of 1 to 60 of glycerine, it appeared to dissolve, but the sulphur gradually subsided.

A vote of thanks was passed to Mr. Barnes.

General Business.

Mr. Plowman said he rose to perform a very pleasant task. It was hardly necessary to inform the members of the Conference that through the generosity of Mr. Thomas Hyde Hills a fund had been provided for giving a number of books to be given to the Associations of those towns where the Conference might meet from time to time. In the case of Southport there had been, up to the present time, no Association, and hence some little difficulty arose; but after correspondence between the secretaries acting for the Executive Committee and the Southport authorities, it was decided that the books should be granted on condition that they should be taken care of by the local secretary of the Pharmaceutical Society for the time being, and that they should form the nucleus of a library. The books were now on the table for formal presentation to Mr. Ashton, and he could only express a hope that the library would grow as rapidly and with the same signs of permanence as the town of Southport. He must add that besides the Bell and Hills gift were two volumes given by Mr. Thomas Hanbury in memory of his brother, Mr. Daniel Hanbury, namely, 'The Science Papers,' and 'Pharmacographia.'

Mr. Ashton, on behalf of the pharmacists of Southport, begged to heartily thank the committee and trustees of the fund for this gift. According to the arrangements made there was every prospect that in a little time the number of books would be considerably augmented, and he was sure they would be much appreciated by the chemists of Southport.

Place of Meeting for 1884.

Mr. Benger said the members were aware that it was the custom of the Conference to accompany the British Association to its various places of meeting. They would also remember that last year, when it was decided the British Association should go to Canada next year, it was felt that it would not be wise to attempt to follow them on that occasion. Hearing of this, the chemists of Aberdeen and the North of Scotland forwarded a cordial invitation to go there next year. A good deal of correspondence took place and arrangements were almost completed, but within the last few days a new aspect of affairs had arisen. The British Association, it was understood, would probably go to Aberdeen in 1885, and under those circumstances the Aberdeen chemists had withdrawn temporarily their invitation, so as to give the Pharmaceutical Conference an opportunity of accompanying the British Association when it did go there. They were not, however, left homeless. The President had previously had some correspondence with a gentleman in the South of England, and having heard that they were now open, he had sent in the name of the chemists of Hastings and St. Leonards a very cordial invitation to the Conference to meet there next year. Having read the letter of invitation, Mr. Benger concluded by moving that this cordial invitation be as cordially accepted, and he hoped that the meeting might prove as satisfactory in the South of England as the present one had in the North.

Dr. Quinlan seconded the proposition.

The President, in putting the resolution, explained that the invitation was quite spontaneous; it had been made to him privately some two months ago, but it was then held in abeyance owing to the expectation that they would go elsewhere. It had now been renewed in the cordial spirit which they had heard from the letter.

The resolution was carried unanimously.

Election of Officers.

The President said the Executive Committee had now to present the list of suggested names of officers for the ensuing year. As he had before stated, the Committee had done its best to select the names of those who would be likely best to serve the Conference, but at the same time any member was quite at liberty to suggest any other names.

Mr. Benger explained that one or two blanks were left for local officers who would be appointed by the Executive Committee later on, if that met the approval of members.

A resolution was accordingly passed unanimously, entrusting to the Executive Committee the duty of appointing local officers for the ensuing year.

The list of names suggested having been read, Mr. Nesbit and Mr. Chipperfield were appointed to act as scrutineers.

Mr. Stephenson (Edinburgh) then moved:—

"That the cordial thanks of the non-resident members of the British Pharmaceutical Conference be given to the Local Committee, and especially to Messrs. Radley, Ashton, Ball, and Kershaw, for the very successful manner in which the various arrangements connected with the Southport visit have been carried out."

He was sure the Executive Committee had correctly gauged the feelings of the meeting in giving priority to this resolution, and possibly the same feelings of propriety had influenced them in assigning it to his hands he being a comparative stranger among the non-resident visitors. The welcome they had received from the pharmacists of Southport, the kindness and hospitality which they had experienced and further expected to experience were so marked, that it was quite unnecessary to say a single word in support of the resolution. The members of the different localities where the Conference met seemed to vie with each other in hospitality, so that it would be a difficult matter for any town to surpass previous efforts; but without making any invidious comparisons, he might express his own feelings that the Southport people had quite held their own, and it must be very gratifying to them to know that this had been without exception the most successful meeting in point of numbers which the Conference had yet held.

Mr. Taylor had the greatest pleasure in seconding the resolution so ably moved by Mr. Stevenson.

Mr. Benger said he had had rather special opportunities of coming in contact with members of the Committee, having had occasion to visit Southport several times during the past year. He could only say that so far from having to use any influence he might possess in the way of stimulus he had rather to act like the guard at the tail of a train, and endeavour occasionally to put on the brake; however, he must say that the brake did not act very well. It would have been a hard thing to check the generous enthusiasm of the Local Committee and their friends.

The President said not only as President, but as one who had been in the town several days before the meeting commenced, he had seen something of the work of the Local Committee. He had been struck with the admirable organization, great enthusiasm, and entire heartiness with which the local members of the Conference had thrown themselves into the work of entertaining the visiting members.

The motion having been carried unanimously,

Mr. Radley (Chairman of the Local Committee) begged to thank the members for the handsome compliment which had been paid them. It was their great wish that the Conference should have a hearty reception, and it would be a very pleasant reflection that their efforts had been so much appreciated. One great advantage which arose out of these Conferences was the very pleasant meetings of the Committee which had taken place, and the introduction of brethren from neighbouring towns to each other. He trusted this would be the starting point of a local association, which might become very powerful for good in the future.

Mr. Ashton (Local Secretary) said it had been a labour of love to all the Committee. They had had many pleasant meetings together, everything had gone on straightforwardly, and he was quite certain that it had been the means of bringing together some gentlemen who were not in the habit of meeting before, and that the same kindly feeling was engendered in every place which the Conference visited.

(The scrutineers here returned and announced that the election was unanimous, only one paper having been slightly altered, and that not to erase any gentleman's name, but to suggest an alteration in his position.)

Officers for 1883-84.

The following is a list of the officers elected:—

President.—J. Williams, F.C.S.

Vice-Presidents.—M. Carteighe, F.I.C., F.C.S., London; J. R. Young, Edinburgh; W. R. Atkins.

Treasurer.—C. Ekin, F.C.S., Hounslow.

General Secretaries.—F. Baden Benger, F.C.S., Manchester; S. Plowman, F.I.C., London.

Other Members of Executive Committee.—J. Borland, F.C.S., F.R.M.S., Kilmarnock; J. C. C. Payne, Belfast; W. A. H. Naylor, F.C.S., London; W. V. Radley, Southport; W. Hills, F.C.S., London; G. S. Taylor, F.C.S., London; J. C. Thresh, D.Sc., F.C.S., Buxton; J. B. Stephenson, Edinburgh.

Auditor.—T. H. Sykes, Southport.

Mr. Brunker said that whilst fully concurring in the vote of thanks which had been passed to the Local Committee he felt that the visiting members would be guilty of a great omission if they were not to express their cordial thanks to the public bodies which had done so much for the entertainment of the visitors. He would, therefore, propose—

"That the best thanks of this meeting be given to the chairman (Ed. Holden, Esq.), the directors, and the manager (Mr. Howorth) of the Victoria Baths Company for their kindness in giving a special swimming entertainment to members of the Conference. Also to the chairman (Ed. Holden, Esq.), the directors, and the manager (Mr. Nightingale) of the Glaciarium Company for granting admission to the Glaciarium and allowing members to inspect the works."

Mr. Naylor seconded the resolution, which was carried unanimously.

Mr. John Williams moved the next resolution, viz:—

"That the hearty thanks of the Conference be accorded to the President for the very able and courteous manner in which he has conducted the business of the meeting."

If he were to say what he should like, and, perhaps, ought to say in support of this resolution he should require a considerable time; but at that late hour he felt sure he should best serve the interests and consult the feelings of the meeting by not attempting to say much. He must say one thing, however, that so ably had the President conducted the business of the Conference, and so much were they indebted to him for the admirable discourse which he had delivered, that it made one tremble to think that whoever followed him must inevitably by comparison fail. For himself he should have to throw himself on the indulgence of the members, and could hardly hope in any way to emulate the admirable performance of the President.

Mr. A. H. Mason said the resolution really did not require a seconder, but simply as a matter of form he would add a word or two. They were not only indebted to Professor Attfield for the ability with which he had presided over the meetings, but, as Mr. Williams had said, for the two able addresses which he had delivered. Most of them would feel that it might have been more congenial to the tastes of Professor Attfield to deliver addresses having a more scientific aspect; but he had sacrificed his own feelings and considered only the position of the members at large in giving these two discourses on the relations of pharmacy to the State, and the relations of the State to pharmacy. When Mr. Kershaw moved a vote of thanks to Professor Attfield the other day, a hint which he took upon himself to ask the meeting to endorse was most enthusiastically received, viz., that a copy of these addresses might be distributed to every member of the House of Commons. If it were necessary that a resolution should be passed authorizing the incoming executive to undertake that work he was sure it would receive cordial approval, but that would not be necessary if the members showed their approbation in the usual way. He might state, also, that it would not be a costly proceeding, the addresses being already in type. If any of them had seen the *Times* of that day they would have noticed a very pertinent article dealing with the address in which the editor took up the position put forward by the President, namely, that pharmacists had to undergo a certain education, etc., for the benefit of the State, and that the State did not provide a *quid pro quo*. An old philosopher said there was nothing like agitation; even butter was made by agitation. The press was taking this matter up, and at the present time it would be most desirable to send a copy of this address to the members of the House of Commons. In conclusion he could only say that it was with extreme regret that he noticed Professor Attfield's name was obliterated from the list of officers handed round, but he was quite sure that although his name was not there his heart would remain with them always.

Mr. Plowman remarked that Professor Attfield still remained vice-president in virtue of having been president, and he would no doubt be present at every meeting of the committee as he had been since the founding of the Conference.

Mr. Schacht, having read an extract from the article in the *Times* referred to, said the machinery for the improved legislation required already existed in the action taken by the Council of the Pharmaceutical Society.

The resolution was then put by Mr. Williams, and carried unanimously.

The President, in response, said he thanked the members from the very bottom of his heart for the most enthusiastic way in which the resolution had been accepted. He thanked his colleagues, and the members generally, for the support they had given him, and he could not have conducted the business so successfully, as it was alleged he had, had he not had the hearty support of his colleagues on the Executive Committee. Each year there had been present gentlemen who had been former presidents, from whose example he had learnt so much, and who had kindly aided him in conducting the meetings. He must not omit to refer to the very great service rendered to him personally as President as well as to the meeting, and to every member of the Conference, by the two General Secretaries, Mr. Benger and Mr. Plowman. He also begged most heartily to thank the authors of the papers. These meetings, were after all, to aid the Conference in its objects of prosecuting researches and promoting good fellowship; the former stood first in the official pages, and he had to thank the authors of papers for coming forward, both last year and this, with such valuable communications. He was very proud to see that so many of the authors of papers had been his own old students. He must also thank all who had attended the meetings. He would not suppose that the very large meetings they had had, attended by more members than had ever attended any meetings before—according to the official record within seven of 200—had been brought about on account of his presiding; but he did know and was happy to acknowledge that many gentlemen had come kindly to support him personally. It seemed to be the desire of the meeting that some arrangements might be made by which his address, or the two addresses forming one subject, should be brought before the notice of members of Parliament, and whilst thanking the members most heartily for the great personal compliment to himself contained in the suggestion, he might say that there was no difficulty in the way of that wish being carried out. The present address was in type, and, through the kindness of the Executive Committee, he had been furnished with a few copies for distribution to the press, and he was glad to see that the distribution already had such useful results. Last year also, having the intention to complete the subject this year by delivering the second address, he took the precaution of having extra copies of the address supplied to him by the printers which could now be bound up with the present one, and circulated as desired, and he could only hope that members of Parliament might make good use of them. Mr. Plowman had drawn attention to the fact that he had been able to give his services to the Conference without one single break for twenty-one consecutive years. He was thankful to have had the health necessary to enable him to do so, for he had, of course, to give up a great part of his holiday every year to carry out this work; nevertheless, although it had been somewhat a strain upon him, it had been a work of love, a labour of pleasure, for he felt that as pharmacy had given to him his position, for he had always been proud to state that he had begun life in connection with science as a pharmaceutical apprentice, he should do from year to year all he could in support of all the objects of pharmacy, and to promote its welfare. Twenty years ago he aided in founding the Conference; that, therefore, made the twenty-first meeting. He had since aided in maintaining the Conference with the help of its numerous supporters, and now he was proud to think he had helped in conducting the last two of its meetings. Although, perhaps, his health would not enable him to be present at every annual gathering in future, they might all rest assured that he should be present whenever possible, and that from his position in London he should no doubt be able, and certainly should be anxious, to attend every one of the Executive Committee meetings. Nevertheless, as one of the elected officers, though he still had a position on the committee, he must now bid a loving farewell to the Conference and to the members, thanking them for the kindness they had shown him.

Correspondence.

Dragon's Blood.

Sir,—In the course of the discussion on our paper on "Dragon's Blood," read before the Pharmaceutical Society, Professor Bentley expressed a wish to know if we had tested for iron in the specimens of dragon's blood examined by us. In answer, we beg to state that we analysed the ash in each case and found iron always present, though not in large quantity. We omitted to give the analyses of ash, as well as many other minor details of our investigation, in order that our paper might not be of undue length.

We would also beg to direct attention to two corrections which are necessary in our paper. On page 363 of the Journal, bottom line, for $(C_{18}H_{17}O)_2Pb$ read $(C_{18}H_{17}O_4)_2Pb$, and on page 364, line 19 from top, for $C_{17}H_{19}O_5$ read $C_{17}H_{18}O_5$.

J. J. Dobbie,
G. G. Henderson.

University of Glasgow, Chemical Laboratory.

Communications, Letters, etc., have been received from Messrs. Brown, Nind, Quinlan, Newsholme, Cooper, Henry, Hick, Pharmacist, Inquirer.

"THE MONTH."

At no time of the year perhaps are there fewer flowers to be found, either in gardens or in the country, whether in the hedgerows, the waysides or the woods, than in November. It is the month of decaying leaves and damp muggy weather, when cryptogams reign supreme, when moulds and fungi perform their functions of effecting chemical changes in the vegetable kingdom, and their near relations, the schizomycetes, are equally active in carrying on pathological changes in the animal kingdom. According to the *Medical Times and Gazette* (p. 522), Dr. C. Kelly, in a succession of able reports, has gone some way towards showing that in most of the rather numerous epidemics of diphtheria which have occurred in his district (West Sussex) within the last few years, a clear connection may be traced between the disease and the moist condition of the air and soil. Certain it is that the damp weather of October and November is most favourable for the development of many of the lower algæ, the red *Protococcus* and the blackish *Oscillariæ* being noticeable everywhere on damp walls and untrodden paths and waysides. This being the case there is every reason to suppose that the decaying vegetable and animal matter of sewers and dustbins is likely to develop at this time of year micro-organisms, as low or lower in the scale of life, at a much more rapid rate than usual, and thus tend to cause the spread of infectious diseases to a greater extent than at other periods.

A Parliamentary paper issued during the last few days contains an extract from the Anglo-Brazilian *Times* which gives some interesting particulars respecting the discovery, by Dr. Freire, of a micro-organism that is alleged to be the cause of yellow fever, to which a brief reference was made last month. According to Dr. Freire the disease is due to the rapid development and multiplication of a *Cryptococcus*, always recognizable in cases of yellow fever, to which he has given the name of *C. xanthogenicus*. In support of his theory he describes the results of a number of experiments. A rabbit inoculated with a drop of blood from the body of a person who had died from yellow fever died shortly afterwards, and a drop of this rabbit's blood caused the death of a guinea pig, the symptoms and lesions being exactly like those associated with yellow fever in man. The inoculation was continued through a series of guinea pigs until the ninth in succession was reached, the disease meanwhile showing rather an increase in virulence than otherwise. The organisms, even when taken direct from a corpse, remained inert after having been heated to 280°, though some taken at the same time, but not so treated, caused death. A guinea pig enclosed in an atmosphere saturated with the organisms died with the symptoms of yellow fever in seven days, whilst another died in one day after vaccination with water that had been in contact with earth from the cemetery, in which there was an abundance of the cryptococci. Dr. Freire is hopeful as to the discovery of a means of combating the disease, and claims to have already succeeded in attenuating its virulence though the cultivation and injection of organisms antagonistic to the yellow fever microbes and by which their development is impeded.

Some further results have been obtained by Messrs. Cornil and Berlioz in their investigations upon the bacilli of jequirity (*Abrus precatorius*). (*Comptes Rendus*, xcvii., 806). It seems that these micro-organisms produce different effects according to the dose employed, the part which is inoculated and the animals upon which experiment is made. In small-sized animals absorption of a small dose through the skin causes local inflammation or gangrene and confers immunity from subsequent inoculation. In larger doses fatal disease follows. When injected into the blood-vessels of the frog an extraordinary growth of the bacilli takes place and causes a virulent malady. The blood of guinea pigs and rabbits does not form so favourable a nidus for their multiplication.

"Salicyl-resorcin-ketone" is a compound which is formed when salicylic acid and resorcin are heated together to 195-200° C., and as might be expected it shares to some extent the antiseptic and antipyretic properties of the bodies from which it is prepared. According to Herr Repond (*Zeits. d. allg. öst. Apot.-Ver.*, xxi., 502), in small quantities it is less powerful as an antiseptic than either salicylic acid or carbolic acid; its action being rather to limit the development of than to kill the septic germs. It is, however, non-poisonous, repeated doses of two grams having been taken without inconvenience; it has been found useful for surgical dressings and has been administered to the extent of three or four grams daily in typhoid fever without producing any unpleasant symptoms. Salicyl-resorcin-ketone is soluble in 1000 parts of water at 40° C., soluble with difficulty in hot water and easily soluble in glycerine and alcohol. It melts at 133°-134° C., gives when in solution a red-brown colour with perchloride of iron, smells faintly aromatic and has a not disagreeable taste. The corresponding compound with phenol, "salicyl-phenol-ketone," is still less active as an antiseptic and more insoluble, but is said to be non-poisonous even in ten gram doses.

Dr. Hassall, in a paper in the *British Medical Journal* (Nov. 3, p. 869), on "Inhalation, more particularly Antiseptic Inhalation in Diseases of the Lungs," publishes the results of his experiments, which show that there is still much room for improvement in the method of employing this form of medical treatment. The conclusion he has arrived at is that there is reason to believe that but a very small portion of the substances employed, as the sprays are at present used, really reaches the lungs themselves, or even the larynx and trachea. This applies more particularly to such substances as carbolic acid, creasote, thymol and iodine; but with respect to others possessing a high degree of volatility, and employed in considerable quantity, the temperature being maintained, he considers that vapour inhalation may be practised in some cases with benefit. It is an interesting fact to place on record that so small a proportion of the remedy used, as he states, is inhaled; but inhalation would doubtless soon go out of fashion if the small quantity of the drug inhaled did not produce the effect required, and the proportion of any remedy necessary to produce its therapeutical effects is apparently, in some cases at all events, much smaller than is generally supposed. The proportion of musk or of other perfumes that is capable of producing a painful or pleasurable effect on the nervous system is extremely minute. It may be hoped, therefore, that Dr. Hassall's further researches will give some information as to the actual therapeutical effect produced by the small quantity of the drugs he mentions as capable of being effectively inhaled by the methods at present in use.

Convallaria majalis still seems to attract a fair share of attention as a remedy for cardiac diseases. Dr. G. Herschell (*Lancet*, Oct. 27, p. 724) mentions a case in which symptoms occurred almost the direct opposite of those that might have been expected from the use of the drug. The patient, who had, however, previously been in the habit of taking digitalis, suffered after each dose of convallaria from a sense of oppression over the sternum, nausea, cold feet, vertigo, flatulence, and a feeling of utter prostration, whilst the pulse became nearly imperceptible at the wrist. The action normally produced by the drug, according to Dr. Lee, is to slacken the beating of the heart, restore its normal rhythm, augment the energy of the systole and increase the blood pressure. Dr. E. Drummond, writing from Rome, points out in the *British Medical Journal* (Nov. 17, p. 970) that the properties of the plant were known in Europe as early as the beginning of the seventeenth century. In an old Italian 'Commentary on the Materia Medica of Dioscorides,' by Dr. Pietro Andrea Matthioli (physician to the Emperor and to the Archduke Ferdinand of Austria), and published in Venice in 1621, he has found the following statement:—"The Germans use lily of the valleys to strengthen the heart, the brain and spiritual parts, and give it in palpitation, vertigo, epilepsy and apoplexy, also as a remedy for the bites and stings of poisonous animals, to quicken parturition, and for inflammations of the eyes. For this purpose they are wont to prepare the wine from the flowers at the time of the vintage, and then infuse them in old wine for forty days in the sun, and subsequently distil and redistil (but not many times) along with lavender flowers, rosemary and other aromatics. They then preserve it as one of the most precious things that are to be found among medicines, and they call it *aqua aurea*, and preserve it in vessels of gold and silver against sudden attacks. They even believe that given *in articulo mortis* it is able to prolong life for several hours. In this, however, they are not unfrequently deceived, as I have myself witnessed." Almost exactly the same description occurs in the 'Botanologia' of Johannes Franckenii, a medical writer of the first half of the sixteenth century, recently published by Dr. R. Fristedt, of Upsala, except that proportions are mentioned and that ten days instead of forty is the time given for allowing the infusion to stand before distillation. However much of the beneficial stimulant effect of the distilled water may have been due to the cinnamon, cloves, cardamoms, rosemary and lavender, it is certain that the lily of the valley must have been classed as a cardiac stimulant, from having been given with other drugs to which similar properties were attributed; a proof of this use of one of the drugs remaining to this day in the spiritus lavandulæ co. of the Pharmacopœia.

Paraldehyd, the new hypnotic, has been the subject of a large number of observations, made by Dr. Langreuter in the Dalldorf lunatic asylum (*Pharm. Cent.*, xxiv., 503). The difficult solubility of the compound and its burning taste rendered its administration difficult, and the formula adopted was:—paraldehyd, 25 grams; ol. menth. pip., gtt. 2; ol. oliv. q.s. ad 50 grams. The ordinary dose was 6 grams of paraldehyd, which produced no abnormal symptoms, with the exception of a slight irregularity of the pulse that rapidly passed away, the pulse becoming somewhat fuller. Sleep followed in from five to thirty minutes after taking the dose, and in two cases the patient sank from the seat in one minute. Quietude was found to favour the best results, sleep ensuing in 90 per cent. of the cases when the medicine was administered in the evening and in 61 per cent. when administered in the day-time. In 61 per cent. of the cases a full night's rest (seven or eight hours) was obtained, and even where sleep was not induced the medicine exercised a calming influence. Experiments were also tried with acetal, but the results were not so favourable, and its use is not recommended by Dr. Langreuter. He found it less powerful in its action than paraldehyd, an average dose from 8 to 10 grams being required, whilst the taste and smell are much more intense and the result is not so constant; nevertheless, although it may not induce sleep it exercises a calming influence on violent lunatics, which chloral hydrate does not. The corresponding doses appear to be: chloral hydrate, 2·5 grams = paraldehyd, 6 grams = acetal, 10 grams. Both paraldehyd and acetal are at present much dearer than chloral hydrate, but paraldehyd can be used where chloral hydrate is contraindicated, in cases where the heart is affected.

Toothache is treated by Dr. Kirchbauer by the internal administration hourly until relief commences to be effected of tablespoonful doses of a mixture consisting of—chloral. butyl., 5·0; glycerin., 30·0; aq. dest., 100·0; syr. cort. aur., 20·0; ol. fœniculi, gtt. 5 (*Pharm. Post.*, xvi., 537). He also uses what he calls "chloral-carbol wadding," which is prepared by steeping purified wadding in a mixture made by allowing equal parts of carbolic acid and chloral hydrate to liquefy together, and keeping the whole in a closed vessel until required for use. A small plug of the medicated wadding is placed in the aching tooth.

Dr. Delbastaille reports (*Pharm. Post*, xvi., 537) that he has treated strumous glands, sarcoma, cancer, etc., with good effect by daily injections of three minim doses of a one per cent. solution of perosmic acid. He states that the surrounding tissues are not affected by the acid. According to the *Lancet* (Nov. 24, p. 919), Professor Bilroth has used a solution of perosmic acid of the same strength as a subcutaneous injection in the treatment of neuralgia, but the dose is not stated.

The use of an ointment consisting of oil of cade, red oxide of mercury, camphor and vaseline has been recommended as a dressing for eczema. It is reported (*Pharm. Post.*, xvi., 537) that in a case where oil of cajeput was erronously dispensed for oil of cade in making this ointment it proved to be a valuable remedy in that disease.

The value of pilocarpine in the treatment of severe hiccough, to which attention was called some time ago in the *Revue Médicale Chirurgicale*, has been confirmed by the success attending its use in a very severe case which had lasted for three months and resisted all other remedies (*Brit. Med. Journ.*, Nov. 17, p. 985). Dr. Ruhdorfer administered a subcutaneous injection of the hydrochlorate of pilocarpine (of the strength of 3 centigrammes in a gram of water) and the hiccough was at once cured, as if by magic, and did not subsequently return.

A solution of chrysarobin in collodion has been recently recommended in the treatment of psoriasis by Dr. G. H. Fox, New York, and several dermatologists have confirmed his statements as to its efficacy. Dr. van Harlingen (*Bost. Med. Journ.*, Nov. 8, p. 440) says that it has one great advantage over the gelatine preparations introduced lately, in that it can be applied extemporaneously, but he has found it so much less active than chrysarobin ointment that he has not been encouraged to continue its use. He prefers to use a 10 per cent. emulsion of chrysarobin in liquor gutta-perchæ, which would be a preparation similar to that described a few weeks ago by Mr. Modlen (see before, p. 341).

Dr. F. C. Berry, of Lynton, has called attention (*Practitioner*, p. 346) to the use of marshmallow in palmar psoriasis. In one case in which Fowler's solution, chrysophanic acid, huile de cade, and other remedies had proved unsuccessful, the disease is said to have been cured in a month by the application of marsh-mallow ointment. The ointment was made by cutting the fresh leaves into small pieces, stirring them together with lard, boiling the mixture for half an hour, and then straining it.

A new therapeutical use of santonin has been recently discovered by accident. Dr. U. Anderson writes in the *Lancet* (Nov. 10, p. 845) that after treating a patient for lumbrici the patient remarked that the medicine had not merely killed the worms, but cured a gleet of long standing. Dr. Anderson recommends for the latter disease, as a dose, 5 grains of santonin rubbed down with 5 grains of sugar of milk and taken twice a day, fasting, in milk.

A case of poisoning by 4½ drachms of chloral and 3 drachms of bromide of potassium is recorded in the *Lancet*, in which the administration of strychnine (although the antidote was given probably ten hours after taking the chloral) caused the return of consciousness in three hours and ultimate recovery. The dose used is not mentioned, but probably the quantity recommended in Dr. Murrell's excellent little work, 'What to do in Cases of Poisoning,' was prescribed. The history of the recovery from so large a dose of chloral would, however, have been enhanced in value had the dose of strychnine that was found so effectual been mentioned.

Dr. Layet, Professor of the Faculty of Medicine of Bordeaux, has lately read a paper (*Lancet*, Oct. 27, p. 740) on some injurious properties of vanilla, which have hitherto not been satisfactorily explained. In storehouses where the pods are cleaned, sorted and classed according to their quality, symptoms of itching of the face and hands, together with a powerful smarting sensation, are experienced, and the skin becomes covered with a pruriginous eruption, followed by swelling and reddening, and desquamation after a few days. Dr. Layet has studied this complaint at a warehouse in Bordeaux, where on an average 25,000 to 30,000 kilogrammes of vanilla are received every year. He finds the above symptoms to be apparently produced by a small white acarus which generally occupies the end of the pod. This insect does not bury itself in the skin like the *Acarus scabiei*, but causes the irritation by mere contact, being probably aided in its irritating effects by the presence of the "givre" or acicular crystals which effloresce on the surface of the vanilla. Another affection produced by the manipulation of vanilla is characterized by a feeling of malaise with dullness, stiffness and muscular pains, which oblige the worker to give up this kind of labour. These symptoms Dr. Layet considers to be probably due to the manipulation of inferior pods of vanilla containing much oily juice enveloping the seeds in the interior of the pod.

Students of materia medica who have perused the 'Pharmacographia' will probably be familiar with the fact that there are two drugs which have been imported into this country under the name of kamala, but that one of these is more correctly known as "wars" or "wurrus," and that it differs from the true kamala in being of a dark purple colour. Hitherto its exact source was unknown, but in part iv., p. 584, of Dr. Dymock's 'Vegetable Materia Medica of Western India,' just issued, it is stated that it is the gland of the leaf of a leguminous plant, *Flemingia congesta*, common in Arabia and India. Singularly enough, it has never been collected, so far as Dr. Dymock has been able to ascertain, in India, nor does it appear to be known as an import from Arabia.

Cusparia bark has been the subject of an investigation by Messrs. Körner and Böhringer, who report (*Ann. di Chimica*, lxxvi., 193) some very interesting results. The bark was extracted with ether and the solution when treated with dilute sulphuric or oxalic acid gave a coloured crystalline precipitate of the corresponding salt of an alkaloid, which after repeated recrystallizations from hot alcohol still formed greenish-yellow crystals. The colour, however, appears to have been due to an impurity, for upon decomposing the salt the free alkaloid was obtained colourless and then formed colourless salts. This alkaloid, which the authors have named "cusparine" and represent by the formula $C_{19}H_{17}NO_3$, melts at 92° C., and when treated with potash splits up into a new alkaloid, melting at about 250° C., and a difficultly soluble substance having the characters of an aromatic acid. The sulphate, hydrochlorate and oxalate of cusparine are slightly soluble in water, the acetate and the tartrate being much more soluble. The ethereal mother-liquor was found to contain the salt of another alkaloid, which when set free and crystallized from petroleum spirit formed slender white needles, fusing at 115·5° C. This alkaloid has been named "galipeine" and is represented by the formula $C_{20}H_{21}NO_3$. The neutral sulphate of galeipeine crystallizes from water in large yellow-green prisms, containing seven molecules of water and melting at about 50°; towards 100° the salt is decomposed into the sulphate of a new alkaloid and another nitrogenous substance. The presence was also recognized of a third alkaloid, which fused at 180°; it was easily decomposable and its solution showed a blue fluorescence. Neither of these alkaloids appears to agree with that described by Messrs. Oberlin and Schlagdenhauffen (*Journ. Pharm. et Chim.*, [4], xxviii., 263) under the name of "angosturine," which melted at 85° C., and had the composition $C_{10}H_{40}NO_{14}$.

Some further light has been thrown upon the constitution of quinine by the experiments of Herr Skraup, a point of contact having apparently been established between an important product of decomposition of quinine and a synthetically prepared compound (*Monatshefte*, iv., 695). Herr Skraup has found that when quinine or quinidine is oxidized by means of chromic acid carbonic anhydride is evolved and a crystalline acid is formed which he has named "quininic acid" and represented by the formula $C_{11}H_9NO_3$, differing from that of cinchoninic acid by CH_2O. When heated with concentrated hydrochloric acid quininic acid yields methyl chloride and xanthoquinic acid ($C_{10}H_7NO_3$), and this when strongly heated is further split up and gives carbonic anhydride and a phenol-like body, which has been identified with one of the three out of four possible oxychinolines that have been prepared synthetically.

The composition of the alkaloid berberine has at different times been represented by contradictory formulæ; an attempt has therefore been made by Herr Court to clear up the confusion (*Berichte*, xvi., 2589). Numerous analyses of the free base, the hydrochlorate, nitrate and sulphate have been made, the results of which point to the formula $C_{20}H_{17}NO_4+4H_2O$. With the exception of the water of crystallization this agrees with the results of Perrin and Hlasiwetz. Upon oxidation of the alkaloid in weak alkaline solution carbonic anhydride was evolved and the principal product of the decomposition was a bibasic acid resembling in composition and melting point hemipinic acid, but whether it is identical in all its characters with hemipinic acid from narcotine has not yet been determined. Herr Bernheimer has also made the observation (*Berichte*, xvi., 2685), that when berberine is distilled with a considerable excess of potassium hydrate, besides two acids that have been described by Hlasiwetz, chinoline is formed, which has been identified by its platinum salt.

Writers in German periodicals have already pointed out the defective nature of the method prescribed by the German Pharmacopœia for testing subnitrate of bismuth for arsenic. Reichardt (*Archiv*, [3], xxi., 585) shows that the nascent hydrogen produced by the action of caustic soda on iron and zinc is incapable of reducing arsenic acid; all arsenic, therefore, present in that form in the subnitrate of bismuth escapes detection when tested by the official method. In place of the latter Reichardt recommends boiling with caustic soda (test for ammonia), filtering, acidifying with sulphuric or hydrochloric acid, adding zinc and passing the gas evolved through a concentrated strongly acid solution of nitrate of silver. Experiments made by Jassay (*Archiv*, xxi., 745), however, tend to show that the bismuth salt, when boiled with caustic soda, tenaciously retains any arsenic that may be contained in it. The subnitrate is therefore best tested for arsenic by dissolving in hydrochloric acid, diluting, adding a trace of iodine and zinc; the test tube is covered with a filter-paper moistened with a concentrated *neutral* solution of nitrate of silver, upon which a trace of arseniuretted hydrogen produces a characteristic yellow spot.

Another of the tests in the Pharmacopœa Germanica said to be misleading is that for detecting storax in balsam of Peru. Grote (*Pharm. Centralhalle*, xxiv., 179) finds that genuine specimens of balsam, when shaken with petroleum benzine, yield to that liquid substances capable of producing with nitric acid the changes supposed to indicate the presence of storax. Flückiger's test, slightly modified as follows, is preferred by the author:—1 gram of the balsam is mixed with one or two drops of spirit, and to ten drops of the mixture 0·4 gram of slaked lime is added. If the balsam is pure the mass will not harden; should that take place the sample is adulterated, probably with either storax, benzoin, colophonium, copaiba or tolu.

M. G. Bruel describes a process for the volumetric estimation of iron, based upon the intense colour given by traces of a dissolved ferric salt in the presence of salicylate of sodium, and the total decoloration which takes place upon the reduction of the ferric to a ferrous salt by means of hyposulphite of sodium (*Comptes Rend.*, xcvii., 954). The solution of hyposulphite to be used is made of the strength of 1 in 1000 and then titrated with a standard solution containing 1 milligram of iron in the state of perchloride in each cubic centimetre.

During the operation of distilling some phosphorus in a current of hydrogen and condensing the vapour in cold water, Messrs. Remsen and Keiser observed the deposition upon the surface of the water of a layer of a snow-white substance, which was at first thought to be an oxide, due to some leak in the apparatus, but eventually proved to be an unusual form of the metalloid (*Chem. News*, xlviii., 201). This "white phosphorus" is light and plastic, insoluble in water, soluble in carbon bisulphide, melts at the same temperature as ordinary phosphorus and is then transformed into ordinary phosphorus. When placed upon a piece of bibulous paper so that the water is absorbed from it, it gives off dense white fumes, melts without taking fire and is converted into ordinary phosphorus. It is also at once changed into the ordinary form when placed in warm water. The authors compare this difference in physical condition to that which exists between "flowers of sulphur" and "roll sulphur." "White phosphorus" is said to be comparatively little susceptible to the action of light. One of the conditions essential to its successful preparation appears to be the presence of ice-cold water in the receiver, in close contiguity to the mouth of the delivery tube, but the operation is one requiring great care. Other substances have been described under the name of "white phosphorus," but none of these appears to be identical with the form observed by Messrs. Remsen and Keiser.

Borneol, the camphor of *Dryobalanops Camphora*, as is known, may be prepared artifically from ordinary camphor, the two methods hitherto described being that of treatment with caustic potash, and the treatment first with soda and afterwards with carbonic acid. Messrs. Jackson and Menke now describe a third method (*Amer. Chem. Journ.*, v., 270), which they say gives a better yield. It consists in dissolving the camphor in eighteen times its weight of ordinary alcohol and then adding sodium in fragments not exceeding one gram until the additions amount to one third in excess of the quantity calculated to be required for the conversion. Some of the spirit is then distilled off and water is added, upon which the crude borneol is precipitated. This when washed to free it from sodium hydrate and recrystallized from alcohol amounts to about 94 per cent. of the theoretical yield.

According to M. Jorissen (*Bull. Acad. Roy. Belg.* [3], v., 750), if linseed meal, after being stirred with warm water, be allowed to stand for some time at a temperature of 25° C., then distilled, a distillate is obtained containing hydrocyanic acid. The acid does not exist ready-formed in the seed, but it would appear that there is present in it a compound which acts upon amygdalin similarly to emulsin. A mixture of amygdalin, linseed oil and water is said to develop a distinct odour of bitter almonds.

About two years since, M. Richet published the result of some experiments upon the relative toxic action exercised by different metals on fishes. He has now supplemented these by the results of another series of experiments as to their relative action upon bacteria (*Comptes Rend.*, xcvii., 1005), the propagating liquid used being a mixture of sea water, 900 parts, neutralized urine, 100 parts, and peptone, 1 part. The metals were used in the state of chloride. The weights of the metals, in grams per litre of liquid, which sufficed to stop putrefaction are given as follows:—Mercury (Hg″), 0·0055; zinc, 0·026; cadmium, 0·040; copper, 0·062; nickel, 0·18; iron (Fe″), 0·24; barium, 3·35; lithium, 6·9; magnesium, 7·2; manganese, 7·7; ammonium, 18·7; calcium, 30·0; sodium, 43·0; and potassium, 58·0. In comparing this list with that relating to fishes (see *Pharm. Journ.*, [3], xii., 439), it appears that the proportion of metal required to prevent the development of bacteria is always larger than that which will kill fishes, and as a rule at least twenty times as much. Another point worthy of note is the innocuousness of ammonium, lithium and potassium towards microbes, and as is known towards plant life, as compared with their toxicity towards fishes and other animals. M. Richet thinks the poisons might be ranged in two classes: (1) universal poisons, of which mercury is the most perfect type, including zinc, cadmium and copper, which are poisons of the animal and vegetable cell; and (2) poisons special to animals, such as lithium, and especially potassium and ammonium, which are nearly innocuous towards vegetable tissues.

In the *Pharmaceutische Zeitung*, Herr Mader of Culmbach, reports that a parcel of this season's *Conium* herb that he examined consisted entirely of two other common umbelliferous plants, *Anthriscus sylvestris* and *Chærophyllum temulum*, without a trace of *Conium*. His suspicion was first aroused by the hay-like, not mousy, order given off when a portion was boiled with caustic soda. The substitution is easily understood on the supposition that the herb was not collected by a druggist, but by some one not familiar with botany, for the leaves of the *Anthriscus* are very similar in appearance to those of hemlock, while the *Chærophyllum* has a spotted stem. The latter, however, is easily detected even when dried by the hairiness of the leaves, and also by the swollen joints of the stem and the cylindrical fruits, if any portion of them be present, which occur in both the plants mentioned.

A species of henbane is described in the *Journal de Pharmacie* ([5], viii., 415), under the Arabic name "El Béthina," which is believed to be the plant employed by the Touaregs to get rid of the members of the Flatters mission. This kind of henbane is met with frequently a few days' journey to the south of El Golea in the Sahara region. It grows in isolated tufts and attains a height of 50 to 60 centimetres, flowering in March and fruiting in June. The plant is used by the Sahara Arabs for criminal purposes; it is known to be poisonous to the camel and horse, but is said to be eaten with impunity by the gazelle and sheep. The natives use the herb in the form of pulp or powder, which is mixed with dates or milk. The antidote used is pepper and butter, mixed with water that has been triturated with dates. This produces profuse perspiration, and the patient recovers without having experienced hallucination. The leaves of the plant are oblong, lanceolate and slightly tomentose sinuate, but not toothed, and amplexicaul at the base. The flowers are whitish, funnel-shaped, a little longer than the calyx, which has mucronate but not reflexed teeth, and is stalked. The bract which subtends the scorpioid cyme is shortly stalked, oblong, linear and entire.

The term "cellulin" has recently been given by Pringsheim (*Journ. Roy. Micr. Soc.*, p. 676) to a modification of cellulose found in the fertilizing tubes of the *Saprolegniæ*, and forming peculiar granular bodies of concentrically stratified structure, but which differs from starch in not being coloured blue with iodine and are not soluble in ammoniacal solution of oxide of copper. This new term is so near to cellulose that care must be taken by students of botany to distinguish between them.

Another new term, "haptera," has been proposed by M. Warming to include organs which serve for attaching the parts from which they spring, such as the attachment disks of the Virginian creeper, ordinary rhizomes, the adhesive tissue of *Cuscuta*, etc.

In *Schenk's Encyklopædie der Natur Wissenschaften* W. Zopf gives an exhaustive account of the *Schizomycetes*, in which he gives as his opinion that the various forms hitherto considered distinct by Cohn and others, such as the micrococcus, bacterium, and bacillus, are genetically connected. Thus the micrococcus under certain conditions may develop into the shorter rod form or bacterium, or longer rod form or bacillus, and if these divide continually may develop into the filiform leptothrix, vibrio (curved), or spirillum or spirochæte (spirally coiled) form. Any of these forms may again produce the micrococcus, which may be regarded as the final product. The production of the zooglœa or gelatinous form depends on the accumulation of resting cells and the tendency of their walls to gelatinize.

At the last meeting of the Linnean Society of London, three new British plants were exhibited, viz., *Naias marina* and *N. aloguensis* by Mr. A. Bennett, of Croydon, and a specimen of *Chara Braunii*, by Mr. H. Groves.

SCIENCE: ITS ABUSE AND USE.*

BY JOSEPH INCE.

In this age of introductory discourses, the discovery of a new subject is as difficult as the search after truth: fully conscious of the fact, and despairing to strike out into some untried path, I have chosen rather to review the past, and to lead your thoughts into a direction which may prove of service, when you, more fortunate than myself, may be on the track of original research.

Your surroundings, and the daily course of your occupations, bring you face to face with Science, not as an ideal and abstract conception, but as a living thing, clothed with power, actual as well as intellectual; and having the promise not only of the world of high imaginings, but of that prosaic world in which we have to gain our bread. There is Science, in plainer language knowledge, one and universal: the faculty of knowing and its possession. To attain this, in greater or less degree, has been the hope of all awakened human mind from our first parents down to the latest thinker. Science, thus understood, has been the theme, the teaching and the aim of all philosophy and of every system. *Scire*, is to know; *sciens*, the man who knows. *Scientia* is not the field of observation but the state. Hence it is illimitable, for it concerns the knowledge of all created things and thoughts; it is unfathomable, for the finite cannot grasp the infinite; and the span of human life

* Introductory address delivered before the School of Pharmacy Students' Association, November 15, 1883.

leaves us not the time to master that which He who is from everlasting to everlasting has ordained.

Science thus understood was a word familiar to our forefathers:—

"Ye distant spires, ye antique towers,
That crown the watery glade,
Where grateful Science still adores
Her Henry's holy shade."

Neither when the sixth Henry reigned, nor when Gray (1742) wrote his lines on Eton College, did it bear any other signification.

But the term in modern times has got a new meaning and is used in a restrictive sense. We mean by it either the knowledge of a definite group of mental observations which we label logic, mathematics or otherwise; or still oftener, though we may be tempted to resent the charge, the study of physical facts, based upon experiment, and capable of direct application.

I have no wish to criticize a definition which certainly is current; but I would ask you to note the change, else when alluding to the larger interpretation, the more limited only may be supposed.

I have to talk about a great subject in the smallest compass of words and time.

I do not wish to linger over generalities; and as all of us here are striving to cultivate science, practical or abstract, I would try to bring out specially one truth; the assumption of science constitutes its main, though not its sole abuse; but when, and just so far as science may be the synonym for knowledge, its uses are as beneficent as they are endless.

From the charge of assumption must be excepted the old world literature and its teaching.

Greek influence, and not Roman, gave the tone of thought; and the Greek drama which was the expression of the religion of the time was filled with allusions which to us are fanciful, but which in their day were accepted as articles of faith. No wonder then that their national philosophy which had no other standard should appear imaginative. The Latin authors borrowed their inspiration, and a great deal of their literature from Greece, and were less able to shake off poetic imagery and to take Nature, not the dramatists for their guide. I do not think we should blame this period for inexactness, and say that its writers were men who saw visions, and who dreamed dreams.

Sometimes they came marvellously near the truth, and especially Lucretius, as John Eliot Howard, whom we are proud to recognize as a chemist, has described. They *had* no facts, or very few; they had not enough to form a chain of reasoning. But they assumed nothing, and were not charlatans.

When their science related to modes of thought, then they redeemed their character, and gave the key to a logic which has been adopted throughout all ages. Otherwise, their science was not the synonym for knowledge, and therefore it was not beneficial to posterity.

The most wonderful thing to recollect is that for centuries, that to which we assign the name of science was latent; and we come straight down to the sixteenth century with the alchemists to find its manifestation.

There had been long talk of the art of prolonging life, and of that of transmuting the baser metals into gold. A race of men affirmed that they had hit upon the Elixir Vitæ, the Universal Solvent, the magic stone and the secret of converting one substance into another. You know the story. You must not forget that outrageous as was the system, and bombastic as were its professors, it exercised an extraordinary influence alike over the simple and the profoundly learned. Alchemy was science falsely so called; it was an abuse, for its exponents assumed a knowledge which in their own hearts they could never have persuaded themselves that they possessed. Nevertheless, out of darkness there sprang light; and we are indebted to alchemy for a recoil against all research which is based upon credulity, vanity and assumption.

A deliverance was at hand, and it was wanted. Exactly twenty years after the grave had closed over the rant of Theophrastus, rose our famous Englishman, Lord Bacon (1561). Entering at the age of thirteen the University of Cambridge, he was not seventeen years old when he wrote against the philosophy of Aristotle. This, in his opinion, was a system of definitions and of abstract speculations, which tended only to disputes. He went to Paris where he studied men and manners from the life; and at nineteen wrote his work upon the 'State of Europe.' Returning to his native land he devoted himself to the profession of the law, and was patronized by the reigning favourite, the Earl of Essex. Society bade him welcome; the court was his natural element; and his companions were the great in intellect and station. How he rose to eminence and became Lord High Chancellor; how he conceived the loftiest purposes, and stooped to actions which left his private memory a reproach; how in himself was seen the strange union between transcendant genius and the meanest practices it concerns us not here to recapitulate. We have to do with Bacon the philosopher, and find in his imperishable writings the revelation of those principles of science which for three centuries have determined the progress of the world. He touched the springs of knowledge; and you, who this day are working by direct experiment in this laboratory, are following out the lines traced by the master of original research.

The treatise, 'De Augmentis,' or the 'Advancement of Learning,' and the 'Novum Organum,' or 'New Instrument for inquiring into Truth,' created, rather say, established a new method of investigation. Many here are familiar with these things; some may not be, and for them a sketch may be acceptable which can be amplified at leisure.

Now I wish you to observe certain facts. The ancient writers on philosophy threw their strength into style and composition; their views were embodied in an incomparable diction, and their majestic sentences showed a power and glory of expression which few have equalled, none surpassed. Plato, the Greek, and Cicero, the Roman, have left passages on record which distance modern imitation. I would have you note that this was not for embellishment, but of set purpose.

Next; that whether the discourse ran on the praise of virtue or the contempt of pain; whether it was busied in recondite speculation or the quibbles of ingenious casuistry; it was unconsciously perpetuating the original temptation that they might be "as Gods," knowing good and evil.

That humanity should come as near as might be to the standard of those superior beings who lived serene in a dimly conceived blessedness was the chief aim.

Lastly, both in the contemplation of their abstract morality and of physical phenomena, they considered any leaning to the practical as of the earth earthy, and as not consistent with the dignity of a philosopher.

As there exist in man disturbing elements which war against cold theories; as in spite of all systems his humanity remains and his material interests need some provision, the grandest intellectual aspirations must end where they begin, in words.

They can issue in no real progress; and such progress was not only not aimed at, but despised. The event proved that mankind was none the better for these exalted utterances, and we may say, not in a theological and pious sense, but in the language of criticism, the world by wisdom knew not God.

When the last ancient philosopher expired he left behind him nothing but an admired essay, and in that very day his thoughts perished.

Then rose Lord Bacon, and said—"I purpose the establishment of a philosophy of such a kind as that it shall contain nothing vain or abstract, but which shall advance the condition of human life towards the better." Again: "The end of knowledge is the well-being of the human race."

Science, one and universal, must increase our happiness and ameliorate our state. Science in its separate departments must bear fruit.

At one swoop Bacon discarded idealized astronomy and mathematics; he would have nothing to do with either except so far as to discover, and accurately to describe, the laws on which they were based. There were to be no more Gods and Goddesses in the clouds. The sun ceased to be Phœbus Apollo, but was the great storehouse of heat and light. The moon had to be investigated as to her nature, motions and influence; for his lordship believed less in Diana than we do in the Man who, once on a Sabbath day, gathered sticks and became an habitual lunatic.

In short, astronomy was to be separated no longer from Natural Philosophy; and the science of the stars was to be treated in the same spirit of rational inquiry as the science of terrestrial objects.

So throughout the whole circle of knowledge: mathematics, legislation, medicine. All were to be examined upon direct evidence; and from one and all an answer was exacted to the question, How do these studies promote the well-being of mankind?

Such being the plan you will anticipate what follows. How could the designs be carried out by any other means than by observation, long and repeated; by study, actual and minute; and by experiment, persistent, consecutive and direct? How can we learn the use of anything without a knowledge of its real properties and consequent applications? This is what Lord Bacon did, and I want you, who are the heirs of his philosophy, to know why he is called the Father of Original Research.

The system which has guided all modern discovery has received the name of inductive philosophy: reasoning drawn from things repeatedly observed; by inference recognized as facts, and used systematically for the discovery of new truth. That is of truth new to us, for truth is immortal and not the creation of our researches. The skilled and the ignorant alike regulate their ideas and conduct by induction—so the burnt child dreads the fire—what has caused pain may do so again.

But while thousands trust to the light of nature, Bacon made his observations in an orderly and sequential manner: reduced them into system so as to establish laws by which other phenomena could be interpreted. He was not content that nature should casually reveal her secrets, but he sought them out, and that by the one method of experiment.

Working from the known to the unknown, he went on step by step, and learnt both by a process of separation and by direct questioning what substances were not, as well as their essential properties.

Induction in itself was no new thing—its intelligent use raised it into science.

Once say that the outward senses shall not be the sole guide; that neither mystical analogies nor poetic fancies shall be accepted in the place of facts; that these facts shall be ascertained by positive experiment in first and final proof that they are facts, and you have expressed what is meant by the inductive philosophy of Lord Bacon.

The world was ripe for the system: the hour and the man met, and how shall I sum up results? Why the complete editions of the book you read; the pursuits in which you are engaged; the daily work you do; the laboratory in which you study; the apparatus and appliances which it contains; every paper you may write; every research you make, and every success you gain; in short, your entire life and progress are the fruit of the golden seed sown three centuries ago.

I am uncomfortable when I think that my title includes the use of science, and yet I would fain have introduced a touch of the popular element into this discourse.

I take up the first good book of reference that comes to hand (their name is legion), and when I read of steam, iron and the railway; of light, heat and electricity; of the rise of all the grand commercial industries; of the splendid cultivation of the arts, and of all the beneficent adaptations which minister to the wants of man, and promote his material comfort; of medicine rescued from the hands of the pretender and marching on its double path of charity and skill; of that true chemistry (the adjective is Bacon's) which intermeddles with universal nature, and forces the barren abstract into innumerable channels of advantage; when I frequent places where wise men most do congregate and hear each man on his own special theme, speak simply, modestly, but with irresistible conviction, of things which may be the starting point of fresh discovery, or are their completion; when I reflect that there is not a single link in the chain of evidence over which its discoverer does not rejoice as part of the chain which binds us more firmly to human progress and to human happiness; I feel that I must retreat from before a subject with which I cannot cope; and I would pray you in the words of Shakespeare—

> "Still be kind,
> And eke out our performance with your mind."

Let us re-enter for a moment on the broad subject. As there is no error which has not crept into the church from a misconception of a truth; and no superstition which is not the corruption of a faith, so science itself has been liable to abuse.

I had proposed to omit altogether that palpable sort which springs from a malignant and nefarious spirit; but I must give a passing mention, lest I should be charged with excluding Hamlet from the play.

The murderer, vile and clumsy, and ignorant as he is both, selects some poisonous drug with which to destroy life. It is scarcely science which is concerned, certainly not his own, for he has but a rude knowledge that there are substances which kill; how, and why, he neither knows nor cares. This is the explanation of the vulgar choice of poisons which having marked and protracted symptoms, better skill would prudently avoid. But beyond doubt the last resources of a perverted science have been utilized when hate or lust has thirsted for revenge.

There stands Medea the classic type of villanous ingenuity; and there, Madame la Marquise de Brinvilliers, her antitype in infamy. Sensational novelists have worked up the history of this latter, but the bare facts are far more striking.

Enamoured of a handsome inmate of the household, Gaudin de Sainte-Croix, whom her own husband had introduced, a disastrous intimacy caused the lover to be hurried to the Bastille. It so chanced (I condense from an old French record) that he was confined in the same room as a Florentine called Exili, who had made himself notorious at Rome by more than one hundred and fifty poisonings. The Italian taught his willing pupil the whole art and mystery of the science; and when the chevalier got free, in turn he gave a course of instruction to his mistress. She proved a terribly apt scholar, and death (says the narrator) seemed to hover round her. All who approached her were as an untimely harvest. With gracious manner, and with a semblance of sweet piety, she carried poisoned biscuits to the hospital, and received blessings from the patients whom she was about to slay. In less than four years, from 1666 to 1670, her father, two brothers, and a sister, fell. The Marquis alone escaped; for the fear of being united to the fair fiend prompted her paramour to administer effectual antidotes as occasion needed.

Poisons became this woman's life: her element. A novice forced to take the veil at the bidding of her parents (in order to secure a fortune to the brother), told her sorrows to the Marchioness. She was compassionate, and at the end of one month, father, mother and brother were no more. The novice was free to re-enter society and the world.

Swift punishment befell the chevalier. He was distilling an active poison when the glass mask used for protection from the fumes, broke in pieces, and the poisonous exhalations did their work. He fell down dead. His papers and effects were seized, together with his receipts, and letters from the Marchioness, which she had the audacity to claim. Justice pursued her, for she was compromised beyond redemption, She fled, but by a stratagem was brought back to Paris, where not even the tortures inflicted on her, which have become historic, could wring out one syllable of confession. When all hope of pardon vanished, she wrote a full avowal of her crimes with such horrible detail that historians have refused to lend credence to its veracity. Mounting the scaffold with a firm step, she saw a crowd of the court beauties who had come to enjoy the spectacle. "Is it not a fine sight, my ladies?" said the Marchioness—and then she was guillotined and burnt.

That will do for the criminal abuse of science, and we may pass by Madame Lafarge who brought arsenic into fashion; made Orfila's reputation without saving that of Raspail; or Palmer, who rendered the word strychnine odious to his judge.

Is it not an inspiring thought, and one specially grateful to ourselves, that pharmacy, whose very name means poison, should be the grand science of detection and protection?

Let no pharmacist think lightly of his vocation. It is his to keep watch and ward whilst evil knowledge plots; his also, spoiling the spoiler, to convert the deadliest agents into healing remedies.

But lest I should too far trespass on your patience, these remarks must draw to a conclusion.

When Lavoisier was about to perish on the scaffold, he asked for a few days' time that he might complete his work in hand.

He was answered—"The Republic needs no *savants* and no chemists." Fortunately one of his earliest discoveries was that the presence or absence of an invisible body altered the physical condition of a visible solid: then this invisible gas was known as oxygen, and its nature and properties were ascertained. John Dalton, with his supreme common sense, found that each elementary body had a given weight, and that these bodies united with each other in fixed and definite proportions. From that day to this the science of chemistry has advanced, and surely I shall not be asked to sketch either its developments or its uses. With the former, even the industrious Mr. Watts with all his supplements cannot keep pace; and with the latter, you and the general public are familiar.

With what disastrous cunning chemistry has been abused, and how the secrets of the laboratory have been and are explored in order to scatter broadcast death and terror may best be learnt, unfortunately, in the columns of the daily papers.

Yet even "true" chemistry has its limits, and whenever by physical means it attempts to unravel things spiritual, the science of chemistry is abused. When a learned pundit in ponderous phrases and polysyllabic words defines life as due to the presence of aldehyd groups which are characterized by intensely active atomic movement; and death, as co-eval with and caused by, a transformation of these aldehyd groups into amyl groups, with diminished molecular motion, thus leading to cessation of action; he primarily talks nonsense; and secondly abuses science by assuming a knowledge which he does not possess.*

When a sham medical buys a bogus title, and under cover of its *prestige* tampers with the health of the community who are utterly unable to protect themselves, he but by half brings a slur upon the profession; he abuses science because he assumes a knowledge which he does not possess.

When the sham druggist opens a sham pharmacy and puts his lying bottles in the window, by which act he deceives a public incapable of discerning between the true and false; he not only degrades the calling, but he abuses science, because he assumes a knowledge which he does not possess.

When a half-educated pharmacist scrapes through an examination and is therewith content, he runs dangerously near the same indictment. Enough of shadows; let us walk in light.

The members of this Association are, of all men, least likely to be hurt by indulging now and then in speculations like the foregoing.

I have long thought that in Great Britain we keep the happy mean between abstract philosophy and the practical. Judging from the literature of the day I think we acknowledge both.

I wish from my heart that the two sides in pharmacy would make larger allowance for each other; that the quick energetic man of business would not look down on intellectual culture as so much stuff, good for the marines, and people who have time to waste; that the man trained within these walls, and successful in all his studies, would not despise the sound common sense and long experience of his less educated elder. There are two schools of education: experience in affairs and scholarship. Unite them and you have the science of trade. England is witness, by the rise of her great towns which I dare not specify lest I should offend by unintentional omission; by the lives of her great men of business; by the splendid progress of the industrial arts; that whenever abstract knowledge is made the motive power of commerce, a new and potential science is created.

Listen to Professor Huxley at the Salters' Company on Tuesday, November 13, 1883:—"The future of this country, its commercial predominance, its power of commanding the markets of the world, depends exactly upon whether its merchants or its manufacturers have or have not the wisdom to appreciate the gifts which science offers them. If they have that wisdom the command of the future is before them. If they have not, London will perish as certainly as Carthage."

Listen to Sir Joseph Hooker:—"Science is knowledge organized, and regarded in that light, nothing will be found in it conflicting with the interests of trade and social progress. Science, art and trade must walk hand in hand; if they do not, one and all must come to grief."

And shall Pharmacy, which sorely needs assistance, be kept an outcast at the gates? Shall one who makes vinegar, and another who manufactures cards tell you of the use of science? And do you mean in the nineteenth century, with all history behind you, to say, my trade is the solitary exception to the rule, and to the known law of progress?

In the name of this Association I boldly answer—No.

Yet one thought remains, the use of science to yourselves. Oh! the dreariness and the weariness of leading an objectless life; to have the wish, but not the will to work. What happier lot can be desired than having passed the rudiments of knowledge, to go on in the path of fresh discovery? That is your business here.

And if by study and by experiment you may be led from the known to the unknown into the knowledge of some hitherto concealed truth, which may advance science and be useful to mankind; not the applause of others, or some outward honour will be your first great reward; but the glow of satisfaction you will feel when your heart tells you, "I have not lived in vain."

* *Medical Press and Circular*, August 16, 1882, p. 142.

THE GELATIN BANDAGE.*

In the treatment of certain skin diseases (such as eczema, psoriasis, etc.), it has been customary to apply remedies which so obscure and cover up the affected parts that no opportunity is afforded to observe the condition of the skin after an interval of time. It is quite well known that the most commonly adopted treatment of the above class of skin diseases is that recommended by Hebra, namely, by means of tar. And there can be no doubt that the antiparasitic and antiseptic properties of tar are highly beneficial in such cases. Still, when a large portion of the skin of the body is involved, the tar treatment becomes very disagreeable and repulsive. "As one passes through the wards in Vienna (writes Dr. Rob. B. Morison, of Baltimore, in the *Medical Record*, July 28, 1883, from which we have compiled this abstract), the patients are seen lying upon beds between two blankets which, from the constant use of tar, have become so impregnated with it that the picture is anything but an agreeable one. Add to this the patient himself, covered often with a thin layer of this dirty-looking mass from head to foot, and one realizes that such treatment can only be used as a *dernier ressort*."

Recognizing these drawbacks, Dr. Pick, of Prague, has looked about for a substitute for tar, and has finally devised a treatment which, for simplicity, cleanliness, and beneficial effects, leaves nothing to be desired. [While our main object here is to describe the so-called *gelatin bandage*, the use of which will suggest itself in many cases besides the skin diseases mentioned above, we will briefly outline the other steps of treatment adopted by Professor Pick, and described by Dr. Morison.] "Instead of the troublesome use of powders and salves which in Vienna must be applied at least twice a day, the patient in Prague has immediately wrapped over his diseased parts linen bandages smeared with unguentum saponis, containing 5 to 10 per cent. of salicylic acid. This is applied in any stage of the disease, and left *in situ* for a week.

"The salicylic acid must be thoroughly well mixed with the soap ointment, whilst warm, and this must be spread, when at about the consistence of butter, evenly upon short linen bandages, which should not be more than 1½ inch in width, and even much narrower, when applied to fingers and toes. The ointment should not be in a thicker layer than the back of an ordinary table knife, and should be spread fresh every time it is used. It is not well to mix too large a quantity of the ointment, as upon standing it hardens and is more difficult of application.

"After the bandages are applied, they are covered with tricot, which is manufactured, in various sizes and at small expense, specially for Professor Pick, in England. A patient thus dressed *is able to go about his work* with no inconvenience to himself, and no injury to his clothes. After a week's time, he appears at the hospital, the bandage is removed, and the disease examined. If it is found necessary, from the still remaining inflammation and induration, a fresh bandage is applied and left on for another week. Then the gelatin is applied in the following manner:—

"*Gelatin Bandage.*

"A portion of a mass made by dissolving 50 grams of the purest gelatin in 100 grams of distilled water, and which has been allowed to cool previously, is melted by putting it in a cup, and placing the cup in hot water. To this is added the required strength of salicylic acid, usually 5 per cent. When sufficiently cool, this mixture is painted upon the diseased parts with a painter's brush made of bristles, such as is used in applying tar. The layer of gelatin is made about as thick as a sheet of writing-paper, and, after it has dried, is gently covered with a minimum quantity of glycerin spread on with the hand.

"The use of glycerin is found to be necessary to render the gelatin layer pliable, and to prevent its contracting, which it otherwise would do with considerable force; sufficient to irritate the skin. It is also worthy of note that it *is not practicable* to mix the glycerin with the gelatin before it is applied, as it prevents its hardening sufficiently, and renders it sticky. It takes a very small quantity of glycerin only, after the gelatin has dried upon the skin, to render it soft and pliable. A few trials teach the nurse the amount required. This use of glycerin obviates the only bad effect which the gelatin can possibly have. With such a gelatin bandage, a patient seldom feels the slightest itching, the diseased parts are seen through the transparent layer, thus rendering the progress of the disease visible without the removal of the application, and, what is much more agreeable to the patient, an ordinary bath removes all traces of it. So easy is this method of treatment that the patient can make his own applications in most cases.

"In making the gelatin mixture, the gelatin should be dissolved in distilled water and heated in a porcelain capsule. After stirring thoroughly, it is allowed to cool, and forms a cake which takes the form of the capsule. This cake can be kept for any length of time in paper, and the necessary quantity broken off every time it is to be used. The salicylic acid must *be kept separate* from it, and only added to the glycerin when it is melted. The mixture should not be painted upon the skin unevenly or in a thick layer. When properly applied, it can be torn from the skin in quite large pieces, and it comes off without pain to the patient or irritation to the disease. It sounds like the tearing of tissue-paper, and when thus torn off, looks as if the patient was having his epidermis removed by force.

"Any holes or rents in the gelatin covering may be repaired from time to time by a fresh application. The indications for the renewal of the whole covering are when it has worn off, or after a bath."

NOTE OF ED. N. R.—At various times, during the past eleven years, there has been a method for treating *burns* in use in the public hospitals of the city of New York which was originally devised by one of us, and which closely resembles the above-described glycerin bandage. It is known as—

"*Glue Burn Mixture.*"

White glue	troy oz. 7½.
Water	fl. oz. 16.
Glycerin	fl. oz. 1.
Carbolic acid	fl. dr. 2.

Soak the glue in the water until it is soft; then heat on a water-bath until melted; add the glycerin and carbolic acid, and continue heating until, in the intervals of stirring, a glossy, strong skin begins to form over the surface. When wanted for use, heat on a water-bath, and apply with a flat brush over the burned part.

We have been in the habit of pouring the melted mass into small delf extract jars, which were covered with paraffin-paper and tin-foil before the lid was put on, and afterwards protected by paper pasted around the edge of the lid. In this manner, the mass may be preserved indefinitely.

The materials for making the gelatin bandage may be kept on hand in the same manner. Each pot may contain a certain-weighed quantity of the mass which is stated upon a label to be attached to the pot, and which also specifies the amount of salicylic acid to be weighed out and to be mixed with the mass.

It seems to us that this glycerin bandage will form an admirable application to burns and scalds, particularly in hospitals where the mixture may be conveniently kept on hand. Its advantages over the uncleanly treatment with carron-oil and other similar applications are such that those who have tried it will always prefer to have

* From *New Remedies*, September, 1883.

recourse to it. In private practice, indeed, it is not often convenient to wait until the mixture can be procured or prepared, and for this reason it has not been much adopted outside of hospitals. But, if the gelatin bandage, as proposed by Professor Pick, should become—as it deserves to be—a regular article of commercial supply, there will be no difficulty hereafter in obtaining it at a moment's notice.

In addition to the salicylated gelatin bandage there mentioned, we may add that Professor Pick also uses a *carbolated bandage* containing up to 10 per cent. of carbolic acid. In some forms of skin disease, he employs a mixture containing either pyrogallol (pyrogallic acid), from 10 to 20 per cent., or chrysarobin. The former is transparent, and permits the examination of the skin; the latter is yellow and opaque.

Drs. Unna and Beiersdorff have lately experimented on the applicability of this method to other remedies, and have found that the proportion of gelatin, water and active ingredient must be changed according to the nature of the latter. They have established three series of masses, containing respectively, 5, 10 and 20 per cent. of gelatin, which they have classified in tables, in each of which the respective remedies are enumerated (see *Monatsh. f. prakt. Dermat.*, 1883, No. 2). Table *A* contains jellies with 5 per cent. of gelatin, of a consistence of a gelatin-bougie; they are easily melted by being immersed in hot water, and after being applied to the skin, rapidly solidify. They are called *Gelatinæ glycerinatæ molles.* Table *B* contains the *Gelatinæ glycerinatæ duræ*, with 10 per cent. of gelatin. In the case of these, it suffices to pour a few drops of hot water upon the surface, and to rapidly apply the solution thus produced, which sets quickly. Table *C* enumerates the jellies with 20 per cent. of gelatin; these are made without water. Among these are the jellies of pyrogallic acid and tannin, because any addition of water in these cases would cause chemical changes. The authors also found that fatty substances, up to 30 per cent., even with addition of water, can be incorporated in the mass, provided it consists only of gelatin and glycerin. In the case of chrysarobin, the authors likewise recommend the omission of water, and to make it so as to contain 5 per cent. of gelatin, 5 or 10 per cent. of chrysarobin, and 90 or 85 per cent. of glycerin.

NAPHTHOL: ITS MEDICINAL USES AND VALUE.*

In a paper under this title, read before the Philadelphia County Medical Society on the 17th ult., by Dr. John V. Shoemaker, Physician to the Philadelphia Hospital for Skin Diseases, that distinguished dermatologist calls attention to naphthol in a manner calculated to ensure for that drug a more extensive trial by the profession of the United States, than has yet been accorded it.†

Naphthol is a derivation of naphthalene, a hydrocarbon found in large quantities in coal tar, belonging to the so-called aromatic group. It bears the same relation to naphthaline that phenol does to benzol, and cresol to toluol. It was first employed by Professor Kaposi as a substitute for tar in skin diseases, being considered by him as the essential curative ingredient of that substance, while being free from its objectionable features. The preparation employed in the cases which form the basis of Dr. Shoemaker's report was that made after the method of Dr. Justus Wolf, being free from odour and coming in beautiful crystalline scales. This preparation decomposes under the influence of heat when it again becomes odorous and pungent. The commercial naphthol contains impurities which unfit it for use in medicine. Naphthol thus properly purified is an extremely powerful antiseptic and disinfectant. One part added to 480 of urine kept the latter from decomposing for six months, while another sample of the same urine to which naphthol was not added had a strong putrid odour at the end of eight days. The addition of the naphthol to this putrid sample divested it of all odour within twenty-eight hours.

Dr. Shoemaker's therapeutic experiments extended through some nine months and sufficed to convince him of the great value of naphthol in medicine.

He found it to fully sustain the claim that Kaposi had made for it in scabies, psoriasis and chromophytosis, as well as in some of the chronic forms of eczema, in which it not only allayed the itching attendant thereon, but lessened the infiltration as well. In wounds and indolent ulcers it is a most useful detergent and deodorant, removing the fetor and establishing healthy action of the parts. Aqueous solutions, containing half grain to the ounce, were used to great advantage as vaginal injections, especically in leucorrhœa and uterine carcinoma, as well as in gonorrhœal affections, both in male and female. In diphtheritic throat affections it made a most useful gargle, as well as to remove the fetor of catarrhal and other affections of the buccal cavity. Its greatest value, however, arose from its disinfectant action on the evacuations of fever patients and in rooms containing them, while by its absence of odour it did not tend to produce inconvenience either to patient or attendants. Combined with powdered talcum or starch, or both, and dusted into the shoes or stockings of those affected with fetid exhalations of the feet it acts most satisfactorily, and its effects are equally as good in the same affection involving the hands, axillary and inguinal regions. Combined with other ointments in the proportion of from one to ten grains to the ounce, it not alone preserves the unguent from decomposition, but exercises also an antiseptic action on the parts and the exudation therefrom. A slight admixture to an experimental sample of lard preserved the same in excellent condition throughout the hot summer months. In chronic psoriasis, particularly when there is great infiltration, a five to fifteen per cent. ointment was frequently attended with good results. It also proved very effective in squamous and fissured eczema, used in combination with lard or gelatine.

After his long and successful employment of naphthol Dr. Shoemaker was surprised to find that serious untoward effects had been reported from its use by foreign authors. With a view to further testing its toxic properties he first administered to a rabbit internally in a saturated solution. But on discovering no injurious effect he selected another rabbit which he determined to poison with a view to observing the *post-mortem* appearances. He accordingly gave it at first one-grain pills of naphthol every three hours, and subsequently increased the amount to two grains and again to four grains at the same intervals. But beyond increasing the animal's appetite no effects were apparent. Following these experiments two of his assistants took numerous and large doses (reaching as high as five grains twice a day) without other effect than a sensation of temporary warmth in the epigastric region after each dose and subsequent slight vertigo and buzzing of the ears, with other evidences of hyperæmia. The alvine evacuations were softened to a mushy consistence and changed to a clay colour; in one instance diarrhœa occurred. The deduction from these experiments clearly is that in the case of the ill effects reported an impure preparation had been employed.

Dr. Shoemaker pronounces purified naphthol to be far superior to carbolic acid and the other antiseptics which have been in vogue, while it is almost absolutely odourless. It has the advantage also of being cheaper than carbolic acid, when the amount required to produce its effect is considered.

* From *The Therapeutic Gazette*, November, 1883.

† [The copy of this valuable paper, with which we have been favoured in advance of its publication elsewhere, was received too late for its reproduction in full in this issue of the *Therapeutic Gazette.* We are thus obliged to confine ourselves to a synopsis of it. Readers desiring to peruse it in full may address Dr. Shoemaker for a copy, which he will furnish.—*Ed Ther. Gaz.*]

The Pharmaceutical Journal.

SATURDAY, DECEMBER 1, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

JOHN ELIOT HOWARD, F.R.S.

OUR obituary column this week contains an announcement that will be read with regret in every quarter of the globe: JOHN ELIOT HOWARD, the eminent quinologist, has suddenly and unexpectedly passed away. In every land where the acclimatization of cinchona plants has been attempted and in every community interested in securing a constant supply at a moderate price of the valuable alkaloids derived from them—and what community is not?—it will be felt that the world has lost one of the men who have laboured most arduously and successfully towards the attainment of these ends. The subject of the cinchonas, with which Mr. HOWARD's name will no doubt be long and honourably associated, was taken up by him at a time when, although attention had been called to the increasingly rapid extirpation of the plants in the districts from which bark was then obtained, nothing had yet been done to avoid the extinction of the genus in its native habitat or to transport it to a new home. His first paper was published in 1852, and was very characteristic of much of the work done by him; it consisted of a lengthy report on the results of a laborious and painstaking examination of a series of Peruvian barks in the British Museum, which had been collected by the Spanish botanist PAVON. Whilst engaged in this investigation, in which he had the counsel and assistance of Dr. PEREIRA, Mr. HOWARD was led to suspect the existence of other results of the labours of Spanish botanists who had studied this subject, and as a result of inquiries made in Madrid he succeeded in obtaining more specimens of barks, and, what was of still greater value, the manuscript of an unpublished treatise by PAVON. This manuscript was carefully edited by Mr. HOWARD; Mr. FITCH was dispatched to Madrid to make drawings of the specimens in the national herbarium; and after a lavish expenditure of time, care and money the outcome was the appearance of the magnificent volume know as the 'Illustrations of the Nueva Quinologia of PAVON.'

But before the publication of this fine work, Mr. CLEMENTS MARKHAM had succeeded in introducing live cinchona plants into India, and a new field was thus opened up into which Mr. HOWARD went to work *con amore.* Unceasingly he corresponded with collectors and cultivators; hundreds of specimens of bark from the Madras and Bengal plantations were analysed; plants were reared in his own greenhouses to assist in clearing up doubtful points as to doubtful origin: and the results of all these labours were at once and freely placed at the disposal of the public. The Indian Government, recognizing the value of his unique experience, consulted him on numerous occasions, and profited by a series of admirable reports from his pen. The services thus rendered to the State by Mr. HOWARD in connection with this subject have always been warmly acknowledged, and on one occasion the special thanks of the Government were conveyed to him by the Secretary of State; but we are inclined to think that they might have been more suitably rewarded by a more evident mark of honour. Mr. HOWARD'S counsels with respect to the species of cinchona that should be cultivated were consistent and farsighted, though not always palatable. During the infancy of the acclimatization experiment fresh and extensive sources of bark had been opened up in South America, and Mr. HOWARD recognized and urged that the only prospect of a commercially profitable investment of capital in cinchona planting would be associated with the raising of plants yielding bark rich in quinine rather than others that might be of more robust growth but yielding barks in which the inferior alkaloids preponderated. With a view of rendering the fruits of his experience as widely available as possible Mr. HOWARD issued in 1869 and 1876 the three parts of his 'Quinology of the East Indian Plantations,' which has its only rival in the author's previous work.

The labours of JOHN ELIOT HOWARD are over, but the harvest is far from being yet reaped. Many a poor sufferer who never heard his name will profit unconsciously from the work of his life, and the wreath of cinchona leaves laid on his coffin was a fitting emblem of the service he has rendered to humanity. Only a few weeks before his death he received in the Hanbury Medal a testimony from those best qualified to judge his work as to his "high excellence in the prosecution or promotion of original research in the natural history and chemisty of drugs," and the honour will seldom be awarded to one more worthy to receive it..

BOTANICAL NOMENCLATURE.

ALTHOUGH, under the influence of the new school of physiologists, botany is rapidly losing its reproach of being a mere science of classification, its system of nomenclature is perhaps the most perfect of any of the natural sciences. This is mainly due to the fact that several of the most illustrious botanists of recent times,—among whom must especially be mentioned two still living, ALPH. DE CANDOLLE, of Geneva, and our own veteran, Mr. BENTHAM,—have applied their great powers especially to the perfecting of the laws of nomenclature. The system now all but universally adopted was formulated in a canon of sixty-eight articles laid down by a Congress held for the purpose at Geneva in 1867, which originated mainly with M. De Candolle. The experience of the sixteen years which have elapsed since then has suggested some slight modifications or extensions of these articles, which are published in a *brochure* by the same authority, entitled 'Nouvelles Remarques sur la Nomenclature Botanique' (Genève, 1883). An additional article extends the laws of nomenclature contained in the remaining articles to all classes of the vegetable kingdom, and to fossil as well as to living plants; and in another the term "*mutation*" is applied to a form occurring in a later geological period, but which is still regarded as belonging to the same species as one previously described. Another new article lays down more emphatically than before the principle that a generic name once given must not be altered in order to make it more correct from a linguistic, euphonic, or even from a descriptive point of view. It is obvious that, if it is once admitted that a name once given may be changed in accordance with the caprice, or even with the superior learning, of a subsequent writer, the uncertainty and confusion introduced into nomenclature would be endless. Another new article insists that "the designation of "a group has not for its object the enumeration of the "characters or the history of the group, but simply "the supplying a means of recognizing it when spoken "of." There can be no doubt about the soundness of this view, and it may well be applied to specific names, as well as to those of larger groups. To attempt to describe a new species in its name is usually a mistake; a larger acquaintance with the species and with its allies frequently making such a designation to a certain extent a misnomer. Thus, among familiar English plants, *Epilobium montanum* is our commonest lowland willow-herb, "ascending," according to Hooker, only "to 1700 feet;" and *Bromus maximus* is, by the same authority, in all respects a smaller plant than *B. sterilis*. Still, to alter these names, when once given, would be opposed to all sound rules of nomenclature. Indeed, as a general rule, the more arbitrary the name given to a new plant the better. M. De Candolle draws an interesting comparison in this respect between the gradual change in the style of nomenclature of men and of plants. Nations in a rudimentary state of civilization give names which describe some personal peculiarity or habit of the person named. In a more advanced state of civilization a name is merely a ticket by which a man or woman is known, and something also of his descent is indicated. Before the time of Linnæus the name of a species was at the same time an enumeration of its characters. The objectionable features of descriptive names are more clearly seen when they are translated into English. Nothing can be more absurd than the practice of some botanical writers, of translating the Latin name of every plant, and calling this the English name of the plant. In one small point the current style of nomenclature of plants and of animals differs. In botany the accepted rule is to write all specific names with a small initial letter, except when they are derived from the name of a person; thus:—*Hieracium Lawsoni*, but *Hieracium anglicum*. In zoology the specific name is written with a small initial letter, even when it is the genitive case of a person's name, as *Phasianus reevesi*. In this respect we cannot but think the rule adopted by botanists is the preferable one.

On Wednesday next, December 5th, the usual Evening Meeting of the Pharmaceutical Society will be held. Messrs. Dunstan and Short will present a continuation of their "Report on the Pharmaceutical Preparations of Nux Vomica," dealing on this occasion with the Tincture and the Extract. There will also be a paper on "Tincture of Cinchona," by Mr. E. G. Hogg, and two communications upon the Purgative Principle and the Vesicating Principle of Croton Oil, from Mr. Harold Senier. The chair will be taken at 8.30, but the Theatre will be open an hour previously, to afford facilities for the inspection of recent donations to the Museum and other articles that may be shown.

*   *   *

We regret to have to report that information has been received of the death, on Sunday last, of another of the "approved candidates" for annuities from the Benevolent Fund, Mr. Hugh Talbot, whose name was sixth on the list published last week. This name also will therefore be obliterated from the voting paper, in order to prevent votes being wasted.

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Considerable confusion appears to exist in the published communications upon the subject of "kairin," as to the exact application of that name. In some papers having the appearance of being authoritative,—as for instance one by Professor Filehne (before, p. 383),—that substance has been described as oxychinolinmethyl-hydride, and the "hydrochlorate of kairin" has been spoken of as a distinct compound. In the paper, however, in which Dr. O. Fischer described the preparation of this and other allied compounds to the Berlin Chemical Society (*Berichte*, xvi., 712), he uses the term "kairin" as a synonym of "oxyhydromethylchinolin hydrochlorate." But by the courtesy of a correspondent we have had an opportunity of reading a letter in which it is stated, on the authority of the manufacturers, that the substance at present supplied by them under the name of "kairin" is the "hydrochlorate of oxychinolin ethyl." Possibly this compound is identical with the "α-æthoxychinolin hydrochlorate," which Dr. Fischer distinguishes as "kairin A." In view of this confusion we purpose publishing an abstract of Dr. Fischer's paper on an early opportunity.

*   *   *

Notwithstanding the disadvantages under which sulphate of cinchonidine was placed for a time in the United States, as compared with sulphate of quinine, through the ambiguity in the Tariff Act, to which we recently referred, it appears to be coming largely into use in that country. According to Messrs. Gehe all that can be obtained in the German market is bought up and sent across the Atlantic.

* * *

According to a Parliamentary return issued during the present week, the gross amount of revenue received during the year ending March 31, 1883, on account of patent medicines was £157,773 17*s.* 1½*d.*, which represented the duty paid on 18,457,990 packets.

* * *

In a recent consular report it is stated by Mr. Consul Wrench that the grower of opium in Turkey does not cover his expenses when the price of the drug in Constantinople falls below twelve shillings per pound; but that unless prices fall to and remain permanently at this low figure there is a probability that opium cultivation will increase in that country. The produce for the year 1882 was small, about 4500 chests, but the prospects for the present year were considered to be very good, and have already affected the price.

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The President of the Pharmaceutical Society (M. Carteighe, Esq.) and Dr. B. H. Paul have been elected Honorary Members of the Danish Pharmaceutical Society.

* * *

Mr. Joseph Rees, Chemist and Druggist, has been elected Mayor of the town and borough of Cardigan, and Mr. Daniel Woolley, Pharmaceutical Chemist and Vice-President of the Stockport Chemists' Association, has been elected an Alderman of the borough of Stockport.

* * *

The next meeting of the Chemical Society will be held on Thursday, December 6, when there will be a ballot for the election of Fellows, and the following papers will be read:—"On the Constitution of the Fulminates, and on Liebig's Production of Fulminating Silver without the use of Nitric Acid," by Messrs. Divers and Kawakite; "Note on the Constitution of the Fulminates," by Dr. H. E. Armstrong, and "Experimental Investigations on the Value of Iron Sulphate as a Manure for Certain Crops," by Mr. A. B. Griffiths.

* * *

A meeting of the London Section of the Society of Chemical Industry will be held at Burlington House on Monday evening next, when papers will be read entitled "A New Residual Product from Coal Gas," by Mr. H. L. Greville, and "Further Notes on the Stassfurt Industry," by Mr. C. N. Hake; and Mr. A. Zimmerman will exhibit Rayat and Kunheim's Liquid Carbonic Acid Apparatus.

* * *

A special general meeting of the School of Pharmacy Students' Association will be held on Tuesday next, December 4, at 8.30 p.m., to consider a revision of the rules.

* * *

We are requested to state that the next meeting of the Chemists' Assistants' Association has been postponed from Tuesday, December 4, to Thursday, December 6, when a paper on "Digestion" will be read by R. Wharry, Esq., M.D.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

A general meeting was held in the Society's rooms, Market Place, Sheffield, on Wednesday evening, Nov. 14. Mr. Preston, the President, in the chair.

The minutes of the last meeting having been read and confirmed, the Secretary announced that the following donations had been received:—The *Pharmaceutical Journal* from the Pharmaceutical Society; one guinea from Mr. J. F. Wilkinson, Manchester.

Votes of thanks having been passed to the donors, the President called upon Mr. E. R. Learoyd to read his paper on—

Apprentice and Student.

Before even the Pharmaceutical Society became possessed of the Royal Charter, at a meeting of the youthful Association which was eventually to merge into such an important body, held on May 11, 1841, the honoured founder, Jacob Bell, made use of this statement,—"When we consider the advancement of art and science generally in this country, it is a matter of surprise and regret that pharmacy and pharmaceutical chemistry do not receive that scientific support which is conceded to them in other nations in Europe, and in America." Further, he said, "In chemistry and philosophy, in medicine and surgery, Great Britain holds a prominent plrce; in arts and manufactures we can compete with the whole world; but in pharmaceutical chemistry, in the application of the science of chemistry to the art of relieving the numerous maladies to which human nature is liable, it must be admitted we are deficient."

I have thought well to commence these few remarks with the words of one who has long passed away, but whose name will be reverenced by the pharmacist as long as such exist, in order that not merely might it serve as the introduction to my paper but would forcibly illustrate two principles which I think you will agree with me are admitted thereby: one is that at and prior to the year 1841 (now more than a generation ago) the chemist held an unimportant and rather ignominious position in the estimation of those classes of society who were supposed to be best able to judge of his merits or estimate his worth. The second conclusion we are bound to acknowledge is, that while other sciences, with their several applications, had been making great strides, pharmacy, in the words of the eminent authority I have just quoted, proved admittedly deficient. Deficient in what? In social position? Surely any one who is at all acquainted with the high premiums paid for boys to become apprenticed to chemists of those days must allow that no question of this kind can carry very great weight. In education? Well, then, again I infer that the parents or friends of such youths would be in a position to give them a more than decent education, generally speaking, for the position in life for which they were eventually to qualify. Then in what do we find they were deficient? Again I must refer to the clear and distinct reasoning of Mr. Bell, for I am at a loss to describe, in better terms than his own, the wherefore, which he gives as follows:—"This deficiency may be attributed to the absence of any specific and distinct course of education in this particular department, to the want of a sufficient stimulus to exertion in its advancement, and to the consequent neglect which degrades it below its proper standard of importance." These are strong terms, and may now by some be considered to seriously reflect on the chemist of the past. However, to-night it is our pleasure to be interested somewhat in the apprentice, the youth who is by nothing more than the mere effluxion of time to become the representative, worthy or otherwise, of those whose teachings he has imbibed and in whose footsteps he may be considered hereafter to tread.

Then the question at once arises, to whom were these youths indebted for the knowledge which should fit them for the onerous and important duties they were soon to be called on to fulfil? I can quite imagine that in putting a lad apprentice even then, his friends took very carefully into consideration the fact that a commensurate remuneration must be probable for the outlay in premium and in time expended in acquiring the information necessary to a successful career. But what were the "principals?" Were they able properly to teach or give opportunities to be taught that which of necessity can only fit the aspirant for the position to which he looks forward? To quote once more, Mr. Bell says:—"The chemists and druggists of England have been called into existence by the public demand for a class of persons who devote their principal or exclusive application to the art and science of pharmacy."

But here I am bound to take exception; it seems to me somewhat grandiose and presumptive to assume that such be the condition of affairs, while in the same breath almost we have been told that the chemist was, alas! in the most eminent degree deficient.

It seems strange, but at the same time excusable, that our author, having so earnestly the interests of his fellow-chemists at heart, should at times be rather illogical; but a pang of remorse must have filtered into his breast when he adds, that "In the absence of a uniform system of education it cannot be expected that all 'dispensing chemists' can be equally competent." "Though," he adds, recurring again to his former position, "we must admit that among some of their number a reformation is much required."

It is quite safe to say that at the time the paper just referred to was written, not only did chemists and druggists exist, but they were without doubt called on continually to execute those professional duties apart from mere commerce, which to-day they are expected to be qualified to undertake; in fact Mr. Bell admits that such were in existence and active occupation, for we are told how "pharmaceutical chemistry comprises several departments, the manufacturing chemist, the analytical chemist, the dispensing chemist, how they carry on their respective functions, and finally how from division of labour manifest advantage results.

Thus we see again that the chemist was not only in existence, but it is, I think, fair to presume, was to some considerable extent enjoying the confidence, if not of the scientist, at least of the general public, to whose daily requirements he was devoting his experience and his life.

We must not forget that at the time Mr. Bell made use of these statements he was, as it were, really paving the way for the emancipation of the trade, by the inauguration of the great scheme of education to which he had become so devoted. At the same time, it answers our purpose to-night to consider carefully the arguments used. Why, I will shortly endeavour to explain.

In further announcing the objects of the infant Pharmaceutical Society, Mr. Bell says:—"But some course of education is necessary to qualify all these classes of 'pharmaceutists,' and in the absence of any national institution of this description the attainment of that proficiency from which public benefit can be expected is due to the voluntary and unassisted assiduity of individuals, and not to the system under which they are placed."

Thus we at once see that all this goes to prove the desirability of a national course of education.

But the question now arises, Under what conditions and in what position were the apprentices of the past? Speaking pretty generally I suppose we may consider the apprentice of a generation ago to be much in the position of the apprentice of to-day, with one or two important exceptions. In those days most people in business took (as it is termed) apprentices, and it speaks volumes for the probable pecuniary value of such business that they were able to command good, and in many cases what we should now consider high premiums. To-day it is different, and the tendency of the times is to do away altogether with apprenticeship. Then the youth, whoever and whatever he might be, had to go in as at first little better than the errand boy—begin at the beginning, work hard and long, and only after some years' difficult and laborious servitude would he be able to advance his position in the shop. Times and habits were different. Our forefathers worked longer hours than now universally prevail, and we can well imagine the unfortunate boy, his mother's darling, his father's pride and hope, writing home laboured and affecting accounts of his hardships and troubles as a chemist's apprentice.

That such was the case and that hardship was felt we are quite convinced, for having only again to refer to an article by the Editor of the *Pharmaceutical Journal*, written in or about September of the same year, 1841, which at once shows us how the shoe pinched. In it we are told how a variety of letters have been received from assistants, describing the hardships and disadvantages under which they laboured; and the writer goes on to say that the position of an apprentice or assistant in a chemist's shop is attended with much labour and many privations, close confinement, long hours, constant and wearying application of the faculties to duties which possess in themselves but little interest, the necessity for study and the difficulty of finding time or energy to devote to it; in addition, the labours of the counter.

The usual complaints appear to have had reference to late hours, confinement to business during *seven* days of the week, the want of time for recreation or amusement, and in, some cases, defective domestic arrangements.

So then from an eminent authority do we gain the information that the apprentice of the past was, if not a particularly worthy, at any rate, a much to be commiserated creature. In country towns, and in the majority of cases in the principal cities, the years spent in apprenticeship were usually years of incessant toil.

Apprenticeship for much longer periods prevailed than is now the custom. Used in many cases as cheap labour, we may suppose mental improvement to have been often carelessly neglected and habits of thought considered, if indeed consideration entered at all into the matter, to be subservient to mere handicraft. In our own time we can unfortunately find instances of this. I, myself, have had an assistant who confessed that during the whole of his apprenticeship, he had never made up, or dispensed if you like, what he called a "proper prescription;" to whom the obvious inference must apply I leave to you, as also I leave to you to determine what sort and condition of man would, by such training, be launched upon the troubled sea on which rocks the chemist's "bark."

A good deal might be said as to peculiarities exhibited by some masters. To mention my own case again, I have in the "West-End" of London served as assistant to a pharmaceutical chemist who only allowed the use of the Pharmacopœia to his young men, giving them to understand that his establishment was not to be considered a training school for pupilage but a place for *work*, that is, *his work*. Such narrow-mindedness is beneath contempt and assuredly brings its own reward.

Then, again, situations with their differences in locality and class, differ accordingly in routine. Whilst the youth in London would be complaining that business spreads over such an extended day that owing to circumstances half a day's work remains to be accomplished after eight o'clock at night; on the other hand, the country apprentice was so completely exhausted with pounding, weighing and mixing, that, taken into consideration with the little encouragement received, it was no wonder that "wearied nature sank to rest," or sought relief in perhaps somewhat doubtful recreation.

One point for congratulation may at least be discerned amid the dreariness of this rather dismal category, one redeeming feature, one happy example which serves at least to lighten the general gloom, and this we find by remembering that it has been conceded that advancement even in those times was not impossible, the ladder of progress was not altogether thrown down, and to those who perhaps a little favoured by exceptional circumstances, or by indomitable industry, it was, we are thankful to say still possible to achieve something like success. It has just been admitted that the attainment of proficiency was due mainly to the voluntary and unassisted assiduity of individuals, and all honour to those whose responsibility was so acknowledged, whose trust was not betrayed, and whose interest in the future welfare of their juniors led them (in the exercise of an anxiety sensible to the requirements of the times) to stimulate by the best means at their disposal those habits of study and general conduct, which, properly fostered, bring forth the happiest results.

And well it is for us to look back and note the names of but a few of those pioneers who have, pharmaceutically speaking, "cleared the way,"—Bell, Payne, Pereira, Christison, Liebig, Thompson, Ure, Morson, Redwood, Savory, Deane, Squire, Clarke, Ince, Hanbury and many others,—and I ask you to decide whether or not these names are worthy of your regard, or are not those you would delight to honour.

But for all that, speaking generally, this I take it was the state of affairs in the past: youths put to a business, entailing serious and responsible duties; left very much to their own resources; enjoying, if one may call it such, a somewhat lengthened period of servitude; but unfortunate in having no stated course or educational programme which might prove an incentive to effort, or serve as a guide in directing their studies.

Years have passed away. The plea that the interests of the chemists as well as the safety of the public demand that no person shall become an apprentice in the business who has not had the advantage of a fundamental education, and that no person shall dispense medicines who has not undergone an examination as a test of his competence to perform that important office, has become, as far as the legal definition is concerned, an accomplished fact.

The generation which worked so arduously and disinterestedly for this end has all but passed away, and it becomes an interesting question as to the position the chemist now holds. Has the work prospered? Does the position of the chemist to-day realize the desires and prognostications of the founders of the Society? And more particularly, after all these years of progressive development, is the position of the chemist's apprentice or the "student of pharmacy," as I may now venture to call him (for I am informed on very eminent authority that the days of apprenticeship *as such* are numbered), one which is a matter to us for congratulation or regret?

I am happy to think that I can answer the latter interrogation in the affirmative, and that it does not take any very lengthy consideration to determine that the status of the young man who now aspires to enter the ranks of pharmacy is infinitely superior in nearly every respect to that enjoyed by his predecessor of a generation ago.

To my mind, however, there is something of sadness and regret, as there is something to be admired, in these reminiscences of by-gone days, when men lived and worked much as we are living and working now; when almost alone and often unaided industry and pluck lifted, as it were, a man above his fellows, and when, in spite of difficulties and discouragement, there arose those whose names we mention with respect and esteem.

Undoubtedly *we* should not forget the lessons which the history of the past teaches, some of which I trust you will be able to gather from these remarks.

But "has the work prospered?" Well! to-day we have the Pharmacy Act an accomplished fact; we have the sale of poisons in the hands of only qualified chemists; we have the dispensing of prescriptions more or less efficiently conserved and protected; we have the "title" clearly described and surrounded by the necessary bulwarks; we have pharmacists occupying responsible and honourable positions as analysts, and in other important official capacities; and finally, we have, *or think we have*, an increased status in the estimation of the public at large. With all these advantages, does the position of the chemist to-day accomplish our desires, is our satisfaction reasonably complete? To this question I am compelled to answer, reluctantly but decidedly, No.

That the chemist has all this we admit, and in the abstract privileges such as are most admirable we also admit; but that any real advantage commensurate with the enormous outlay of years of anxious effort has yet dawned on the chemist and druggist, as a whole, we are prepared to doubt. That his anxieties are lessened; that his status is materially improved; that his work is lightened (except in the sense of division of labour); that his hours of business are sensibly relaxed; that his time for relaxation is increased; that his pecuniary emoluments are enhanced; and, to sum up, that he is prominently benefited in the practical sense, rather than in mere theory, again I venture to say you will with me very much doubt.

Nevertheless, there will be those who will tell you that, in the increased knowledge which the chemist has at his command, in the increased interest which things, once common to him as household words, assume by enlarged intelligence, and in the increased power which general enlightenment has given him, there will be found a fund of interest and gratification far beyond any ordinary and common satisfaction; which may be pointed to as the highest aspiration of what might be designated the mere "trader of the past."

Again, may I be permitted to say that once more you will be inclined to accept this argument *cum grano salis.*

But it is with a sense of relief that we turn to our friend the "student" of to-day. He, without doubt, is in the enjoyment of advantages far beyond the wildest dreams of the average youth of the year 1841. Certainly we have to deplore the continuance of late hours,—and whilst we are reminded on this subject, once for all we would lay down the rule, that those who most transgress by keeping open their places of business unreasonably are, with but few exceptions, the new beginners, those who as assistants were the readiest grumblers. Still the Pharmacy Act, if it has done nothing else, has at least done this,—it has given the student a *locus standi*; it has provided for him a curriculum; it has opened to him schools with eminent teachers; it has provided the necessary *stimuli* in the form of exhibitions, scholarships and medals; and finally, after a fairly studious career, enables him to boast of its laurels being placed upon his brow in the shape of the highest degrees at its command.

That the Pharmacy Act is perfect I for one am not at all prepared to admit, and one (to me) great evil, a blemish difficult to understand, if we take into account the amount of consideration the Act involved and received in its preparation, is that young men are only required to serve, or rather be in the occupation of, a duly registered pharmacist for the short term only of three years. I fear much of the disappointment felt by young men entering into business springs from this source.

If nothing else, we may safely look on the old-fashioned plan of five, six or seven years' apprenticeships as one by which the young man would be retained under the immediate superintendence of his master for a period sufficiently long to do two things, viz., to "mould his character," and to give him necessary experience as a business man.

Not in mere boyhood was he to be considered as an "experienced dispenser" (for that I take it, the law being complied with, is the case now), not with habits sufficiently disturbed to give him a distaste for a business, the most unpleasant part of which in the natural order of things comes first, not before he had been sufficiently long with his principal to properly grapple with that important problem of supply and demand which we must all study, and not before, under his master's own eye, had he had sufficient time to develop, if in him was, those traits of character which should send him into the world at once a credit to his trainer and himself.

Perhaps it might be interesting to notice one instance of how the ideas of the Utopians (if we may be so permitted to call them) of the past, permeated through the pharmaceutical world and whether any result was produced.

In 1841, Jacob Bell had promulgated his ideas, and as far as I can learn by the records of the Journal, it was only in 1843 that the first official notice appears of any effect, educationally speaking, having been produced in the country. In January of that year (1843), however, a course of lectures, the first which I can find to be officially recognized, takes place in Manchester, and the circumstances are worthy of record from the singular fact that it is evident that wide-spread interest is exhibited in the new departure; for instance, on this important occasion, forty-four tickets were sold, forty-three to members and associates were 10*s.* 6*d.* each, and one non-member was charged as much as 1 guinea (21*s.*). The lectures took place in the Theatre of the Manchester Medical School, and were delivered by a Mr. Davies.

Of those who attended, four were from Rochdale, eleven miles away; two from Oldham, eight miles; three from Stockport, six miles; one from Hyde, eight miles; one from Bury, nine miles; and one from Bolton, twelve miles; thirty-two being from Manchester, Salford and the neighbourhood. How long the Local Society went on, though assisted by a grant of £30 from London, before being seized by that inevitable consumption which has destroyed so many Provincial Associations, I am not in a position to say. . . . .

The author concluded by saying that in these days we are proud to think there is a brighter look out and a better prospect for the future. Compulsory education was considered necessary and it has been brought about. Means for obtaining the required knowledge could not be dispensed with, therefore such have been satisfactorily arranged for; and it is only fair to assume that in the near future in other places, as in Sheffield, when the requirements become obvious, there will spring up as occasion demands, those opportunities which, if sufficiently embraced, fit our students to take a respected and worthy position in the business they have chosen and in society at large.

The President, invited discussion on the paper, said that the subjects touched upon by Mr. Learoyd were of very great interest, and that the members could not but feel obliged to him for the very able and lucid way in which he had brought the matter forward.

Mr W. Ward was pleased to accord his hearty thanks to Mr. Learoyd for his paper, and to see that the subject had been so attractive to the rising generation as evidenced by the large attendance of associates; he took it as a good sign of the future of pharmacy. He did not agree with those who say education unfits a man for business; he considered that the more highly a man was educated the more likely would he be to succeed, especially when his knowledge is combined with practical common sense; higher education had always been the aim of the Pharmaceutical Society. He had very great pleasure in proposing a vote of thanks to Mr. Learoyd.

Mr. Ellinor seconded the vote of thanks, saying that the apprenticeship of to-day was very different to what it was when he was an apprentice; students had now every opportunity of learning, and it was their own fault in a great measure if they did not get on.

Several other gentlemen joined in the discussion, to the various points of which Mr. Learoyd replied.

The vote of thanks was carried heartily.

Before the conclusion of the meeting, Mr. W. A. Shaw was elected an Associate of the Society.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The third meeting of the sixth session was held in the rooms of the North British Branch of the Pharmaceutical Society, 119A, George Street, on Wednesday, November 21, at 9.15 p.m. Mr. Claude F. Henry, President, in the chair.

There was a large attendance of members and others.

The minutes of last meeting having been read and confirmed, Mr. Peter MacEwan proceeded to read a paper on "Volumetric Analyses."

After some introductory remarks, in which the author urged the importance of everyone connected with pharmacy being able to verify the strength of the medicines before supplying them to the public, he stated that volumetric analysis was one of the most efficient means towards this end, and proceeded to show in what it differed from gravimetric analysis. He then briefly sketched the history of the process as follows:—

"In 1806 Descroizelles, a French chemist, published an account of a new method which he had devised for ascertaining the alkali strength of barilla and potashes. His method consisted in the employment of a 10 per cent. solution of sulphuric acid, which he poured from a graduated tube into a solution of a known weight of the sample until the mixture became slightly acid. The standards which he chose were entirely arbitrary, and consequently his proposal was little heeded. In 1817 Mr. Charles Tennant, of Glasgow, contributed to the August number of *Thomson's Annals*, 'A Table showing the quantity of Soda (free or combined with Sulphur or Carbonic Acid) contained in the specimen under trial with Sulphuric Acid, containing 10 per cent. real acid. If the specimen under trial consists of 100 grains, the Table of course shows the percentage of Alkali.' His measuring apparatus was a tube graduated to 5 grain division, and he indicated neutrality with red cabbage infusion. He had also used 'a solution of Soda, containing 5 per cent. real alkali, for trying the strength of acids.' Dr. Andrew Ure, one of the first honorary members of the Pharmaceutical Society, contributed a paper to the October number of the volume mentioned, in which he speaks of alkalimetry and the use of litmus as an indicator, giving the results of some estimations made volumetrically. In this paper mention is made of a memoir which the author had submitted to Dr. Henry, of Manchester, in the year previous, in which memoir a full account was given of volumetric methods based on 'the lights recently shed on chemical proportions by Dr. Dalton's atomic theory, and thus made it' (the standard solution) 'represent *not arbitrary*' (as in Descroizelles' method) 'but *absolute* measures.' This is the true basis of volumetric analysis, and Dr. Ure makes good his claim for its invention in a paper read to the Pharmaceutical Society in February, 1844. At that time volumetric analysis had come into general use, particularly on the Continent. Gay Lussac had experimented and devised at least two processes, which are still in use, namely, estimation of free chlorine with arsenious acid, and silver with common salt, the latter method giving origin to the word *titration* applied to the volumetric process, and derived from the French word '*titré*,' standard (of gold or silver). Liebig had devised that beautiful process, now pharmacopœial, for the estimation of hydrocyanic acid, and Bunsen, Schwartz, Fresenius and Will gave the art great impetus by their careful researches. Dr. Mohr, of Coblentz, revised all that had been done by previous investigators, devised new processes, and that burette which is now so much used, thus placing the art in a state of efficiency which has called for little revision. Helpers were not wanting in our own country, but I need only mention the name of Francis Sutton, whose treatise on volumetric analysis has no peer in our language.

"Volumetric analysis was then described as being based primarily on the incontrovertible law of combining proportions, the practice of the art involving several recognized principles which may be generalized as—

"1. A constant and known reaction between the reagent and the substance titrated, the end of the reaction being capable of easy and quick determination.

"2. Standard solutions of reagents whose strength is related to the chemical weight unit—hydrogen.

"3. Employment of apparatus graduated on a decimal system."

The author then proceeded to describe the apparatus required, and the preparation of the standard solutions, referred to the principal features of the reactions, and explained, with numerous illustrations, the basis upon which the necessary calculations are made.

The President moved a hearty vote of thanks to Mr. MacEwan for his paper, and in commending the subject to the attention of the members, referred to the immense labour which the getting up of such a paper with its attendant experiments must have entailed on Mr. MacEwan.

The motion was seconded by Mr. Hill, who regretted that, there being much business before the Association that evening, there was so little time left for the consideration of the paper.

The motion having been heartily accorded, Mr. MacEwan briefly replied.

Mr. J. D. Robertson now proposed "That the annual *réunion* this year take the form of a Conversazione and Ball."

Mr. Turnbull having seconded the motion, it was unanimously approved of, and Messrs. Aitken, Boa, Crowden, C. F. Henry, MacEwan, J. D. Robertson and Turnbull were appointed as a committee to act in the matter.

The queries, as intimated, were then submitted and freely discussed, in which Messrs. Aitken, Boa, Crowden, C. F. Henry, Hill, MacEwan, Duncan M'Laren and Turnbull took part.

The Secretary then gave notice of several queries to be answered at next meeting; and the President having intimated that it will be held on December 5, and that Mr. G. R. Fowler will then read a paper on "Elementary Chemistry," the meeting adjourned.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The second monthly meeting of the above Association was held in the Sunday School Union Institute, Shakespeare Street, on Friday evening, November 23. There was a good muster of members and associates present. Mr. Councillor Fitzhugh, F.C.S., occupied the chair.

After the reading of the minutes, the President congratulated the members of the Association that at last such arrangements had been made that they would in future be able to meet in the room which they then occupied for the first time. It would be open for the use of associates one night (Friday) every week. He trusted that as it was so centrally situated and comfortable, the associates would avail themselves of this opportunity of improvement and fully appreciate the advantages it would give.

A committee was appointed, consisting of six of the associates, to assist in the arrangements connected with the materia medica, chemical specimens and library that were to be placed in the new room.

The President next introduced Mr. F. H. Spenser, who delivered a most useful and instructive lecture on "The Ear," illustrating his remarks by a large dissecting model.

At its conclusion, Mr. F. Lumby moved a cordial vote of thanks to Mr. Spenser for his able and instructive lecture.

This was seconded by Mr. R. Jackson, supported by the President, and carried.

DOVER CHEMISTS' ASSOCIATION.

The annual meeting of the Dover Chemists' Association was held at the Apollonian Hall, Dover, on the 21st inst., when there was a full attendance of the members. Mr. H. Peake was unanimously re-elected Chairman, and Mr. W. B. Cotterell Hon. Secretary and Treasurer for the ensuing year.

A discussion arose with respect to a retail catalogue emanating from a London firm, which it was stated had been distributed by post throughout the town, and a resolution was passed upon the subject.

The annual supper was held after the business meeting, when Mr. Bottle proposed the health of the President (Mr. Peake), who replied in a suitable manner. A very pleasant evening was spent.

Proceedings of Scientific Societies.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the Chemists' Assistants' Association, held on November 21, Mr. Parkinson, President, in the chair, a paper, on "Glycerine and its Impurities," was read by Mr. F. H. Alcock, of which the following is a *résumé*:—

The author described the various processes for the production of glycerine, including its preparation from emplastrum plumbi, which was the original method adopted by its discoverer, Scheele. The process, as patented by Messrs. Wilson and Payne in 1854, was fully described, viz., that of the dissociation of fats by means of superheated steam. The lime saponification process was also mentioned, as also the means by which the resulting glycerine was purified and concentrated to meet the requirements of medicine and the arts.

The manufacture of hard soap was briefly described in order to show that large quantities of glycerine were formed, which were contained in what is popularly known as soap boilers' waste or soap "lyes." It was with this source that the author wished to deal as fully as possible. Samples of this waste were shown in its original state, filtered and unfiltered, and also a concentrated sample which had been obtained by evaporation by steam heat from 420 pounds weight to 16 pounds. A sample which had been examined showed that this waste consists of a weak solution of glycerine in combination with gelatinous and albuminous matters, caustic soda, carbonate of sodium, chloride of sodium, possessing a disagreeable odour and a dark sherry colour, with a specific gravity of 1·0959, which, however, is very variable.

Many of the patents which have from time to time been taken out with the object of obtaining glycerine from this source were briefly described from the specifications, and allusion was also made to the fact that many more patents were about to be taken out in England, the specifications of which have not yet been printed. The official tests and characters of glycerine contained in the British, German, French (Codex), and United States Pharmacopœias were mentioned, and their object explained and defects pointed out.

Although tests were given for the detection of such substances as sugar, dextrine, gum, and others, which may be purposely added, yet the samples obtained (numbering twelve) from manufacturers, and illustrating the stages of their processes, were only examined for such impurities as might be associated with the method of production.

A tabulated list of results of reagents on the samples examined was shown, which indicated that most samples of medicinal glycerine were very pure, but that pure glycerine from soap lyes was still a problem, the chief objections being colour, smell, chlorides and sulphates.

In the discussion which followed, the President, Messrs. Braithwaite, Bailey, Dodd, Hadfield and Cracknell took part.

Parliamentary and Law Proceedings.

The Sale of Arsenic.

On Tuesday, November 20, Mr. W. Hardy, Deputy-Coroner, held an adjourned inquiry at the Angel Hotel, Mersey Road, Widnes, into the circumstances attending the death of William Williams, a baker, which took place on the 9th inst., from the effects of poison.

After the evidence of the daughter of the deceased had been taken,—

Mr. Alfred Jackson,* said: I am manager for the West Bank Pharmacy Company. I produce the book in which I enter the sales of all poisons sold in the shop. In that book I find an entry dated November 6, and it relates to a man named William Johnson, of Thomas Street, who said he was a grocer, as having bought half an ounce of arsenic, for the purpose of poisoning rats. The entry is signed by himself, "William Johnson." He was introduced by Mr. Thomas Smith, grocer, 84, Mersey Road, who is known to me. He said he knew the man who bought the arsenic, but he did not tell me that he knew him by name. Mr. Smith happened to be in the shop when William Johnson came in.

The Coroner (looking at the book): So far you have complied with the Act of Parliament. Did you not know this William Johnson yourself?—I had seen him a time or two, but did not know his name.

Are you in a position now to say that William Johnson is not William Williams?—I am not.

Have you any doubt that this man is not the man, William Williams, whose death we are inquiring into?—I cannot swear to him. I should like to see a photograph of him, and then I should know. Mr. Smith was rather reluctant at first; but after he heard his tale he signed for him. William Johnson asked Mr Smith to sign for him as knowing him.

Did Mr. Smith tell you he did not know his name?—Yes.

The Act contemplates that you should know the names of persons who ask for poisons. You know I know hundreds of persons by their features; but I do not know them personally, and if they asked me to do something for them, such as certifying that this arsenic was not wanted for the purpose of destroying their lives, I would not do it. If you had known that you should have said to Johnson, "Mr. Smith cannot introduce you here, because he does not even know your name."—I knew the man very well by sight.

You have already told me that Mr. Smith said he did not know his name, but that he knew him by sight. The Act of Parliament says that the person who wants to buy the arsenic as well as the person who introduces him shall be known to the seller. Of course, if it had rested there; if Mr. Smith had said "I do not know you by name, but I know you by sight," you are not bound to serve him. In your presence this gentleman introduces him. He said he only knew him by sight, and that is why I say you should have been more careful, and that is why I say it is not complying with the Act, though I should be extremely sorry to see any action taken upon it.

By the Foreman: I do not remember on any previous occasion selling poison to this person.

The Foreman: It has been stated that he got poison at your shop previously.—I have never heard of this man being served with a pennyworth of white precipitate at our shop. There has not been a boy employed in the shop since June.

The Coroner: The Act of Parliament is an excellent one. It should be strictly complied with, and if it had been broken in the manner in which I should have thought it necessary to call the attention of the police to it, the penalty would have been enforced in this case.

* The name of this witness does not occur on the Register of Chemists and Druggists for 1883.—Ed. Ph. J.

Mr. Thomas Smith said: I am a grocer, residing at Widnes. On the 6th inst., I was standing in the West Bank Pharmacy when the deceased came in. Mr. Jackson asked me if I knew him, and I said I did not, though I had seen him before.

The Coroner: Can you tell me who the man was?—No, I did not know him.

Have you any doubt that the man, William Johnson, who asked for arsenic in the West Bank Pharmacy was not the William Williams about whose death we are now inquiring?—I cannot say.

Do you think that this man, William Johnson, who purchased the arsenic was not William Williams?—I have heard since that he was.

So has everyone in Widnes and in the county of Lancaster.—Well, I do not know him.

What sort of a looking man was he?—He was a tall, thin person, with white hair. I think when he came in he asked to be served with twopennyworth of arsenic to kill rats with. Mr. Jackson told him he could not sell him any unless some person would sign for him as a witness. The deceased thereupon turned to me, and said, "Mr. Smith will do—won't he?" He then asked me if I had any objection to sign, and I said, "No." I told Mr. Jackson that I knew him by sight, but not by name. Mr. Jackson asked me if I would have any objection to sign the register for him, and I said "No," and did so.

The Jury returned a verdict of "Temporary insanity"

Review.

Dispensatory of the United States of America. By Geo. B. Wood and Dr. Franklin Bache. Fifteenth Edition. By H. C. Wood, M.D., Joseph P. Remington, Ph.G., and Samuel P. Sadtler, Ph.D., F.C.S.*

A work that has reached its fifteenth edition and of which it can be truly said that the copies hitherto sold "are to be numbered by the hundreds of thousands" might in some respects be deemed to be above criticism. But it is not every work that can stand the ordeal of such a success, especially when dealing with a subject that undergoes continual change and development. Too frequently succeeding editions fall away from the high standard of perfection which in the first edition won for the book its acceptance, and after existing for a longer or shorter time upon its first reputation the once famous work becomes ingloriously obsolete. Such a fate not long since appeared to await the book under notice in the not very remote future. But the circumstance that might have given it the *coup de grâce*,—the issue of a profoundly modified form of the work of which it is put forward as the exponent,—has been utilized for its resuscitation, and under its new editors it has started with a new lease of life. It is fifty years since the first edition of the 'United States Dispensatory' was issued, and when ten years ago the fourteenth edition was published the surviving editor was eighty years of age, and physically unequal to the task of revising it. The new edition, however, has had the advantage of the services of three competent editors, one for each branch of the subject matter, who have supplied a large quantity of ably written fresh matter, rendered necessary by the introduction of new substances or preparations into the Pharmacopœia, and in many instances have practically rewritten other articles in order to bring them up to date.

Most of our readers are aware of the nature of the Dispensatories with which our Transatlantic brethren are so richly supplied. The book under notice was the earliest to appear, and in its present form presents an extremely practical and useful commentary upon not only the United States Pharmacopœia, but the British

* Philadelphia and London: J. B. Lippincott and Co. 1883. Pp. i.-viii., 1-1928.

as well, since it deals with all the articles official in both works. This commentary includes as a rule the history and origin of the several drugs or chemicals, a judicious summary of what has been written upon them, and notes on their properties; in the case of preparations, where necessary, the chemistry and pharmacy are discussed; and in most cases there is a valuable note on the medical properties and uses. A very praiseworthy feature is that where the statements of other authors are quoted references are given to the original papers; sometimes these references might be a little more precise, as in the case of journals which like our own have had the fortune or misfortune of being divided into series, but on the whole they are sufficiently definite.

The present edition differs materially in arrangement from preceding ones, consequent upon the incorporation of the materia medica with the preparations in the new United States Pharmacopœia. A considerable number of fairly executed illustrations have also been introduced. After the official articles have been dealt with, another couple of hundred closely-printed pages are devoted to drugs and medicines not official, and then follow sections on the tests, various tables, a list of all American mineral springs of known medicinal value, together with results of analyses of their waters, and a full index, which is rendered more useful by the presence of the German names as well as the Latin and English.

The work is not without faults; it would be wonderful if such a mass of statements did not include some that were open to criticism, and we had noted some down with the intention of referring to them. But we have come to the conclusion that this would be to give them undue importance, since we are of opinion that the book, as a whole, is one that is most worthy to hold a place in the pharmacist's select library.

Obituary.

JOHN ELIOT HOWARD, F.R.S.

We greatly regret to have to record the death of Mr. John Eliot Howard, on the 22nd of November, after a very short illness, at his residence, Lord's Meade, Tottenham.

Mr. Howard was born on the 11th of December, 1807. He was the son of Mr. Luke Howard, F.R.S., who towards the end of the last century was a partner with Mr. Allen in the pharmacy at Plough Court, and subsequently founded the well-known firm of Howards and Sons, chemical manufacturers, at Stratford, but who was perhaps better known in the scientific world on account of his meteorological investigations. After leaving school, Mr. John Eliot Howard joined his father in the business at Stratford, and he remained in connection with it until his death. He, however, was able to find time to indulge his interest in science, and in addition to the study of chemistry, he devoted many years of his life to investigations into the botanical and natural history of the genus *Cinchona*, with which his name will continue to remain associated.

In the course of his quinological studies, Mr. Howard edited the unpublished work of Pavon, the 'Nueva Quinologia,' and illustrated it with a magnificent series of plates drawn by the well-known artist, Mr. Fitch, from Pavon's specimens at Madrid. When the Government of India introduced cinchona cultivation into that country, assisted by the untiring zeal and energy of Mr. Clements Markham, and of his able coadjutors, Messrs. Spruce and Cross, Mr. Howard, seeing the immense public importance of the work, generously gave all the assistance in his power without a thought of recompense, and his services were in 1873 acknowledged in a special vote of thanks from Her Majesty's Government. Mr. Howard devoted the labour of years to the study of the various problems which suggested themselves while this great enterprise was being carried out, and his work on the 'Quinology of the East Indian Plantations,' in which he embodied the result of his investigations, will always remain an authority on these questions. He also communicated numerous papers upon similar subjects to the Pharmaceutical and Linnean Societies, to the British Pharmaceutical Conference, and to this and various foreign journals. Mr. Howard was also a liberal donor of specimens to the Museum of the Pharmaceutical Society, many of them being of special value as illustrative of papers read at Evening Meetings and published in the *Pharmaceutical Journal.*

Mr. Howard devoted much time and thought to the questions of the relation of religion and science that occupy the minds of so many at the present day. An unhesitating believer in Christian doctrine, he never doubted that a reconciliation is to be found for all that is true in science with the truths of Revelation. Various papers by him on these subjects may be found in the Journals of the Victoria Institute, of which he was a Vice-President.

Mr. Howard joined the Pharmaceutical Society in 1853, and continued a member until his death. On the 6th of October last, at the first Evening Meeting of the Society for the present session, Mr. Howard received from the hands of the President, as representing the committee of adjudicators, the Hanbury Gold Medal, in recognition of the value of his scientific investigations respecting an important article of materia medica. Those who were present on that occasion could little have anticipated that he would so soon be taken from the scene of his earthly labours while still in full vigour of mind and body in spite of his advanced age.

Mr. Howard was elected a Fellow of the Royal Society in 1876, and was also a Fellow of the Linnean Society, a Corresponding Member of the Société de Pharmacie de Paris, and also a member of numerous other scientific bodies on the Continent.

The deceased gentleman married Maria, the daughter of the late Isaac Crewdson, of Kendal, and leaves a large circle of children and grandchildren to lament his loss.

Mr. Howard was buried on Wednesday last in Tottenham Cemetery, and the funeral was attended by a large number of persons desirous of testifying their respect for the deceased. Among the representatives of scientific bodies with which Mr. Howard had been connected were the President of the Pharmaceutcal Society, Mr. Walter Hills, Professor Bentley, Professor Attfield, Mr. E. M. Holmes, etc.

BOOKS RECEIVED.

VOLUMETRISCHE ANALYSE. By Dr. R. RIETH. With a Preface by Dr. A. HILGER. Hamburg: L. Voss. 1883. From the Publisher.

DER TORFMOOS-VERBAND. By H. LEISVINK, M.D., W. H. MIELCK, Ph.D., and S. KORACH, M.D. Hamburg: L. Voss. 1884. From the Publisher.

Correspondence.

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

OL. RUSCI.

Sir,—Mr. MacEwan's paper on "Ol. Rusci" in the *Pharmaceutical Journal*, p. 381, points to the desirability of pharmacists when rambling in foreign lands securing true samples of any article of recognized remedial value peculiar to the country, with the view of enriching the Museum of the Pharmaceutical Society, for future reference, and also of adding to the number of available agents for the cure of disease.

During my stay in St. Petersburg, in connection with the International Congress of 1874, I was desirous of procuring a specimen of the true ol. rusci, and with that object begged the assistance of a pharmacist from the interior of Russia. The difficulty mentioned by Mr. MacEwan of getting the true article was at that time fully recognized, and it was also generally accepted that its export was prohibited, but I am not, even at the present time, able to vouch for the correctness of that report. A portion of the sample then obtained, of the genuineness of which I have not the slightest doubt, was placed in the Society's Museum. Since that period many inquiries have reached me in reference to this article, and having visited Russia a second time in 1881, the difficulty in connection with the subject again recurred to me; however, I did succeed in procuring a larger supply of the true ol. rusci. It may perhaps not be generally known that it is this oil which gives that peculiar, penetrating and persistent odour which characterizes Russian leather.

Although not prepared to express a positive opinion as to the origin of the name, I think that "rusci" is most probably a corruption of "russicum;" the transition of one to the other is easy and almost natural. The Russian name for it, as pronounced by the natives, sounds to a person not conversant with the Russian language as "dagget." It was at a very early period employed in medicine under the several names of ol. betulinum, russicum, rusci, muscoviticum and lithuanicum. It will be observed that excepting betulinum, which indicates its being obtained from the betula or birch, all the names point to a Russian or Polish origin.

I regret that Mr. MacEwan did not apply to me, as I was in a position to and would gladly have supplied him with a larger quantity of the true ol. rusci for the purpose of his experiments.

During my stay in Vienna at the International Pharmaceutical Exhibition in August last, I learnt that this remedy was largely used in the Vienna hospital, and I was anxious to see the particular form of eczema in which ol. rusci was used, and the usual method of applying it. For this purpose I visited the skin ward of the general hospital, called the Kaposi ward.

Kaposi, in his recent work,* speaking of the intolerable itching in eczema papulosum (a form of eczema in which there is little secretion), recommends one or two remedies and then says, "Brushing over with tinct. rusci acts still more favourably."

Professor Kaposi is the successor of Hebra, who obtained great eminence in the cure of skin diseases. Through the courtesy of Dr. Loosgarten, one of the assistants of Professor Kaposi, I was invited to accompany the physicians through the several wards and saw that particular condition of eczema in which ol. rusci and its preparations show their best effects. I may also add that its use is attended with great benefit in ringworm. One of the preparations of ol. rusci alluded to is a solution of the oil to which the name of tinct. rusci is given.

I hope that Mr. MacEwan's paper will serve to direct the attention of those whom it may concern to an article of established reputation in Russia, Poland and Austria, with other northern countries, as a curative in certain conditions of that intractable skin disease to which the general term of eczema is applied, and be the means of adding one more article to our active materia medica for the alleviation of human misery.

THOMAS GREENISH.

20, *New Street, Dorset Square, N.W.*

* 'Pathologie und Therapie der Hautkrankeiten.' Dr. Moritz Kaposi. Wien und Leipsig. 1883.

LIQUID EXTRACT OF CINCHONA.

Sir,—When some time ago you inserted my letter headed "A Query requiring an Answer," I could scarcely have conceived that my question would have drifted from its legitimate channel into a discussion upon the merits or demerits of Mr. Battley's as compared with the Pharmacopœia preparation of liquid extract of cinchona.

Looking at the matter from my standpoint the conclusions to be arrived at are, I respectfully submit, as follows:—

Firstly. That the Ext. Cinch. Liq., B.P., is a misnomer, and reflects as much credit(?) upon its author or authors as do many preparations found in that erudite and impractical compilation.

Secondly. That Mr. Battley's preparation, though admittedly superior to that of the B.P., does not represent, really and truly, what it is stated to do on the label, and,

Thirdly. That Mr. Battley, while professing to divulge his process, did not "disclose the whole of the operations," did "not enter into details of manipulation and elimination" "which constituted the essence and completeness of his preparation"!

No one can admire and appreciate the late Mr. Battley's professional knowledge and its results more than I have done, and still do; but it is to be regretted that while he truthfully stated facts, he appears to have stopped short of stating the whole truth and nothing but the truth.

However, as we are about, I believe, to be honoured with a new Pharmacopœia, it is devoutly to be hoped that practical experience will be brought to bear upon it, and that nothing will be introduced into it which will not bear the most crucial test.

I still "want to know" how, if it be impossible to extract from cinchona bark its alkaloids, upon which its medicinal virtue is said to depend, without acids, an aqueous preparation can contain the entire constituents of the bark, as Battley's liquor professes, and the B.P. extract is said to do.

50, *Elgin Crescent, W.* PERCY WELLS.

TINCTURE OF NUX VOMICA FOR THE EXTRACT.

Sir,—In answer to Mr. Tanner's letter in the *Pharmaceutical Journal* of November 17, I beg to state that I do not make my own extract of nux vomica, and I do not think making a small quantity of extract either profitable or likely to give a fair or average percentage, but I use that sent out by wholesale houses in the ordinary course of business. I consider uniformity of strength of far more importance than colour, taking into consideration its potency, and the small quantity which we sell to the public as tincture of nux vomica. My authority for the quantity of extract I used is Mr. Peter Squire (*vide* 'Squire's Comp., B.P.,' 12th edit., p. 211), who gives 16 ounces of seeds yield 1 ounce of extract. I think no better reason could be brought forward for change of formula than that produced by Mr. Tanner, he having found about 20 per cent. of extract and Mr. Squire about 6·25 per cent., rather a wide descrepancy. The only explanation I can think of is that the former had a sample rich in extractive matter and the latter the reverse.

Preparing tincture from extract is not quite unknown even in the the present B.P., and the deposit on the sides and bottoms of bottles is not peculiar to tinctures made from extracts, but may be noticed in many which are prepared in the ordinary way, although I have never heard of it being put forward as an objection to the method of preparation.

If Mr. Tanner can steam, dry rapidly, and powder four ounces of seeds with the same facility that he can weigh 120 grains of extract, I must own, with all humility, that I cannot.

London. J. HICK.

Inquirer.—If the preparation is received, as is usually the case, as a "triple" water, it should be diluted in proportion.

Creon.—The article is the subject of a patent.

G. Nind.—We do not think that the restatement of your proposition is plainer than the original statement, or that the correspondent referred to failed to understand it.

"Apprentice."—(1) *Aster Trifolium.* (2) *Viola tricolor.* (3) *Hypericum perfoliatum.* (4) *Achillea Millefolium.* (5) *Trifolium procumbens.* (6) *Geranium Robertianum.*

J. F. Brown.—We are not acquainted with any published analysis of malt combings. Perhaps some reader may be able to furnish a reference to one.

A Member.—Hydrochloric or sulphuric acid would be equally efficacious.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Conroy, Hodgkin, Dyer, Pharmacist, Quercus, A. E. I.

REPORT UPON THE PHARMACEUTICAL PREPARATIONS OF NUX-VOMICA.*

(*Continued.*)

II. NOTES AND SUGGESTIONS UPON TINCTURE OF NUX VOMICA.

BY WYNDHAM R. DUNSTAN,

Assistant Lecturer in Chemistry and Physics to the Pharmaceutical Society and Demonstrator of Practical Chemistry in the School of Pharmacy;

AND F. W. SHORT,

Assistant Demonstrator of Practical Chemistry in the School of Pharmacy.

In a former paper (*Pharm. Journ.*, [3], xiv., 290) we have shown by analysis that commercial tinctures of nux-vomica vary considerably in alkaloidal strength. This difference is no doubt in the first instance due to a variation in the amount of alkaloid contained in the seeds of *Strychnos Nux-vomica* now in commerce, the existence of which we have already proved in a previous communication to this Society (*Pharm. Journ.*, [3], xiii., 666 and 1053). There are, however, other possible causes which might contribute to the inconstant result. Foremost among these is the possibility of alcohol containing more water than rectified spirit having been employed in the manufacture of the tincture; this conjecture might appear to be supported by a relation which is noticed in the table of analyses published in our previous paper upon this subject. For it is here observed that in certain cases high specific gravity is associated with a large percentage of alkaloid. The important assumption underlying this conjecture is that a dilute alcohol extracts more alkaloid than a stronger alcohol; but, as far as we can discover, this has never been experimentally substantiated. Nevertheless, various suggestions based upon this assumption have been made for the employment of a weaker alcohol than rectified spirit for the preparation of the tincture, and some of these suggestions have been adopted in foreign pharmacopœias.

In order to determine by direct experiment the extractive power of alcohol of different strengths the following experiments were made. Five gram quantities of nux-vomica in impalpable powder were macerated for three days with 50 cubic centimetres of alcohol containing different proportions of water, the mixtures being frequently agitated. Maceration was adopted, because percolation with alcohol containing more water than proof spirit is rendered practically impossible owing to swelling of the seeds and consequent c ogging of the percolator, occasioned by the action of the water upon the mucilaginous constituents, and it was deemed important that the experiments should be strictly comparative. And further, had ordinary percolation been adopted and a larger amount of alkaloid been found to be extracted by the weaker spirit, there would be the alternative that this was due, not to the greater solubility of the alkaloidal salts in the weaker spirit, but to the longer time during which the seeds were in contact with this spirit, for with nux-vomica the rate of percolation is inversely as the quantity of water present. After maceration 40 cubic centimetres of the tincture were filtered off and the amount of total alkaloid determined by a process which has been described in general outline in our former paper upon tincture of nux-vomica.

In detail the process is as follows. The quantity of tincture to be estimated, usually 50 grams, is evaporated almost to dryness upon the water-bath in a beaker; to this residue 25 c.c. of chloroform are added, but inasmuch as the residue will not dissolve in chloroform alone 15 c.c. of dilute sulphuric acid (5 per cent.) are added, and the mixture is poured, after gently warming, into a separating funnel, well shaken, and the chloroform run off; the latter is extracted with a little more acid if necessary. The acid liquid, which contains the alkaloid, is rendered alkaline with ammonium hydrate and agitated with 15 c.c. of chloroform, which is separated and filtered if necessary. The alkaline liquid is again shaken with chloroform and the latter run off. The mixed chloroformic solutions, which should be perfectly clear, are evaporated to dryness upon the water-bath, and after exposure for one hour at this temperature the residue of total alkaloid is weighed.

In many cases the residue from the evaporation of the tincture may be directly dissolved in dilute sulphuric acid, the liquid rendered alkaline with ammonium hydrate and the alkaloid extracted with chloroform. In certain cases, however, the alkaloid obtained in this way contains a trace of colouring matter, but a perfectly pure residue is obtained by the method described at length above.

The following table shows the results of the experiments:—

TABLE 1.

Proportion of rectified spirit to water (by volume).	Quantity of total alkaloid in 40 c.c. of tincture.	Percentage of total alkaloid extracted from the nux-vomica.
100 : 0 (rectified spirit)	0·078	1·95
100 : 25	0·088	2·20
100 : 33	0·088	2·20
100 : 50	0·089	2·22
100 : 60 (proof spirit)	0·086	2·15
100 : 100	0·074	1·85

The marcs from these tinctures were found in all cases to be distinctly bitter, and hence in no case had the exhaustion been complete. The above results show that water mixed with rectified spirit in any proportion up to and including proof spirit extracts more alkaloid than rectified spirit alone; but when the water rises above the proportion contained in proof spirit the extractive power for alkaloid again diminishes. The obvious conclusion to be drawn from these experiments is that proof spirit should be substituted for rectified spirit in the preparation of tincture of nux-vomica. But there is one strong reason for suggesting the use of 100 volumes of rectified spirit mixed with 25 volumes of water. For although the extractive power of these two spirits may be said to be the same, the use of the stronger spirit has this advantage over proof spirit, that it percolates very much more freely, while, owing to the larger proportion of water in the proof spirit, the percolation occupies a much longer time and the percolator is very apt to clog.

Rother (*Am. Journ. Pharm.*, lv., 1; *Pharm. Journ.* [3], xiii., 643) has proposed the use of sodium chloride in the preparation of tincture of nux-vomica,

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, December 5, 1883.

claiming that more complete exhaustion is by this means obtained; but this statement is not supported by any alkaloidal determinations. We have therefore experimentally studied the influence of sodium chloride upon the extraction of nux-vomica by alcohol. Rother recommends the use of spirit the strength of which is represented by equal volumes of rectified spirit and water; but in view of the results obtained above, we have employed 100 volumes of rectified spirit to 25 volumes of water.

Five grams of nux-vomica were macerated for three days with 50 c.c. of spirit containing 100 volumes of rectified spirit and 25 volumes of water, in which was dissolved 0·7 gram of sodium chloride. Three experiments were made. In the first experiment the maceration was continued for two days; in the second and third experiments for three days. The results are recorded in Table II.

TABLE II.

Proportion of rectified spirit to water. (By volume).	Percentage of NaCl dissolved in spirit.	Amount of total alkaloid in 40 c.c. of tincture.	Percentage of alkaloid extracted from the nux-vomica.
100 : 25	1·5	0·087	2·18
100 : 25	1·5	0·102	2·55
100 : 25	1·5	0·100	2·50

As maceration is but an imperfect process of exhaustion, two experiments were made by percolation, spirit of the above strength being employed in one experiment and the same spirit containing 1·5 per cent. of sodium chloride in the other. Five grams of the finely powdered seeds being percolated with 50 cubic centimetres of the spirit. The results are shown in Table III.

TABLE III.

Proportion of rectified spirit to water. (By volume).	Percentage of NaCl dissolved in spirit.	Amount of total alkaloid in 50 c.c. of tincture.	Percentage of alkaloid extracted from nux-vomica.
100 : 25	0	0·125	2·5
100 : 25	1·5	0·130	2·6

In the first experiment the marc was slightly bitter, but in the second, where sodium chloride was used, the marc was entirely free from bitterness, indicating complete exhaustion. It will be seen from these experiments that a spirit made by the addition of 25 volumes of water to 100 volumes of rectified spirit extracts nearly the whole of the alkaloid from nux-vomica when used in the proportion of 1 of nux-vomica to 10 of the spirit. When sodium chloride to the extent of 1·5 per cent. is dissolved in spirit of the above strength the whole of the alkaloid is withdrawn from the seeds, the sodium chloride no doubt acting, not chemically as Rother maintains, but physically, by softening and dissolving the albuminous matter of the seeds, as it is known to do in other cases. As the ultimate gain effected by the use of sodium chloride is but small it becomes a question for consideration whether it should be adopted in practice.

It has frequently been suggested that tincture of nux-vomica should be prepared by dissolving a definite quantity of extract of nux-vomica in alcohol. Apart from any practical difficulties that may stand in the way of this suggestion, it is based upon the supposition that extract of nux-vomica is a product of definite alkaloidal strength, and therefore that when a tincture contains a known quantity of the extract it may be considered as uniform in action and composition. This supposition, as we shall subsequently prove, is entirely erroneous, extract of nux-vomica being in reality very variable in alkaloidal strength, just as the tincture is, when prepared in the ordinary way. The new edition of the United States Pharmacopœia contains a process for making tincture of nux-vomica constant in the amount of extract which it contains. But, it appeared to us that, having an extract known to contain a definite quantity of alkaloid to work with, there would be a distinct advantage, other things being equal, in preparing the tincture from such an extract. We therefore made experiments to determine whether by any simple means an extract of nux-vomica could be prepared that would wholly dissolve in alcohol, forming a solution that would not deposit upon keeping.

Experiment 1.—An extract of nux-vomica was prepared with rectified spirit and evaporated upon the water-bath until it had the consistence of a soft extract. Ten grains of this were dissolved with the aid of a gentle heat in one ounce of rectified spirit, by which means a perfectly clear solution was obtained, but in twenty-four hours this had deposited a white sediment.

Experiment 2.—An extract was prepared in the same way as in experiment 1, but ten grains were dissolved in one ounce of a mixture of two volumes of rectified spirit and one volume of water with the aid of a gentle heat. A large quantity of oily matter refused to dissolve and the tincture soon deposited a copious yellow sediment.

Experiment 3.—The same extract was used as in the former experiments, but the solution of ten grains was attempted with one ounce of proof spirit. Some oil remained insoluble and the tincture deposited an abundant yellow sediment.

Experiment 4.—The extract was prepared with rectified spirit, evaporated upon the water-bath, and exposed for eight hours. Ten grains of this extract dissolved readily in one ounce of rectified spirit, but the tincture deposited a small quantity of brown sediment.

Experiment 5.—The extract in this case was prepared with proof spirit and evaporated to a soft consistence. Ten grains of this were dissolved in one ounce of proof spirit, yielding a nearly clear tincture, which deposited very slightly after twenty-four hours.

The above experiments indicate that there is no very ready means of obtaining a perfectly stable tincture of nux-vomica from the solution of the extract in alcohol, although experiments 4 and 5 might possibly be modified to yield good results. However, we are now engaged in elaborating a simple and direct method of preparing tincture of nux-vomica of definite strength upon different lines, and hope to bring our results before this Society at a future meeting.

Our thanks are due to Professor Attfield, F.R.S., for having permitted this investigation to be carried out in the Laboratories of the Pharmaceutical Society, and to the British Pharmaceutical Conference for having aided the work by a grant from its Research Fund.

[*The discussion on this and the following paper is printed at p.* 456.]

REPORT UPON THE PHARMACEUTICAL PREPARATIONS OF NUX-VOMICA.*

(*Continued.*)

III. ON EXTRACT OF NUX-VOMICA.

BY WYNDHAM R. DUNSTAN,

Assistant Lecturer in Chemistry and Physics to the Pharmaceutical Society and Demonstrator of Practical Chemistry in the School of Pharmacy;

AND F. W. SHORT,

Assistant Demonstrator of Practical Chemistry in the School of Pharmacy.

The only analysis, as far as we know, that has been published of extract of nux-vomica is that made by Dragendorff,† who records that he found in one sample of the extract 7·3 per cent. of total alkaloid, and in another 8·5 per cent. Our first experiments upon this subject were directed to the discovery of a simple and accurate method for the estimation of the total alkaloid in the extract. In a previous paper (*Pharm. Journ.*, [3], xiv., 292) we described a process of this kind for the determination of the total alkaloid in tincture of nux-vomica, which consisted in evaporating the tincture to dryness, and then dissolving the residue in a mixture of chloroform and dilute sulphuric acid. We first tried a similar process in the case of the extract, but it was found that although the commercial extract was wholly dissolved by the above mixture, the alkaloid subsequently extracted by chloroform, after the addition of ammonium hydrate, was slightly impure.

We therefore made further experiments, which led to the adoption of the following process:—About one gram of the extract is dissolved in a strong solution of sodium carbonate with the aid of a gentle heat. This solution is extracted with two consecutive 15 c.c. of chloroform. The mixed chloroformic solutions are extracted with two consecutive 15 c.c. of dilute sulphuric acid (5 per cent.), and from the mixed acid solutions, which should be filtered if necessary, the total alkaloid is extracted after the addition of ammonium hydrate by agitation with chloroform, two separate quantities of 15 c.c. being generally sufficient. The clear chloroformic solutions are evaporated to dryness upon the water-bath, and the residue of total alkaloid weighed after exposure for one hour. The alkaloidal residue thus obtained was shown to be pure by applying the ammonia-tannin process, which we have fully described in a former paper. The following is a typical result:—(α) amount of alkaloid originally found; (β) amount of pure alkaloid obtained by ammonia-tannin process.

α—0·164.
β—0·161.

Twelve commercial specimens of extract of nux-vomica were now analysed, the total alkaloid being estimated in the manner above described and the strychnine by a method of precipitation as ferrocyanide, which we have described at length elsewhere (*Pharm. Journ.*, [3], xiv., 290); the brucine was estimated by difference. In addition the quantity of "moisture" indicated by the loss at 100° C. has in all cases been determined. The results are recorded in the following table:—

Analyses of Extracts of Nux-vomica.

No.	Percentage of moisture.	Percentage of total alkaloid.	Percentage of strychnine.	Percentage of brucine.
1	16·7	15·15	6·63	8·52
2	19·7	15·64	7·44	8·20
3	15·5	10·32	4·19	6·13
4	15·7	15·16	7·08	8·08
5	16·0	12·49	5·53	6·96
6	13·9	12·53	5·17	7·36
7	13·8	12·25	4·87	7·38
8	17·8	17·54	7·52	10·02
9	13·6	15·78	6·41	9·37
10	16·0	15·94	6·84	9·10
11	17·3	16·24	5·81	10·43
12	15·9	17·12	8·58	8·54

It will be seen that, just as in the seeds and tincture, so in the commercial extracts of nux-vomica, our analyses indicate a serious want of uniformity in the alkaloidal content. This variation in the extracts might arise at least from two causes: (1) the difference in alkaloidal content among the seeds of commerce; (2) the practice, which might appear from some observations subsequently recorded to be far from uncommon, of removing the oil which separates during the manufacture of the extract.

When an alcoholic tincture of nux-vomica is evaporated a comparatively large quantity of oil separates as the evaporation proceeds, for this oil while soluble in alcohol is insoluble in water. Now an examination of the oil separated in this way has shown us that it contains alkaloid, both as strychnine and brucine, and hence its removal from the extract, in any case illegitimate, is accompanied by abstraction of alkaloid and consequent diminution in the total content. The presence of oil in an extract may easily be detected by warming with water or dilute alcohol, and upon cooling the oil will separate and float upon the surface of the liquid. Some of the commercial extracts, the analysis of which has been given above, failed to yield more than a mere trace of oil when tested in this way. This may be due either to the abstraction of oil during manufacture or to the use of a very dilute spirit in the preparation of the extract. We have found that an extract prepared in the latter way contains little oil. If the absence of the oil is due to this second cause and a spirit about the strength of proof spirit has been employed in the manufacture of the extract, from results published in our foregoing paper more alkaloid should be extracted in this way. In the case of one of the extracts examined, namely that which is richest in total alkaloid, this would seem to be the case, for we found that this extract contained no oil; although this result might have been brought about by the actual removal of the oil during manufacture, the quantity of oil removed being large in proportion to the small quantity of alkaloid which it contains. The actual method of manufacture being unknown to us, the truth of these conjectures must necessarily be uncertain; but, be the cause what it may, we have shown beyond doubt that there is a serious want of uniformity both in the extracts and in the method of their preparation. In a future communication we shall hope to bring forward a simple and direct method for the preparation of an extract of nux-vomica which shall be constant in alkaloidal strength.

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, December 5, 1883.

† 'Die Chemische Werthbestimmung,' p. 72.

We are indebted to Professor Attfield, F.R.S., for allowing the work connected with this investigation to be carried on in the Laboratories of the Pharmaceutical Society, and have also to acknowledge a grant from the Research Fund of the British Pharmaceutical Conference in its aid.

TINCTURE OF CINCHONA.*

BY EDW. GRINDLE HOGG,

Pharmaceutical Chemist.

Published statements as to the exhaustion of the bark by the spirit in making the above preparation being contradictory, it was suggested to me that it might be of interest to make some experiments as an endeavour to settle the divergent opinions already expressed.

In the 'Year-Book of Pharmacy' for 1878, in a paper entitled "A Comparison of the Strength of some of the Cinchona Preparations," Mr. Ekin states that having operated upon a bark in which he found nearly 2 per cent. of total alkaloid he obtained a tincture by the B.P. process, 500 minims of which contained the whole of the alkaloid of 100 grains of the bark. On the other hand, at an Evening Meeting, held in March last, Dr. Paul is reported to have stated:—"That he could not confirm the statement made by Mr. Ekin, but that he (Dr. Paul) found when he repeated the Pharmacopœia process on the same bark he got a result nearly as good the second time as the first in regard to the proportion of alkaloid."

I have to record the result of an examination of four different samples of cinchona bark, tending to prove that Dr. Paul's statement, startling as it may have appeared, was by no means overdrawn.

My mode of proceeding has been as follows. First to estimate the amount of total alkaloid in the bark, then to prepare a tincture strictly according to the official directions, and estimate the amount of alkaloid in it; finally, as a check, I have, in two instances, estimated the amount of alkaloid remaining in the marc. The process of estimation adopted has been the same in each sample, both of bark and tincture, so that the results are strictly comparative. The method is that of H. Meyer (*Archiv d. Pharm.*, [3], xx., 721; *Journ. Chem. Soc.*, ccxliv., 388), which is based upon an examination of the principal published processes and shown by the author's results to be the simplest and most accurate process yet proposed. I have introduced a slight modification to be presently described. Meyer directs 10 grams of bark finely powdered to be intimately mixed with 12 grams of slaked lime, and boiled for one hour in a tared flask with 180 c.c. of strong alcohol. When perfectly cool the centents of the flask to be made up to 190 grams with strong alcohol and set aside to deposit. One hundred c.c. is then filtered off. The specific gravity of the filtrate will average 0·84 and this 100 c.c. represents the total alkaloid from 5 grams of the bark. To this alcoholic solution is added 20 c.c. of 1 per cent. sulphuric acid, and the whole evaporated on a water-bath to about 10 c.c. After cooling 10 c.c. of distilled water is added and the mixture filtered into a separating funnel. Dish and filter are repeatedly washed with distilled water until the washings cease to give a precipitate with picric acid. Fifty c.c. of chloroform is then added and caustic soda to strong alkaline reaction. The mixture is well shaken, the chloroform allowed to separate, run into a tared flask and recovered by distillation. The flask is heated in a hot air chamber at 212° F. for one hour, cooled over sulphuric acid and weighed. The shaking of the mixture in the separating funnel with chloroform is repeated as long as any weighable residue is obtained, three operations being generally found sufficient.

The only departure that I have taken from this method is as follows. Instead of boiling 10 grams of bark and 12 of lime with 180 c.c. of alcohol, as Meyer suggests, and taking half the solution obtained, I have taken 5 grams of bark with 6 of lime and exhausted the mixture with 100 c.c. of strong alcohol in the apparatus for continuous extraction suggested by Messrs. Dunstan and Short in the *Pharmaceutical Journal* of February 17 last, making sure of having thoroughly exhausted the bark by continuing the extraction until the spirit that dropped through ceased to give a precipitate with picric acid. The operation thus conducted occupied about one hour. The principal reason that led me to adopt this modification was that I found boiling the mixture of bark, lime and alcohol in a flask, as Meyer directs, to be attended with considerable difficulty on account of the bumping which takes place when the boiling point is reached. In the estimation of tincture, 50 c.c. were taken, evaporated on a water-bath till the spirit was got rid of, the residue mixed with slaked lime, dried and extracted as described. Proceeding as above the results obtained may be tabulated as follows:—

	Grains of total alkaloid in 100 grains of bark.	Grains of quinine in 100 grains of bark.	Grains of total alkaloid in volume of tincture (500 min.) representing 100 grains bark.	Grains of total alkaloid remaining in marc.
No. 1	3·98	not estimated	1·22	2·76
„ 2	4·96	3·9	1·89	2·65
„ 3	7·10	4·4	2·15	4·95
„ 4	4·25	not estimated	2·87	1·2

The figures in column 3 in the case of samples 2 and 4 were obtained by experiment, the remainder by difference.

The question arises, Were the barks used of the kind and qualities indicated by the Pharmacopœia, according to which we are directed for the preparation of tincture to take of the bark of *Cinchona Calisaya* in flat pieces or in quills, containing not less than 2 per cent. of quinine as estimated by the official process? Sample No. 1 was a trade sample of flat yellow cinchona bark, and these, it is well known, as a rule do not come up to the Pharmacopœia standard, not being the true *Calisaya* bark and containing, often, little or no quinine. No. 2 was a specimen of quilled bark, such as I believe is obtainable in commerce, and was identified by Mr. Holmes as true *Calisaya*. No. 3 was a flat bark, not a true *Calisaya*, although rich in alkaloid, the greater portion of which was found to be quinine, purposely estimated both in this and in the previous bark by the official process, the quilled specimen yielding 3·9 per cent., and the flat 4·4 per cent. of this alkaloid. The result as regards extraction of total alkaloid in the tincture was no better than that obtained from the inferior barks.

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, December 5, 1883.

The best exhaustion obtained was with specimen No. 4. This bark was of the same character as No. 1; but the tincture was prepared by the method I am in the habit of using, viz., moistening the bark with a small quantity of the spirit, packing in a percolator, provided with a tap, pouring on more spirit and allowing to stand about twelve hours with the tap closed, then permitting the spirit to drop only very slowly at first, adding the remainder, pressing and finishing in the usual manner.

Since sending in this paper, Mr. Holmes supplied me with a sample of flat *Calisaya* bark from a specimen in the Museum of this Society. The results obtained were as follows:—

Grains of total alkaloid in 100 grains of bark.	Grains of total alkaloid in volume of tincture (500 minims) representing 100 grains of bark.	Grains of total alkaloid remaining in marc.
2·4	0·75	1·65

These figures fairly coincide with those previously given, but are of interest as this bark appears to be as nearly as possible exactly of the kind and quality indicated by the Pharmacopœia.

It might, perhaps, be suggested that the alcohol exhausts the bark of the quinine, but not so readily of the other alkaloids; but the results given above, obtained with barks rich in quinine, do not support this theory.

The experiments above described indicate that in making tinct. cinchonæ by the process of the Pharmacopœia the bark is deprived of about half of the total alkaloid which it contains.

It is my intention to continue working at this subject in the hope of finding a process for producing a tincture which shall represent the total alkaloid of the bark from which it is prepared. Should I succeed I shall look forward to bringing my results under your notice at a future date.

I cannot conclude without expressing my best thanks to my friend Mr. Wyndham Dunstan for many valuable suggestions, and to Mr. Holmes for kindly identifying the barks.

[*The discussion on this and the following paper is printed at p.* 458.]

THE ALKALOIDAL STRENGTH OF TINCTURA CINCHONÆ FLAVÆ.

BY J. O. BRAITHWAITE.

The difference of opinion which apparently exists as to the alkaloidal strength of the tincture of yellow cinchona and the important bearing that this has on the therapeutic efficacy of a valuable remedial agent, induced me to institute experiments on the matter and to examine commercial samples.

To determine the amount of alkaloid removed by the official process several experiments were made with assayed barks; the "total alkaloids" of both the original bark and of the marc left after making the tincture were estimated by De Vrij's process. The amount of alkaloids in the tinctures was directly estimated by the following process.

One hundred cubic centimetres of the tincture were mixed with 2 grams of freshly slaked lime. This mixture was evaporated to complete dryness and exhausted by boiling with chloroform: when completely exhausted the chloroformic solution was filtered into a small tared flask and the solvent distilled off. The residue dried at 100° C. was weighed as "total alkaloid." For the comparative estimation of the ether-soluble alkaloid, this total alkaloid was digested for twelve hours in a limited quantity of ether (2 c.c. for each 0·1 gram) and the ether evaporated from a tared capsule, the residue being dried at 100° C.

It was found that the mean error of the three estimations, viz., of the bark, the tincture and the marc, did not exceed 0·2 per cent. Thus from a bark yielding 5·224 per cent. of total alkaloid the marc gave 2·665 per cent. and the tincture equivalent to 100 grams of bark 2·359 per cent.

In the above example it will be seen that only 45 per cent. of the alkaloid present in the bark goes into solution. In fact, in poorer barks giving a light coloured tincture this estimate is found to be too high. A sample of tincture may, however, be reasonably expected to contain four-tenths of the total alkaloid of the bark.

The following are the results of the examination of eleven samples of tincture. Nos. 1 to 4 being prepared by myself, the remainder being the commercial article.

No. of Sample.	Total alkaloid.		Ether-soluble alkaloid.		Specific gravity.	Remarks.
	Grams in 100 c.c.	Grains in f℥j.	Grams in 100 c.c.	Grains in f℥j.		
1	0·470	2·05	0·345	1·51	0·9350	Made from a rich commercial quilled calisaya containing 5·224 per cent. total alkaloid and 2·697 ether-soluble alkaloid.
2	0·536	2·34	0·444	1·94	0·8747	Made from the same bark as No. 1, but using rectified spirit instead of proof.
3	0·490	2·14	0·326	1·42	0·9330	Made from commercial calisaya, containing much colouring matter.
4	0·379	1·65	0·161	0·70	0·9256	Made from commercial calisaya, containing 4·392 per cent. total alkaloid, 1·06 per cent. of ether-soluble alkaloid.
5	0·430	1·88	0·254	1·11	0·9289	Trade sample.
6	0·279	1·22	0·078	0·4	0·9374	" "
7	0·350	1·53	0·070	0·3	0·9357	" "
8	0·285	1·24	0·170	0·74	0·939	" "
9	0·417	1·82	0·140	0·61	0·9489	" "
10	0·356	1·55	0·202	0·88	0·9511	" "
11	0·409	1·78	0·204	0·89	0·9346	" "

It will be noticed that in No. 2, where rectified spirit has been used to exhaust, the yield of alkaloid is considerably increased.

Laboratory, 50, *Southwark Street*, S.E.

THE PURGATIVE PRINCIPLE OF CROTON OIL.*

BY HAROLD SENIER,

Fellow of the Institute of Chemistry and of the Chemical Society.

In a paper read before this Society in March, 1878,† I pointed out that English pressed croton oil of undoubted genuineness could be separated by alcohol into two parts. The part soluble in alcohol was, or contained the vesicating principle, while the part insoluble in alcohol was entirely non-vesicating. Further experiments towards the isolation of this vesicating principle I have recorded in another paper. With respect to the other prominent property of croton oil, its purgative activity, I at that time was led by the opinion of therapeutists to believe either that this action was due to the vesicating principle or that it resided in the same portion of the oil—that portion soluble in alcohol; this, however, was not then determined. I now find that the purgative constituent does not exist in the alcohol-soluble vesicating oil, but is entirely in the alcohol non-soluble, non-vesicating oil. This I determined in the first place by experiments on myself and others, and more recently the therapeutic action of this oil has been studied by my friend Dr. J. W. Meek. My experiments consisted first, of the administration of the non-vesicating oil in doses of $\frac{1}{10}$ minim, increased to $\frac{1}{2}$ minim; if this oil contained the whole of the purgative principle, this quantity would be equivalent to about $\frac{1}{5}$ to 1 minim of commercial croton oil. The oil used in these experiments was carefully freed from traces of the vesicating oil by repeated washings with alcohol until nothing more was dissolved. It was administered in the form of pills, and I found magnesium carbonate and extract of hyoscyamus convenient excipients. The general results from these experiments were, briefly, from the smaller doses a mild, and from the larger doses a powerful purgative effect, unaccompanied by any unpleasant symptoms. I supplemented these experiments by the administration of similar doses of the vesicating oil under similiar conditions and obtained no purgative action, but a considerable amount of irritation in the alimentary canal accompanied by nausea.

In conclusion, I do not think I am exaggerating the practical outcome of these experiments when I say, that subject to the results of more extended therapeutic experiments, this non-vesicating croton oil, either in its present form or in the more concentrated form in which I hope to obtain it, furnishes a useful, safe, speedy and pleasant purgative.

Dr. Meek describes the result of the experiments conducted by him as follows:—

Report on the Physiological Action of the Non-vesicating Portion of Croton Oil.

BY JOHN W. MEEK, M.D. LOND.

In order to try the physiological effects of the non-vesicating portion of croton oil, Mr. H. Senier was good enough to supply me with some of that portion of the oil as isolated by him. It was made into the form of pills with extract of hyoscyamus.

Given to healthy adults in doses containing the non-vesicating portion of one-tenth of a minim of ordinary croton oil, beyond slight nausea and some sense of discomfort no appreciable effect was produced; but I found that doses containing the non-vesicating portion of half a minim of croton oil acted as a powerful purgative in from three to six hours from the time of administration. In some of the cases the oil caused griping, but not in all. The motions were usually of a loose character, though not containing a large amount of fluid. The bowels were usually opened two or three times at intervals of an hour or more between each action.

In the doses above mentioned, beyond the action on the alimentary canal, no other physiological effect was observed in any of the cases.

[*The discussion on this and the following paper is printed at p.* 458.]

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain. December 5, 1883.

† *Pharm. Journal,* [3], viii., p. 705.

THE VESICATING PRINCIPLE OF CROTON OIL.*

BY HAROLD SENIER,

Fellow of the Institute of Chemistry and of the Chemical Society.

In a former paper† I gave the results of an investigation into the action of alcohol on croton oil, and found that under certain conditions it separated the oil into two parts; the one part vesicating, the other non-vesicating. I briefly described the vesicating oil and also the non-vesicating oil, which I have since shown to be purgative.

In another paper I have given the results of my work, so far, on this purgative oil. In this paper I show, in the first place, more exactly what the conditions are which affect the solubility of croton oil in alcohol, maintaining and extending my previous conclusions. In the next place, I proceed to determine whether the oil soluble in alcohol is itself the vesicating principle, or what part of it has that power.

The Solubility of Croton Oil in Alcohol.—When alcohol (sp. gr. ·794 to ·800) is mixed in equal volumes with English pressed croton oil, perfect solution takes place, the mixture being permanent at all ordinary temperatures, and this is equally true when any less quantity of alcohol is used. When, however, the proportion of alcohol to croton oil becomes as seven volumes to six, or any larger proportion of alcohol, then a part of the croton oil separates. This part varies in quantity, in the case of different samples of oil, in accordance with the conditions noted in my former paper. It is an interesting fact that that portion of the croton oil which separates when the alcohol is in excess is afterwards insoluble in any proportion of alcohol. But that portion of the oil dissolved by alcohol is, when separated, soluble in all proportions.

In the discussion following my former paper, Professor Redwood remarked on an apparent discrepancy between my results on this point and some experiments made by himself some years previously.

In the experiments reported by Professor Redwood, croton oil and alcohol were used in equal volumes only and found perfectly miscible. This result, so far as it goes, agrees exactly with my own, and no doubt if Professor Redwood had employed other proportions than those given his results would also have coincided with mine. The usual statements regarding the solubility of croton oil in

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, December 5, 1883.

† *Pharm. Journ. and Trans.*, March 9, 1878.

alcohol as found in many text-books, and incidentally revived by Mr. A. H. Allen in his recent paper on 'The Chemistry and Examination of Fixed Oils'* are shown by my experiments to be inaccurate.

Search for the Vesicating Principle.—Some of the characters of the alcohol-soluble croton oil, which has been shown to contain the vesicating principle, I have described in the previous paper, to which reference has already been made. The more important of these characters, together with others since observed, are as follows:—At 60° Fahr. this oil is of a brown colour, and holds in suspension a number of acicular crystals soluble on warming. It has a strong characteristic smell of croton oil, a persistent burning taste, and readily produces pustules when applied to the skin. It has an acid reaction and a sp. gr. of ·987.

Solvents were first tried as a means of further separation. Water, alcohol of various strengths, benzol, chloroform, ether, petroleum naphtha, etc., were tried, at different temperatures and in various proportions, but the results did not indicate a method of further separation. The oil was then subjected to distillation, alone, with acids, alkalies, and by the passage through it of heated steam. Several distillates were thus obtained, but they were all non-vesicating. The oil therefore contains no free volatile vesicating principle, neither does the vesicating activity exist in a combined volatile alkaloid or alcohol.

To determine whether the fatty acids or alcoholic radical contained the vesicating principle, the oil was subjected to saponification, first of the free fatty acids. 50 grams of oil were digested on a water-bath for one hour, with 12½ grams of sodium bicarbonate and 10 grams of water. The resulting soapy mass was agitated with petroleum naphtha, and the whole placed on a filter and repeatedly washed with the same solvent. The filtrate containing the unsaponified neutral oil, when evaporated and dried, weighed 38·7 grams; the difference, representing free fatty acids, being 11·3 grams or 22½ per cent. of the alcohol-soluble oil. The soap left on the filter was diffused in hot water and decomposed with sulphuric acid. The free fatty acids which separated in white flocculi were collected and washed, dissolved in alcohol and crystallized. In this state their melting point indicated fairly pure palmitic acid, which was devoid of any vesicating property. The vesicating activity does not, therefore, reside in the free fatty acids.

Returning now to the neutral oil, this was saponified by 10 grams of caustic soda and 20 grams of water. The soap on cooling rose to the top as a hard cake, from which the aqueous solution containing the alcohol radical was easily separated. This on concentration gave no evidence of containing any vesicating principle. The soap was diffused in hot water, decomposed with sulphuric acid, and the free fatty acids separated. The soap previous to decomposition had no tendency to vesicate, but the free acids when liberated were strongly vesicant.

It was now evident that the vesicating principle was among the fatty acids; the next experiments were directed, therefore, to their separation. This has at present been accomplished only in an approximate manner, but the subject presented so many difficulties that it seemed advisable to publish the results so far obtained.

* *Journ. Soc. Chem. Ind.*, February 28, 1883.

Many processes were applied to the separation of these acids, which after much time and careful working gave only negative results. The description of these I shall omit. The following gave the only results from which even general conclusions could be drawn:—First, separation by means of the different congealing points of the glycerides of the fatty acids. Second, separation by means of the different solubilities of their lead salts in alcohol and ether. Third, separation by fractional saponification. Fourth, separation by fractional decomposition of the soda salts. The first of these separations was accomplished by filtration and slight pressure through a plug of tow in a jacketed funnel surrounded by refrigerating mixtures. The manner of accomplishing the other three separations does not require a special description.

The conclusions from the results of these processes were briefly as follows:—First, the vesicating principle is contained in those acids having the lowest melting points. Second, the lead salt is soluble in ether, but not at all, or very slightly, in alcohol. Third, it is contained in those acids least readily saponified by alkalies. Fourth, it is contained in those acids first liberated when the alkali soap is decomposed by acids.

In the next experiment the acids were separated into four groups, as follows:—First, those having ammonia salts insoluble in alcohol (palmitic acid). Second, those (after removal of group 1) which are precipitated from alcoholic solution by magnesium acetate. Third, those which, in the absence of groups 1 and 2, are precipitated as insoluble barium salts in alcoholic solution (oleic, etc.). Fourth, those whose barium salts are soluble in alcohol. The fatty acids were dissolved in alcohol and saturated solutions of the reagents were added. The precipitate in each case was washed on a filter with cold alcohol. The yield of acids in each group was, in round numbers, group 1, 15 per cent; group 2, 20 per cent.; group 3, 40 per cent., and group 4, 25 per cent. of total fatty acids in the neutral alcohol-soluble croton oil. The acids of groups 1, 2 and 3 were entirely inactive as regards vesicating effects, but those separated in group 4 were highly vesicant. These acids when separated are of a dark brown colour, and remain liquid at 50° Fah. They may be further purified by saponification with plumbic oxide, solution of the soap in ether and regeneration with an acid. In this state they are rendered much more active. Taking into consideration the low melting point and the solubilities of the metallic salts, together with the results of the experiments on the separation of the acids by the different congealing points of their glycerides and by their partial saponification, I think it more than probable that this new acid will be found to be closely allied to oleic acid and its analogues ricinoleic and linoleic.

In conclusion, I have shown, first, what the conditions are which obtain in the separation of croton oil by alcohol into its vesicant and purgative parts. Secondly, the vesicating activity of the alcohol-soluble croton oil I have proved not to exist in the free acids and not to belong to any basic constituent, but to reside in the combined non-volatile fatty acids. These have been separated to a considerable extent, if not to complete isolation, and the probable position of the new acid in the fatty acid series I have indicated. The further elucidation and study of the new acid I reserve for a future communication.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 8, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

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

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

NATIONALITY IN SCIENCE.

"All roads lead to Rome," was the old saying, but the individuality of the men who reached the capital was not more distinct and different than the routes they took. Our international courtesies but prove the fact and confirm the observation that the traveller may change his clime, but never his own character.

One would have imagined that this was limited to questions of geography, and that the rule was no longer applicable when it concerned the realms of thought. Yet nothing is more striking than the influence which nationality exerts even in the pursuit of science.

In Rome, the English tourist would be intelligent, brisk in his movements, and observant. In his hands would be found the most approved guide-book and the latest printed information, whether conveyed in story or in a more serious publication; and with restless energy he would try at least to verify the accounts of others.

The Frenchman would skim the surface of society, measure the present and the past by his Parisian experiences, and send home a brilliant and very readable description.

The German would know beforehand every street and bye-path in the city from a caretully studied map, and would be more conversant with such detials than the oldest inhabitant. He would be familar with the theory held by scholars from time immemorial respecting each classic monument.

With some he would agree; while others he would confute; and he would contribute, on his return, a mass of learned disquisitions, invaluable for future reference, though presented with the scantiest arrangement.

We thus gain a key to the sharply defined peculiarities which stamp the productions of the three nations, and probably we must remain content with the results which spring from national sources.

We, as Englishmen, have been accused, though less now than formerly, of following too much in the wake of German original research.

Our distinguished chemists, the moment their home education has been finished, have often betaken themselves to some foreign university where they may be gladdened by the scenery of the Rhine, and may listen to professors who teach more by their own investigations in the laboratory than by an attractive exposition of facts already ascertained.

The Rhineland has hitherto had the monopoly of our best men, and it has sent them back with a deep conviction of the importance of a personal and experimental searching into truth.

There was a time, in the recollection of this generation, when Paris was the centre of attraction. In the fine arts and imaginative literature, the French metropolis still holds its own; and for the written or acted drama has yet no equal.

But the very brilliance of the place, the sparkle of its society, and its unrestful eagerness after pleasure, react upon its men of science.

There are, of course, a few splendid and conspicuous exceptions; but the French investigator aims generally on presenting his work with artistic finish, and in a graceful literary form. Hence, the more serious and matter of fact portion of the community in our unimaginative isle has come to attach a certain distrust to such elegant effusions.

It must be conceded also that French science dates too exclusively from Paris and takes small cognizance of what may be passing elsewhere.

It is, moreover, unfortunate that a national hostility to the German Empire, its people and concerns, is allowed to be an interfering agency in the recognition of that science which, in its very essence is universal.

We may say, without assumption, that the charge justly brought against ourselves of neglect of original research, and of a too ready utilization of other people's labours is daily becoming one that can be less sustained. There is at least an effort and an intention to remove it altogether.

Up to a very recent period we have struggled under considerable disadvantage. Our technical schools, and those adapted to advanced practical work have been few and expensive. There has always been abundance of good elementary teaching, but a scarcity of opportunities furnished for the higher branches and developments of scientific education. Many of our professors are now actively carrying out the principles they have imbibed from continental universities, and stimulate their students to enter on that pathway of research which they themselves are treading. Many others who have never left their home surroundings are doing the same thing. Certain national instincts are in our favour. First, a capacity for generalization which has won fame for our great English men of science; secondly, an absolute freedom of acceptance of all discovery from whatever quarter it may spring; and lastly, the public, now thoroughly awake to the financial and utilitarian value of every description of research, is quite willing to reward substantially those who devote themselves to its pursuits.

LIQUEFIED CARBONIC ACID.

THE fact that carbonic acid gas under a pressure of thirty-six atmospheres and at a temperature of 0° C. passes into the liquid state has been known since the earlier days of FARADAY'S career, but until recently has been turned to little practical account. A few months since, however, some interest was excited by the statement that liquefied carbonic acid was being advantageously used in the manufacture of aerated beverages, and on Monday last, at a meeting of the London Section of the Society of Chemical Industry, the apparatus contrived by Dr. RAYDT, of Hanover, in conjunction with Messrs. KUNHEIM, of Berlin, for facilitating the industrial application of FARADAY'S discovery was explained by Mr. A. ZIMMERMANN. Of course the important part of the problem consisted in providing a vessel capable of holding the acid under the necessary pressure and yet so that it should be available when required. This is effected by constructing a wrought-iron cylinder of about ten litres capacity, representing a quantity of liquid acid which is sufficient when liberated from pressure to yield about 4500 litres of carbonic acid gas of ordinary density. At one end and screwed into the metal of the cylinder is an exactly finished brass screw valve tap, somewhat similar in principle to a high-pressure water tap, by which the exit of the gas can be controlled, so that it may pass into the gasometer or other vessel at any rate desired. It was one of these cylinders that was submitted to the inspection of the meeting referred to, and it was stated that each cylinder is certified to withstand a pressure equal to two hundred and fifty atmospheres. In fact it is claimed that it has been experimentally proved that, with a temperature of 200° C., the enormous pressure of twelve hundred atmospheres can in this way be made applicable.

The brewing industry in Germany has been one of the first to avail itself of the practical advantages resulting from this invention, in using the pressure resulting from the vaporization of the liquid acid for the purpose of raising lager beer from the cask to the place of draught, instead of condensed air pressure, which in some districts is prohibited on account of the usually impure condition of cellar atmosphere. An interesting experiment is also stated to have been made with cloudy beer in an English brewery, when it was shown that instead of keeping the beer in continuous agitation, as was generally expected, the pressure of the liberated gas acted uniformly and steadily on the top of the liquid. In this way, it is affirmed, all the suspended matters to which the cloudiness was due were precipitated by mechanical pressure, the hops floated on the top, and bright beer could be drawn from the intervening space. It is also anticipated that the invention will be utilized by engineers in various ways. Already, in Kiel harbour, a stone, weighing about fifteen tons, has been raised from a depth of thirty-five feet by attaching to it a vessel inflated from one of the cylinders. At Essen, Herr KRUPP is said to take advantage of the pressure obtained by the liberation of the gas to condense the molten iron while cooling in the mould. Further, its use for blasting operations and in locomotive engines has been suggested.

In the early part of last year an imperial decree was issued ordering the adoption in Turkey of the metric system of weights and measures and the abolition of the weights and measures hitherto in use, the names of which were applied to their nearest representatives among their substitutes. Very great difficulty was, however, experienced in enforcing the adoption of this measure, and the obstruction to business proved to be so great that for some time past the Government has been content to ignore the fact that although the new measures are displayed on the counter or carried in the hand, all ordinary dealings are conducted by means of the old ones. It is now reported that another attempt is to be made to give effect to the decree.

* * *

The *Medical Press and Circular* mentions a sad case of poisoning near Greenlaw, Berwickshire, by which a child aged nine months lost its life. It appears that some sleeping powders which had been ordered by a medical man for a Miss Wood were inclosed in a parcel sent to a gentleman who had a married daughter also bearing the name of Wood and who was expecting medicine for her child. Unfortunately when the packet of powders was found it was assumed that they were intended for the infant and one was administered, the consequences being fatal to the child.

* * *

A few days ago an interesting ceremony took place at Liége on the occasion of the opening by the ministers of State of new buildings in connection with the University in that city. One group of buildings erected in the botanic garden is devoted to lecture-rooms, museums, laboratories, herbaria, etc., and another to a museum of economic botany, a library and a physiological laboratory. There was also an institute officially opened which is to be devoted to the study and applications of electricity, and, last but not least, another which is to be devoted to pharmacy.

* * *

At a recent meeting of the Austrian General Pharmaceutical Association, it was decided to reorganize the School of Pharmacy in Vienna, which is henceforth to be known as the School of the Association and of the Vienna Pharmaceutical Gremium. It was stated that the school was attended by thirty male and four female pupils, the latter being nuns.

* * *

The fund that is being raised for the widow and children of the pharmacist's assistant, recently murdered in Strassburg, already exceeds 6000 marks.

* * *

The first sessional meeting of the Manchester Pharmaceutical Association will be held at the Owens College, on Monday evening next, December 10, at 7.30 p.m., when an address to students will be delivered by Mr. W. Elborne, on "The Examinations of the Pharmaceutical Society."

* * *

The next meeting of the Chemists' Assistants' Association will be held on Wednesday, December 12, when a report on "Materia Medica" will be read by Mr. J. O. Braithwaite.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, December 5, 1883.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Messrs. Andrews, Borland, Bottle, Butt, Gostling, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Squire, Symes, Williams, Woolley and Young.

The minutes of the last meeting were read and confirmed.

The late Mr. John Eliot Howard, F.R.S.

The Vice-President moved the following resolution:—

"That this Council learns with much regret the death of Mr. John Eliot Howard, and that the President be requested to write a letter of condolence to Mrs. Howard, expressing the sympathy of the Council with her and the members of her family."

He said it was hardly necessary to say anything in support of this motion, but he felt that not only pharmacists, but the world of science generally, had sustained a great loss in the death of Mr. Howard. He hoped also that he was not going beyond the proper limits in saying that he was much struck by one remark of Mr. Howard when receiving the Hanbury medal at the hands of the President, which showed very clearly the devoutness of his spirit. One often heard of the difficulties of harmonizing faith and science, and he was much impressed with the way in which Mr. Howard avowed his faith in the great principles of the Christian religion.

Mr. Bottle had much pleasure in seconding the motion so admirably moved by the Vice-President. It was not his privilege to know much personally of Mr. Howard, but he had known his name almost as long as he had known his own.

The President heartily endorsed all that had been said by the Vice-President and Mr. Bottle. It would be satisfactory to some of the younger members of the Council, who did not know Mr. Howard personally, to hear that in addition to his other great qualifications he was regarded as a great benefactor by all his neighbours and one of the best counsellors and advisers of his district. The number of persons attending the funeral showed very strongly the great loss which all his neighbours felt they had sustained.

The motion was carried unanimously.

Appointment of Examiners for 1884.

The Council went into committee to consider nominations, and upon resuming the following pharmaceutical chemists were appointed to act as Examiners for the ensuing year, subject to the approval of the Privy Council:—

England and Wales.

Barnes, James Benjamin, 1, Trevor Terrace, Knightsbridge, S.W.
Benger, Frederick Baden, 7, Exchange Street, Manchester.
Brady, Henry Bowman, Hillfield, Gateshead-on-Tyne.
Corder, Octavius, 31, London Street, Norwich.
Ekin, Charles, 2, Lampton Road, Hounslow.
Fletcher, John, Montpellier Avenue, Cheltenham.
Gale, Samuel, 225, Oxford Street, W.
Greenish, Thomas Edward, 5, Bathurst Street, Sussex Square, W.
Linford, John Samuel, 16, Gladstone Street, Hull.
Plowman, Sidney, 2, Residence, St. Thomas's Hospital, S.E.
Southall, William, 17, Bull Street, Birmingham.
Tanner, Alfred Edward, High Cross, Tottenham, N.
Taylor, George Spratt, 13, Queen's Terrace, St. John's Wood, N.W.
Thresh, John Clough, 11, Eagle Parade, Buxton.

Scotland.

Baildon, Henry Bellyse, 73, Princes Street, Edinburgh.
Clark, William Inglis, 26, South Back Canongate, Edinburgh.
Gibson, Adam, Leven.
Gilmour, William, 11, Elm Row, Edinburgh.
Kinninmont, Alexander, 69, South Portland Street, Glasgow.
Maben, Thomas, 5, Oliver Place, Hawick.
Nesbit, John, 162, High Street, Portobello.
Stephenson, John Bertram, 48, North Frederick Street, Edinburgh.

It was resolved—

"That the Board of Examiners for England and Wales shall meet in the months of February, April, June, July, October and December in 1884; and in Scotland in January, April, July and October."

The cordial thanks of the Council were unanimously voted to the Boards of Examiners for their services during the present year.

It was also resolved—

"That this Council desires to record its sense of the value of the services rendered to the Society by Mr. Ainslie as a member for many years of the Board of Examiners for Scotland,"

that gentleman having intimated that he desired to retire from the Board.

A member was restored to his former status in the Society upon payment of the current year's subscription and a fine.

Restoration to the Register.

The name of the following person, who has made the required declarations and paid a fine of one guinea, was restored to the Register of Chemists and Druggists:—

James Alfred Jordan, 113, Every Street, Manchester.

Reports of Committees.

FINANCE.

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

BENEVOLENT FUND.

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

£20 to the widow of a member. Husband was an annuitant for six years, and formerly a member for thirty-seven years (Hampshire).

£10 to the widow of a member from 1841 to 1858. Husband was a surgeon's assistant, suffering from fracture of radius (Middlesex).

£10 to a former member from 1841 to 1881, aged 69. Suffering from heart disease (Warwickshire).

£10 to an associate in business from 1868 to 1877, to aid a fund which is being raised to enable him to emigrate (Surrey).

£10 to the widow of a registered chemist and druggist. Husband in business for many years (Huntingdon).

£5 to the widow of a registered chemist and druggist. Applicant has had three previous grants of £5 each, has to support two children and partly two others (Derbyshire).

£5 to the widow of a registered chemist and druggist. Husband died in January last; was in business in small way for twenty years (Yorkshire).

£5 to the Secretary for his Casual Fund.

The Committee had considered the resolution of the Council that the Benevolent Fund Committee be instructed to undertake the distribution of the proceeds of Mr. Robbins's special donation, and recommended that £5 be given to Henry Edward Davies, a member from 1842 to 1870, who had in former years contributed £13 13s. to the Fund.

Several other applications for assistance, after consideration, had not been further entertained.

The Committee had considered a suggestion made by Mr. Hampson, that persons other than members and subscribers should be allowed to sign petitions for assistance from the Fund, and had decided not to recommend any alteration in the present regulations.

Mr. Hampson said he should like to ask some member of the Committee to state the reasons which had induced it to come to the conclusion that it was inadvisable to make any alteration in the existing regulations in the direction he had suggested. He much regretted that the Committee had not been able to recommend an alteration which would admit of the reception of information from any trustworthy quarter. According to the present rules the Committee could only obtain information from subscribers to the Fund, or from members, or persons connected with the Society or the trade; and he could readily imagine that in small places it might be difficult to obtain the right kind of information; at any rate, he should like to see an alteration by which an applicant would be allowed to have his paper signed by other persons. It was no doubt necessary that some subscriber should attach his name to the paper, but on the other hand, the Committee would often get fuller and better information by going outside the pale of the business. As dispensers of this Fund the members of the Council ought to obtain all possible information, and he was persuaded that the present method was not sufficient, that valuable information was often excluded, and that it was just possible that the Fund might be in that way, to a certain extent, not well administered. He knew it was very difficult to get the right kind of information. The other day he signed a paper, and though he had seen the person occasionally from time to time, he could not feel that he was warranted in signing it from his own information alone. Knowing the pains the Committee had taken, he did not like giving it further trouble; but he still felt that the subject was worth further consideration.

The Vice-President said he had acted as Chairman of the Committee, and he might say that Mr. Hampson's letter was very carefully considered, and if the members of the Committee could have seen their way to adopt the recommendations made, many of them would have been very glad to do so. Amongst the reasons for coming to an adverse conclusion were the following:—It was ascertained from the office that up to the present time there had been no known case of insuperable difficulty, and *à priori* that was an argument against change. He was not quite sure that he apprehended Mr. Hampson's point, because the Committee did accept all the information it was possible to obtain, and in addition to the signatures of subscribers there was generally a mass of correspondence from outsiders which was carefully read and considered. The case which had led Mr. Hampson to write to the Committee was one in which the Committee was informed that there would have been no difficulty in obtaining the requisite number of signatures, and he would remind Mr. Hampson that in respect to small places even there need be no difficulty, because the signatories were not required to be resident in the same place; any member or subscriber resident in a neighbouring town was equally eligible. He should rather put the argument the other way and say that it was very desirable that persons who filled up the official forms should be in the neighbourhood, and if there were a difficulty in obtaining the names, that ought to be a motive for increasing the number of subscribers. Half-a-crown per annum was sufficient to qualify a man, and experience showed that persons were induced to subscribe in order that they might be able to afford assistance to candidates for the charity. If, in any small town where there were four chemists, there were not four subscribers, he thought it would not be difficult to make them subscribe. He believed the Committee was unanimous in thinking that no practical grievance had been shown to exist.

Mr. Savage thought there was a good deal in what Mr. Hampson had said, and he could readily imagine that the office might not always be made acquainted with the difficulties which arose. He could conceive that if there were two chemists in a small town there might be some antagonism between them, and the parties applied to might not readily concur in giving a recommendation. It was generally considered that a clergyman or some official person was much more likely to furnish correct information than someone living in an adjoining place. As an alternative he thought Mr. Hampson's suggestion well worth considering.

Mr. Williams thought the Committee already accepted information from the clergy, or any other resident. It required four subscribers to sign the application paper, but did not limit the information received to those four persons. No doubt it was a troublesome thing to get the paper filled np, and cases might arise in which the Committee was not able to give relief on this ground alone, though the case was a deserving one. At the same time the argument adduced that anyone could become a subscriber by paying half-a-crown was very strong.

The President, referring to the rules, said that section 8 provided that the application must be signed by four persons who had subscribed not less than half-a-guinea for three preceding years, or had given a donation of five guineas. In the case of widows and orphans, the Council was allowed to receive the testimony of four persons who had subscribed half-a-guinea for the current year. On the face of it the regulation appeared a little hard.

Mr. Richardson had considerable sympathy with Mr. Hampson's proposition, and thought it might prove a hardship in small towns that some other source of information was not available. He thought the evidence of a minister of religion would be the best obtainable. In some cases there was a considerable amount of diffidence, and these were just the cases which were often the most deserving. It was very desirable that some means should be adopted by which every deserving case could be reached.

Mr. Andrews supported Mr. Hampson's view. It was within his knowledge that difficulties had occurred in getting the paper signed. In one case he felt that he did not know so much about the person as he should have liked, and there was great difficulty in getting the fourth name. It would be a step in the right direction if all applicants were put on the same footing as widows and orphans.

The President said there seemed to be two questions involved; one, whether it was expedient to insist on as many as four subscribers signing the first certificate; and secondly, as to subsequent information, with regard to which he understood there was practically no limit. He understood Mr. Hampson to advocate allowing any responsible person to put the machinery in motion for inquiry. That he understood had been considered by the Committee, who thought it would not be to the interest of the Fund to leave the power of signing quite so open.

The Vice-President said there might be something to be said in favour of reducing the number of signatories required, and that point he thought the Committee would be willing to reconsider; but the logical conclusion from Mr. Hampson's remarks would be to dismiss the necessity of having any subscribers at all.

Mr. Robbins thought it might be desirable to have a change. It was frequently found in the case of widows and orphans that there was great difficulty in finding subscribers who could speak from personal knowledge of them, though they might have known the husband very well. If the applicants were known to a clergyman or a justice of the peace that should be sufficient; but he should be sorry to see a change with regard to the male adults, because he thought if they were not known to four members of the trade they ought not to receive assistance. He thought that any man who had been in business would be known by the chemists in another town a few miles off, and would have no difficulty in getting his paper signed. If the Committee went outside and did not limit the recommendation to clergymen and justices of the peace it would know as little about the person signing the paper as about the applicant himself. All the members knew Mr. Hampson, but if they had a paper signed by a Mr. Jones, grocer, Islington, they would have to make inquiries to know whether his recommendation could be accepted. Anyone applying for the benefit of this Fund ought to be known by his brother tradesmen, and in making grants great importance was attached to the names appended to the papers. Mr. Hampson must know that information did frequently come in from outside sources, and several instances might be named in which that outside information had been the means of securing the grant. He remembered several cases in which the Committee had received information from medical men who had attended applicants.

The Vice-President remarked that the Committee had had a good deal of outside evidence before it in dealing with applications for assistance on the previous day.

Mr. Radley said there were several new points now suggested which might be worth consideration by the Committee, but he was satisfied that in the main the principle hitherto acted upon was correct.

Mr. Young said he was not present at the Committee meetings, but he felt rather favourably disposed towards Mr. Hampson's suggestion; perhaps the name of a clergyman or justice and two subscribers might be sufficient. Even then there might be a difficulty in finding two persons who knew the applicant personally, who had subscribed for the specified time; but if the 8th section were altered in accordance with the 9th that difficulty would be overcome, because persons did not generally get into destitute circumstances all at once, and they might prepare for what was coming by getting two friends to subscribe 10*s.* 6*d.* each for a year.

Mr. Symes thought that there was certainly something to be said in favour of a modification of Mr. Hampson's suggestion. He had seen something of the working of the regulations and only remembered one case in which there was great difficulty, where a widow in advanced years could scarcely remember the names of persons who had known her husband in former times. If there had been only two names required, the thing would have been exceedingly simple. If there were an alternative, either four subscribers, as at present, or two subscribers and a clergyman or justice, so long as two subscribers at least were retained, he thought the difficulty would be got over. Or it might be accomplished by reducing the number of years for which a person should have subscribed. The difficulty did not lie in getting signatures, but in ensuring that they were signed by trustworthy persons, on whose judgment the Committee could rely. Many persons could sign papers but could not give satisfactory answers from personal knowledge to the inquiries made by the Committee. He had signed a paper for a person he had only known for about two years, but he did not do so without making numerous inquiries. If he had had to depend upon his personal knowledge he could not have signed it.

Mr. Schacht said it seemed to be thought desirable that each one should express his sentiments on this not very important matter—it did not seem very important, because he had not heard any very large number of grievances in connection with the history of the Benevolent Fund, and, therefore, *à priori* one would rather that things were left in their present condition. Supposing any difficulty arose he thought the suggestion of Mr. Hampson was not a fortunate one, because it seemed to him rather incongruous that Mr. A., who had nothing to do with the Fund, should recommend Mr. B. to give somebody else something. The people who had a right to give money were those who gave out of their own pocket, not those who gave it out of somebody else's pocket. Therefore, it seemed to him that if there were any difficulty, and it might be that, occasionally, difficulties arose, Mr. Hampson's suggestion would not be likely to commend itself. It seemed to him that the recommendation of the grants ought to come from those who found the money.

Mr. Squire said a remark had been made by the Vice-President that it would be perfectly easy for anybody to sign a paper, as he had simply to pay half-a-guinea, but, as a matter of fact, he would have to pay half-a-guinea for three years previously, and, therefore, it was quite impossible for a man even on a month's notice to make himself eligible to sign a paper.

The Vice-President said he must admit that he had been misinformed as to the amount of subscription which would qualify a person to sign, and it did give some point to Mr. Hampson's contention. It was not brought before the Committee on the previous day, and he thought it might be wise to refer the matter again. There was a great deal of force in what Mr. Schacht said, and he certainly would not allow the recommendation to be entirely outside the hands of subscribing members. He must repeat that he did not know of his own knowledge of a single case of hardship having occurred.

Mr. Borland said in looking over the list of contributors to the Benevolent Fund in various small places he found there were very few who contributed to the amount of half-a-guinea, and that rendered the difficulty of finding signatures to these papers still greater. A great many were subscribers to the extent of five shillings, and if the report was sent back to the Committee he thought it might well take into consideration the propriety of reducing the qualifying amount, and leaving out the period of three years. He did not believe the Fund would suffer in the least from such a change, but on the other hand, it would give a greater number an interest in the matter, and would tend very largely to an increase in the income.

The Vice-President said he would move that this portion of the report be referred back to the Committee.

Mr. Bottle seconded this suggestion. He rather supported Mr. Borland's view that the amount required to entitle a contributor to give a recommendation should be reduced from 10*s.* 6*d.* to 5*s.*. He did not like reducing the number from four to two. There was another view of the matter to be taken, and that was the interest of the Benevolent Fund itself. In all societies where there was a benevolent fund it was fenced round about with a certain amount of preliminary introduction, which involved the necessity of advertising the fund and making it known.

Mr. Hampson said he feared he had not been sufficiently explicit in his remarks, but in his letter to the Committee, he simply asked for the consideration of some alternative method of receiving signatures of persons other than chemists. He had not heard anything which had at all shaken his view that the present method was not exactly the best. He did not wish all the signatures to be other than chemists', but if they were combined with one outsider he thought it would be in some respects beneficial.

It was then resolved that the report and recommendations be received and adopted, with the exception of the paragraph having reference to the regulations of the Fund, and that this question be remitted to the Committee for further consideration and report.

Amount of Subscriptions in 1883.

Mr. RICHARDSON asked if the Secretary could give any information as to the amount of subscriptions received this year as compared with last year.

The SECRETARY, after making inquiries, reported that the subscriptions received up to the present time for this year were £1520 3*s.* 8*d.* Last year to the end of December, they were £1568, so that they were nearly the same. With regard to donations; last year they were £388 1*s.*, and the present year, only £94 15*s.* Last year there was £300 in legacies and this year up to the present time none had been received. On the whole, therefore, the Fund had received this year £642 less than last year.

Publication of List of Subscriptions.

Mr. SYMES moved, and it was seconded by Mr. RADLEY, and carried unanimously, that the list of subscriptions to the Benevolent Fund be published in the *Pharmaceutical Journal* of February 23 next, and that a copy be sent to every chemist and druggist on the Register.

The Secretary reported that Mr. Matterson of Dewsbury had sent a donation of twenty guineas to the Fund, in addition to a previous donation, and stated in his letter that he considered this the finest charitable institution he knew of.

LIBRARY, MUSEUM, LABORATORY, AND HOUSE.

Library.

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

Attendance.		Total.	Highest.	Lowest.	Average.
October.	Day	527	31	7	19
	Evening	206	19	4	9

Circulation of books.	No. of Entries. Town.	Country.	Total.
October	204	144	348

Carriage paid, £2 5*s.* 4½*d.*

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

Brighton Health Congress, 1881, Transactions.
From Mr. J. E. MAYALL.

Swiezawski (E. S.) i K. Wenda, Materyjaly do dziejów farmacyi w dawnej Polsce, *etc.*, 1882–83.
From M. WENDA.

Meyer (A.), Ueber Psychotria Ipecacuanha, 1883.
From the AUTHOR.

Newman (D.), On Malpositions of the Kidney, 1883.
From the AUTHOR.

The Committee recommended the purchase of the undermentioned books:—

Smith (E.), Foods, latest ed.

Laborde (J. V.) et H. Duquesnel, Des Aconits et de l'Aconitine, 1883.

Candolle (Alph. de), Nouvelles Remarques sur la Nomenclature Botanique, 1883.

Prantl (K.), Lehrbuch der Botanik, 5e Aufl., 1883.

Watts (H.), Manual of Chemistry, vol. i., 1883.

Lancet. A second copy.

Curator's Report.

The Curator had reported the attendance in the Museum during October to have been:—

	Total.	Highest.	Lowest.	Average.
Morning	516	28	13	19
Evening	116	15	1	5

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

A specimen of Benzoic Acid prepared from Hippuric Acid, and a specimen of the same prepared by sublimation. From Mr. J. T. DYMOND.

Specimen of Jamaica Jalap.
From Messrs. WRIGHT, LAYMAN and UMNEY.

Specimens of Menthol in fine crystals, and of Ceylon Gamboge in the tear.
From Messrs. HEARON, SQUIRE and FRANCIS.

Specimen of *Tachia Guianensis.*
From Messrs. SYMES and HALLAWELL.

Very fine specimens of different varieties of Ginseng Root. From Messrs. WILSON and Co., Shanghai. These specimens were brought home by Dr. V. KNAGGS.

Specimens of very fine Brazilian Ipecacuanha Root; Specimens of *Pao Pereiro* Bark, of the Roots of *Smilax Japecanga*, *Anchietea salutaris.*, *Solanum Jequirioba*, and of the leaves of *Ipeuva*, *Pipi Guiné* and *Solanum Jurubeba.*
From Messrs. T. CHRISTY and Co.

Very fine specimens of Cuprea Bark, *Cinchona succirubra* from St. Helena, Ball Tobacco from Zambesi, and the fruit of *Strychnos spinosa*; Specimen of the Oil of *Perilla ocymoides*, of Refined Cotton Seed Oil, and Herbarium specimens of the Cotton Tree.
From the DIRECTOR, Royal Gardens, Kew.

Specimens of Batoum Tea, of *Kabuklu jeviz*, *Kara Halileh*, and Kakulla Cardamoms.
From Mr. C. B. ALLEN.

The practicability of exhibiting new forms of apparatus in the Society's Museum had been considered, and the Committee was of opinion that, having regard to the limited space available in the Society's house, it was not practicable at present to devote any of the cases to this purpose.

It was also recommended that the present assistant to the Curator be engaged at a salary of 30*s.* weekly.

Estimates for printing the Register and Calendar had been submitted and approved, and it was recommended that 1600 copies of the Register and 900 of the Calendar be ordered.

A letter from the Secretary of the College of Preceptors had been submitted to the Committee stating that in consequence of the increase of time occupied by the Preliminary examination, which would involve more work for the Examiners, the fee payable to the College would have to be increased by about 30 per cent. It was recommended that this increase be allowed.

The adoption of the report and recommendations was moved by Mr. ROBBINS and seconded by Mr. GREENISH.

Mr. SYMES said he was sorry to hear the Committee had reported that it could find no room for what he considered to be a portion of the educational usefulness of the establishment. On more than one occasion he had urged the desirability of exhibiting forms of improved apparatus, and he could only say that he should move a resolution that space be acquired for the purpose. He believed that was as important as any part of the educational work there, and that there should be no space in which the things could be deposited was very unfortunate. He had hoped that some such place would have been found available. Some time ago he read a paper on Filtration, at Liverpool, when he suggested a particular form of funnel which he had seen somewhere in Paris—he had forgotten where. However, he succeeded in getting one, which he had brought up with him and intended placing on the table that evening. There might be persons present who would be interested in the matter, or there might not; but it would no doubt be reported in the Journal, and the result would be in the ordinary course of things that he should get a number of letters asking where this funnel could be obtained. It would be much more satisfactory if all those persons could know that if they came to that institution they could see such things and judge for themselves whether they would be useful. He had intended to leave it there for some time, but he now found that there was no place where a funnel holding half a pint could be put. Knowing the trouble and time spent by the Committee in doing its work, it was painful for him to disagree with any portion of their report, but he should feel it a matter of duty to the members generally to vote against that portion of the report.

Mr. Hampson said he was not able to attend the meeting of the Committee referred to, but he thought it was somewhat unfortunate that there was no place in which to deposit a few pieces of apparatus which would be interesting to chemists. It was a melancholy admission to make, but it might be that it was desirable to make it, because if small apparatus were brought in, possibly large apparatus would be; but he could not help thinking that some place ought to be found for the purpose of depositing apparatus of a simple character which might be useful and interesting to the members. What was the Society for? Not simply that there should be a Museum for showing chemicals and drugs. Surely the means by which the chemicals and preparations were made were as important as the drugs themselves. Therefore, though he did not like to vote in the teeth of the Committee's report, he thought this subject was worthy of reconsideration.

The President said the subject presented itself in several aspects. He did not think the report would apply to the case presented by Mr. Symes, but the Committee understood the proposal to be that novelties in apparatus should be exhibited, not temporarily but continuously. That was the question considered, and the answer was that it could not be done, the room in the house being wanted for other purposes, and at present it appeared to the Committee that this space had better not be interfered with. To show that the tendency of the Committee and the officers was in the direction advocated by Mr. Symes, it would be remembered that they had already suggested a little alteration in connection with the Evening Meetings, namely, that the meeting should begin at half-past seven, and that persons should be invited to send apparatus and leave it there for an hour before the business commenced, so that those interested might come and examine it. He did not think it would be necessary to pass any formal resolution to carry out what Mr. Symes required as regarded his funnel, but the question of exhibiting novelties and apparatus in these days of advancing chemistry was a very large one, and the Committee was unanimous in thinking that until the Society got the next house or some large place it could not be done satisfactorily. The Curator could take charge of small things for a certain time, but the continuous exhibition of novelties in apparatus could not be kept up in a way that would be thought satisfactory.

Mr. Savage thought the suggestion of the President a very good one as far as it went, but to his mind it did not go far enough. The number of persons who would see this apparatus at an Evening Meeting was comparatively small, and he thought it might be arranged with regard to any small apparatus, such as would be exhibited at the Evening Meetings, that it might remain for some time, so that it might be seen by other members.

The President said the Committee was very desirous that the Society's premises should be made useful to all the members. The question had been considered all round, and, as was known, novelties in materia medica and chemistry were already arranged for; but with regard to apparatus, the question of space was so very pressing that at the present time the Committee could not see its way to doing what was desired.

The Vice-President said the subject was considered with all desire to meet Mr. Symes's wishes if possible; but the Committee did not find it practicable. The question would arise, which had arisen already with regard to the national collection very close by, a large portion of which had had to be removed to South Kensington. There was not space enough in that house, and where was the line to be drawn? Between a half-pint funnel and a large soda water machine there was an enormous variety, and who was to draw the line?

Mr. Symes said he should move that the report of the Library, Museum, Laboratory and House Committee be received and adopted except that portion which refers to the space for new and improved forms of pharmaceutical and chemical apparatus, which portion be referred back to it for further consideration. In answer to the arguments which had been made use of, he would say that the Committee would certainly not pass the resolution without having the control over the things sent. He had never suggested that soda water apparatus should be sent; he did not know whether it would come within the designation of pharmaceutical or chemical apparatus. If he were on the Committee, and someone sent in a soda water machine which had a great deal of interest for pharmacists, he should inform him that there was not space to exhibit it, but if he would send a small model room would be found for it. Regulations might be made that apparatus exceeding certain dimensions could only be exhibited in model. They were told that space would be required equal to South Kensington Museum. He could only say that taking the last ten or twenty years, all improved apparatus necessary to be shown could have been put on that Council table, either in reality or in model—at any rate it could be very conveniently put in half the room. It would not be difficult to find space as time went on. He thought the importance of this subject was very largely under-estimated. When chemists read of anything interesting at an Evening Meeting they made a note of it and would go to the Society, and they would much rather come and see an improved form of apparatus than the whole of the present Museum. There was no case in the Museum which would be so likely to attract the average pharmacist to the institution as a case in which he could see the improved means by which he could manipulate the materials and carry on his business. To all men it was an important matter to know how to carry on their business with the greatest facility. He did not wish this especially for country members, because he occasionally went round in London, and he found some of the London men were quite as backward as those in the country and quite as amenable to improvement. It would be useful to all to know that they could come there and look at new things, and that would be an inducement to all to look to that institution as a central point from which they might gain information in all forms. Things of that sort would be far more useful than the fine specimens of drugs and chemicals which were to be seen in the Museum, which were not always of the character of those from which chemists had to select in making their ordinary purchases.

Mr. Williams asked if all the splendid samples were to be turned out of the Museum to make room for pieces of apparatus from all parts of the Continent and America. It seemed to him the thing was absurd.

Mr. Hampson said he felt bound to second the amendment of Mr. Symes, although he had always worked harmoniously with the Committee.

The Vice-President said he did not make the absurd remark that a place would be required as large as South Kensington Museum. He simply gave the illustration that some of the treasures of the British Museum had had to be removed to South Kensington for want of room.

Mr. Richardson said this question had been discussed for two or three years, and he thought it was hardly fair for Mr. Symes to impeach his brother councillors in the way he had that morning. No one was more anxious than he was that an exhibition should be held, if it were practicable, for their country friends, but they had had two exhibitions which had been failures.

The President said it was not a question of an exhibition, but a permanent collection of novelties.

Mr. Richardson said he had no doubt that would be carried out when the Committee could see its way clearly as to space and other matters. To his mind there was not such an immense number of new inventions, unless they took into consideration the enterprise of their brethren across the Atlantic, who were very profuse in the development of apparatus of every description.

Mr. Squire said he must challenge one statement which had been made. It was a question of space, and if it were true that that table would hold all the new and improved apparatus required it might not be such a great difficulty, but the question raised by Mr. Symes was a particular sort of funnel for filtration, and he should say that if they simply exhibited the different forms of apparatus for filtration alone, let alone anything else, it would occupy far more than the space stated. Filter presses, very good in their way and distinctly pharmaceutical, had been exhibited in those rooms; but if a filter press sent by one maker were shown all the other makers would at once want to exhibit theirs. There were various ways of filtering, as filtration by pressure and by vacuum, and he was quite certain that the Council table would not hold the different forms of apparatus used in that one process—in fact the house itself would not hold the different forms of apparatus.

Mr. Bottle said he was much surprised to hear from Mr. Symes that he had any doubt about whether soda water apparatus came within the scope of pharmaceutical or chemical apparatus, because when soda water had found its way into the Pharmacopœia there need hardly be any misgivings as to whether the apparatus would come within the definition. He thought Mr. Symes had adopted the proper course in introducing the funnel to the Evening Meeting; and all similar small portable things might be shown in the same way, and then, at the discretion of the President or the Evening Meetings Committee, they might remain within the building for a few weeks or months, available for the inspection of those interested in coming to see them. He did see, however, a great difficulty in opening the door to large apparatus, and could not tell where the line could be drawn.

The President then put the amendment, and Mr. Symes requested that the names should be taken. The following was the result:—

For—Messrs. Andrews, Hampson, Radley, Savage, Symes and Woolley. 6.

Against—Messrs. Atkins, Borland, Bottle, Butt, Carteighe, Gostling, Greenish, Hills, Robbins, Schacht, Squire, Williams and Young. 13.

Mr. Richardson was present at the division, but did not vote.

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

Mr. Greenish said he wished to suggest that whenever there was a division the names of the members voting on each side should always be taken. He had been waiting for some time for an opportunity to bring this matter forward, because some subjects came before the Council which were popular but not very important, and others which were important but might not be very popular, and when a member rose on certain occasions only to require that the names be taken it gave an air of fictitious importance to the question which would not otherwise belong to it. He would propose, therefore, that in all cases where there was a division the names should be taken.

Mr. Schacht said he was of the same opinion, and when a resolution of this kind was proposed he should be glad to support it.

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor, giving particulars of the progress made with the cases placed in his hands. It stated that—

Alexander Holmes, 40, High St., Stockton-on-Tees, trading under the name of "The Northern Counties Supply Stores," had, prior to the date fixed for the hearing of the case, remitted the penalty sued for and court costs.

Several cases of alleged infringements of the Pharmacy Act had been before the Committee, with regard to which further inquires were directed to be made.

The report was, as usual, considered in committee.

On resuming, the report and recommendations were unanimously adopted.

Pharmacy Acts Amendment Bill.

The Secretary read a communication from the Lincolnshire Association for the Prevention of the Administration of Poisonous Drugs to Horses, enclosing resolutions passed by the Association at its annual meeting on November 9, thanking the Council for the steps it had already taken with regard to preventing the sale of poisons, urging it to press on the Amended Bill by every means, and saying that the members of the Association were of opinion that it was of the utmost importance that hellebore and salts of copper should be included in the schedule. The Secretary of the Association had also informed him that a communication had been received from the Privy Council on November 7, stating that the subject of the amendment of the law respecting the sale of poisons was still under the consideration of Her Majesty's Government.

Mr. Hampson inquired if the President had any information to add to that contained in the letters just read. It was quite time the Council should know what were the intentions of the Government with respect to the amendment of the Pharmacy Act. There were instances of infringement constantly occurring. Small companies were being established for the purpose of evading the Act, and the whole thing was so unsatisfactory and so dangerous to the interests of the public that it was quite time that either the Council or the Government should take steps to remedy the evil. He should be glad to know if the President had received any communication from the Privy Council which would make it clear that it was intended to amend the law. If not it would be the duty of the Society to take the initiative and find some independent member who would introduce the Bill. The State had interfered with the dealers in drugs by legislation which was imperfect, and the Society was bound not only in the interest of the public, but in the interests of chemists and druggists, to see that the law was not allowed to become a dead letter.

The President said he was sorry to say that he could not give any further information at present. He had made use of the communication just read to go down to the Privy Council, where he was informed that the only answer that could be given to him, either privately or publicly, would be that the matter was still under the consideration of the Government; that the Government was anxious to do something, and hoped in the course of this or next month to have a clear idea on the subject. He could only say that he had put these matters prominently before the department as requiring attention and a definite reply at the earliest possible moment.

Mr. Hampson suggested that it would be well for the Committee to meet at an early date to confer with the President on the subject. Time was pressing. Parliament would meet in February, and it was probable that the Government was already arranging as to what Bills should be introduced.

The President said he should certainly summon the Committee at an early date.

Mr. Bottle thought with Mr. Hampson that it was most desirable to learn at an early date what the views of the Government with regard to the amended Pharmacy Bill were. If the Government had no intention of introducing a Bill next session it would be the duty of the Council to introduce one independently. There was no doubt, as everyone saw day by day, that the present Acts were being evaded and driven through in all directions. Whether the Government would see fit to assist in mending that condition of things was for it to decide, but the Council had a good case to lay before Parliament, and there was a little interest now stirred up in the country which would help in promoting, and probably in securing, the passing of a measure. He would suggest that steps should at once be taken in this direction, and if the President would endeavour to get some information, and summon the Committee, it would be a good thing.

Mr. Schacht said so much would depend on the position the President could take in his possible interviews with the heads of the department that he should rather like to know the view of the Council as to the direction in which it was possible that pressure might be judiciously exercised. It had been to him for a long time extremely disagreeable to have to vote for legal proceedings being taken against poor creatures who perhaps had offended against the law; who, it appeared to him, were sometimes as well able to conduct their business as he was, but who had not exactly complied with the letter of the law. It had been painful to him to be compelled to vote for legal prosecutions and taking steps in such cases, whilst at the same time he was aware that flagrant and absolutely violent hostility to the principle of the Act was being carried into practical effect by persons who just managed to evade, according to recent decisions, the letter of the law. The Council had lately been considering the case of an unfortunate individual, about whom there was some doubt as to his being legally entitled to practise, and the officers were actually taking a vast deal of pains to ascertain whether two or three gentlemen who had declared that he was right in practising were telling the absolute truth or not, and at the same time they had been informed, within twenty-four hours, that an individual whom the Council had threatened to prosecute the other day had put himself within the letter of the law by making his concern a limited liability company, and who was publicly advertising that he was defying the Act of Parliament. Could not the Council ask the President to go armed with this kind of argument? When he next found himself face to face with the Government officials, could he not urge with something like force that it was almost impossible for a body of men, constituted as that Council was, to carry out the existing Act of Parliament against petty paltry offenders, who were scarcely worth powder and shot, and who were scarcely doing any harm in the localities in which they were practising, whilst at the same time courts of law declared that they could not touch the most flagrant and successful attempts to evade the Act? Could he not say that this was a position in which no responsible body ought to be placed, and that if it could not be altered the Society should be free from the responsibility of carrying out the Act? He had used that argument himself with his own members, and if the President had the chance of using some such argument to the head of the department it ought to carry some force with it. It was a painful position to be put in to have to tread into the dirt the poor little worms in the way, whilst the bold creature in the forest, who was really the mischief-maker, was allowed to escape with impunity.

Mr. Symes said the recent action which had been taken to make the position known to members of Parliament would certainly assist at the present time; but if the Bill were delayed for another session a great deal of that effect would be lost.

The President said he would call the Committee together as soon as possible, and would endeavour to obtain some further information.

The School of Pharmacy Students' Association.

The President said an amended set of bye-laws for this Association had been submitted for the approval of the Council according to the regulations. He had read through the rules, which seemed to be all reasonable and proper rules, and he would ask the Council to approve of them.

Mr. Hills asked what was the principal alteration.

The President said the principal alteration was simply verbal, to allow the admission, as members of the Association, of any student, past or present, of the School of Pharmacy of the Society.

The rules were accordingly approved.

Preliminary Examination.

Mr. Woolley asked what steps it was necessary to take in order to place the name of the Victoria University, of Manchester, on the list of educational bodies whose certificates would be received in lieu of the Preliminary examination.

The President said that formal application must be made to the Board of Examiners, who passed it on to the Council.

EVENING MEETING.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The third Evening Meeting of the session was held on Wednesday, the 5th inst., at half-past eight o'clock.

The minutes of the last meeting having been read and confirmed, two papers were read entitled—

Notes and Suggestions upon Tincture of Nux-vomica; and

On Extract of Nux-vomica.

BY WYNDHAM R. DUNSTAN AND F. W. SHORT.

The papers are printed on pp. 441 and 443, and gave rise to the following discussion:—

Mr. Umney said there could be no question as to the great importance of the subject, both to the medical practitioner as well as to the pharmacist, for such a variation in the proportion of strychnia in the extract as the authors had pointed out was a very serious matter. He was inclined to think that the alkaloidal difference in the extract arose more from the fact that the strychnos seeds themselves differed, rather than from the mode of manufacture. The manufacture of strychnia in England was confined to one or two firms only; the custom of buyers was to refuse strychnos coming from Calcutta or Madras, and select that which came from Calicut. He imagined that they had found that the latter yielded a larger percentage of alkaloid than the others. He was looking forward to enlightenment from the authors upon this point, for he did not know any book in which the percentage yield of these alkaloids was recorded in the same way as the different percentages of alkaloids yielded by cinchona barks were mentioned. As to the abstraction of the oil, he was not at all sure that such was practised. Speaking for himself, he invariably operated on large quantities of nux-vomica for the sake of convenience, and he had generally used a spirit about 63 degrees over proof, containing say 90 per cent. of alcohol. So far as the removal of the oil from the extract was concerned, he did not think that that would be carried out by any manufacturers in an extract so produced. His own notion was that proof spirit would be the most suitable solvent. Certainly it would act less upon the oil; and if it extracted both the strychnia and the brucia and other extractives equally well as rectified spirit and the latter not in excess, he did not see any reason why it should not be far preferable to alcohol of 85 to 90 per cent.

Mr. Brownen would like to ask the authors whether their attention had been called to a solid extract which, about a year or two ago, was in the market, and which was prepared by means of acid and water. He believed that the acid was acetic. The extract was exhibited in the form of dry chocolate coloured masses. It might be that acetic acid in a dilute form, similar to that used in the preparation of the extractum colchici aceticum, might be of advantage in the extraction of nux-vomica.

Dr. Symes said that in a discussion which took place at the Pharmaceutical Conference on a paper on this subject by Messrs. Dunstan and Short, Mr. Conroy, Liverpool, suggested that possibly the higher strength of certain liquids was due to the fact that they had been extracted with a weaker spirit, because it was found that all the tinctures of higher specific gravity contained more alkaloid. At the last meeting of the Liverpool Chemists' Association, Mr. Conroy had read a paper on the subject, in which he recorded experimental results that agreed pretty well with those obtained by the authors of the present paper.* He (Dr. Symes) would suggest that the authors, in pursuing this subject, should ascertain whether proof spirit removed the alkaloid from the oil; that is to say, whether it separated a certain amount of oil which was bitter, and which gave evidence of containing some alkaloid which, possibly, was present as free alkaloid and not as a salt. If that was the case it would be interesting to ascertain whether the proof spirit or the mixture of 100 parts of rectified spirit and 25 parts of water, as recommended by the authors, really washed out the alkaloid from the oil. If it did not do so, that fact certainly went against using the weaker spirit. An extract was, however, much more elegant when prepared without the presence of much oil. Speaking of tincture of nux-vomica, the authors mentioned that the amount of alcohol which they used did not exhaust the nux-vomica, as the marc in each case was bitter. It had occurred to him that as the process was one of maceration, of course the marc as left would be still saturated with the tincture, and to ascertain whether the tincture was capable of exhausting it, it would be necessary to try some further experiments. One would fancy that the quantity of spirit which they used was capable of exhausting it, and, in fact, in the case of the extract it did appear to be sufficient. Mr. Conroy, since writing his paper, had operated on three quantities of the same nux vomica, namely, 100 ounces of each. With rectified spirit he obtained 8½ ounces of extract. With a mixture of equal parts of rectified and proof spirit he got 10½ ounces of extract, and when he used proof spirit he got 11½ ounces. As a larger percentage of extract was obtained by using the weaker spirit, it was necessary, of course, in examining the extract for alkaloid to recognize the fact that a larger percentage of extract had been obtained. The appearance and character of these extracts indicated that the oil was no advantage. The presence of the oil made the extract more difficult to combine, and it formed a very tenacious and unsatisfactory substance to work into a pill mass. He was glad that the authors were giving their attention to the question of uniformity of strength in tincture of nux-vomica. He had known as much as a drachm dose of the tincture prescribed, and the variation in the strength which had been indicated would be a very serious matter.

Mr. Giles said that very many years ago he suspected the judiciousness of the strength of the spirit employed in making tincture of nux-vomica especially, and he was led to the conclusion that a weaker spirit was more effectual. He was glad to hear his opinion substantiated by the present paper. As he had said on former occasions, he thought that the whole question of the alcoholic strength of tinctures wanted revision. There appeared to have been a kind of superstition that there was something magical in the conditions of rectified and proof spirit. He was sorry that this subject had not been taken up by pharmacists in England before being apparently nearly worked out in the United States. After all, that which he regarded as the most important feature of the paper was the question of standardizing preparations. When they were dealing with such potential agents as nux-vomica in the forms of extract and of tincture, it was perfectly absurd that they should be absolutely ignorant of their relative strength. He thought that pharmacists had been a little too much the slaves of the Pharmacopœia. When a preparation got into the Pharmacopœia it appeared to be felt that nobody had a right to interfere with its essentials, and that all that pharmacists could venture to do was to endeavour to carry out the instructions of the Pharmacopœia in the most convenient way. Hence pharmaceutical research was stifled, and was not allowed to exercise itself as it ought to do. The reason evidently was that they had no chance of dealing with the Pharmacopœia. They were not the makers of the Pharmacopœia and he was not clear that they were fit to be the makers of it, but he was quite sure that nobody else was so fit. Inasmuch as the Pharmaceutical Society and pharmacists did not appear to be able to get their claims recognized, he would suggest that they should constitute themselves a Pharmacopœia Committee, and that they should raise a fund with which to endow a pharmacopœia laboratory. The notion of producing a pharmacopœia appeared to be, to slumber for ten years and then to wake up and say, "Let us make a pharmacopœia;" whereas the work was one which should be going on incessantly from day to day. He regarded it as worthy of the consideration of the members of the Society to take a new departure and put themselves into such a position that no body thenceforward should attempt to touch the Pharmacopœia without coming to the Society and receiving the benefit of those stores of information which it had accumulated.

Mr. Greenish said that, as pharmacists, they had been alive to the question of the strength of spirit used in making tinctures. On one occasion during the Presidency of the late Mr. Haselden, he (Mr. Greenish) had read a paper on this subject and had suggested that pharmacists would do well to turn their attention to the Homœopathic Pharmacopœia, where the relative proportions of spirit and water were suited to the various ingredients.

Mr. Dunstan, in reply, said that with reference to the origin of the seeds, Mr. Short and he had started an investigation upon that point, but it was somewhat difficult because there were no good specimens to be obtained in England, and the work had to be done abroad. He was glad to hear the opinion of Mr. Umney, as a manufacturer, with reference to the preparation of the extract; but it appeared to him that the examination of the extracts undoubtedly pointed to the fact that manufacturers either used a more dilute spirit or removed the oil. Mr. Umney appeared to think that the more dilute spirit was employed, and that the oil was not removed. The preferableness of proof spirit in the making of extract was not suggested in the paper, but, in the case of tincture, the paper pointed out that the stronger spirit was to be preferred, because it percolated better. It seemed desirable that, as far as possible, the composition of the present extract should be maintained. That extract had won its way as a therapeutic agent, and it would require therapeutic experiments before it could be said that the oil should be excluded. As to the use of acetic acid, he had never seen extract prepared by that means, and he did not consider that such a method was desirable, especially as nux-vomica could be exhausted by means of alcohol and water. With reference to what had been said by Dr. Symes, he was pleased to hear that Mr. Conroy's experiments were confirmatory; but at the same time he should have been glad to have heard earlier that Mr. Conroy had taken up the subject, for a great deal of trouble might have been saved thereby to Mr. Short and himself (Mr. Dunstan). Their present work was, however, begun before their paper was read at the Conference. As to the fact that the marc was found to be bitter, the marc in that case had been washed with a small quantity of alcohol before it was tasted, so that the associated tincture might be removed. Dr. Symes seemed to think that there were conflicting statements in the paper with reference to the strength of spirit. He would find that that statement was made with reference to maceration and percolation. Where percolation was used, and sodium chloride was employed, the marc was entirely free from

* The paper referred to by Dr. Symes, has been received and will be published next week.—Ed. Ph. J.

bitterness; and where alcohol and water, in the proportion of 100 to 25, was used, it was nearly free from bitterness.

The PRESIDENT said that it was extremely satisfactory to find that Mr. Conroy, Mr. Giles and others had confirmed the results obtained by the authors. With regard to the question of the Pharmacopœia, to which Mr. Giles had referred, it was one of those matters which were not likely to be lost sight of by the President of the Society. But he thought that they would agree that the time had not quite arrived for the commencement of a Pharmacopœia laboratory. This, however, was a matter which belonged to what in "another place" would be called politics, rather than to the subject of the paper.

A vote of thanks to the authors of the papers was then passed.

A paper was then read entitled—

TINCTURE OF CINCHONA.

BY EDWARD GRINDLE HOGG.

This was followed by a paper on—

THE ALKALOIDAL STRENGTH OF TINCTURE.

BY J. O. BRAITHWAITE.

The papers are printed on pp. 444 and 445, and gave rise to the following discussion:—

Professor ATTFIELD, referring to the table given in Mr. Hogg's paper, asked whether it was to be understood that the amount of alkaloid in the tincture and the amount of the alkaloid remaining in the marc together equalled the quantity of alkaloid in the bark. It did so in No. 1 and No. 3, but not in No. 2 and No. 4.

Mr. HOGG said that the separate quantities added together were intended to make up the amount originally contained in the bark. They did so exactly in two cases, but in those they were only taken by difference, while in No. 2 and No. 4 the figures were obtained by actual experiment.

Mr. EKIN said that the reason for the two papers which had been read was found in an observation credited to Dr. Paul in a discussion on the bark question last session. Mr. Hogg's paper referred to a difference between Dr. Paul's results and his (Mr. Ekin's) results, and the reference was justified by the remark of Dr. Paul, that he could not confirm his (Mr. Ekin's) statement. That statement was, that upon operating on a bark which contained 2 per cent. of total alkaloid soluble in ether, the bark having been specially selected for the purpose as being rich in quinic and quinovic acids, he was able to extract the whole of the alkaloid in the tincture. There was no question about that fact. Dr. Paul operated upon totally different barks, very rich in combined alkaloids and very rich in cinchotannic acid which, as was known, locked up the alkaloids very much. Hence Dr. Paul obtained different results, as might be expected. It was hardly scientific to say that Dr. Paul either agreed or disagreed with his (Mr. Ekin's) results, because the barks examined were totally different. Sample No. 3 in the paper corroborated the result at which he (Mr. Ekin) had arrived. Mr. Hogg had stated that he found that the tincture exhausted the bark about half, but that was hardly the case. No. 2 gave 38 per cent. in the tincture; No. 3, 30 per cent.; and No. 4 as much as 67 per cent. As Mr. Hogg said, probably this difference had nothing to do with the proportion of quinine; but he (the speaker) would suggest that in further investigations the quinic and cinchotannic acids should be investigated, for he considered that they affected the result very much. He thought that Mr. Braithwaite must have misunderstood him. He could not have suggested that a bark, rich in colouring matter, was likely to be rich in alkaloid. He saw no connection between the two.

Mr. NAYLOR wished to know from Mr. Braithwaite whether the relation between the ether and the total alkaloid was constant throughout his experiments. Apart from that, they did not know the significance of the ether residue.

Mr. UMNEY said that veterans in pharmacy must have laughed within themselves upon finding that for forty or fifty years they had been going on in such happy ignorance of the real value of tincture of cinchona. He was glad that young pharmacists were taking this and other preparations in hand and bringing chemical knowledge and experiment to elucidate those points which previously had been but little understood. It seemed pretty clear from the experiments of Mr. Hogg and Mr. Braithwaite that generally about 40 per cent. only of the alkaloid was dissolved; but he agreed with Mr. Ekin that no hard and fast line could be laid down. He (Mr. Umney) knew from experience that the extraction of alkaloids from barks rich in cinchotannic acid was not easy. In commerce they had what was known as soft *Carthagena* bark, which contained very little colouring matter. Then again, they had soft Columbian bark and quilled *Calisaya* bark. Also, there was flat *Calisaya* bark which possibly Mr. Hogg had operated upon, the true kind of which did not appear at the present time in the London drug market. All these varied in the degree in which they gave up their alkaloid. Mr. Naylor had correctly remarked that though an alkaloid was soluble in ether it by no means followed that it was quinine. In extracting cinchona barks with ether in making analyses, the cautious operator always converted into sulphate and waited for crystallization; indeed, one could only speak positively upon quinine when it was in a weighable crystalline form.

The PRESIDENT congratulated and welcomed Mr. Hogg on his first appearance as the reader of a paper in that room. As members of the Society they were glad to see one who had so comparatively recently passed through the School of Pharmacy presenting work which would do credit to the Society. As to Mr. Braithwaite, he had had some experience as a reader of papers, but they would desire to encourage him to continue his work in that and other directions.

A vote of thanks to the authors of the two papers was then passed.

Two papers were then read, entitled—

THE PURGATIVE PRINCIPLE OF CROTON OIL; AND THE VESICATING PRINCIPLE OF CROTON OIL.

BY HAROLD SENIER.

The papers are printed on p. 446, and gave rise to the following discussion:—

Dr. MEEK said that the experiments which he had made on the non-vesicating portion of croton oil seemed to show that in small doses it acted upon the stomach, and in larger doses upon the intestines without affecting the stomach. The smaller doses seemed to produce nausea and, in one case, vomiting; but those results were not produced when a larger dose was given to produce a purgative effect. The doses were given in the form of pills. It was a question whether the purgative action might not be much more speedy if the principle was dissolved in oil. It was difficult at present to speak of the value of this agent from a therapeutic point of view, for croton oil was very rarely given; but he should presume that the principle which Mr. Senier had described operated by producing a peristaltic action of the intestines.

Professor ATTFIELD said that one of the first questions which occurred in connection with a paper of this kind was as to the origin of the raw material employed by the worker. He believed that Mr. Senier had satisfied himself that the oil used in the present experiments was as genuine as that used in the experiments of 1867; but it was desirable that Mr. Senier should give some information on that point. He (Professor Attfield) must record his admiration of Mr. Senier's courage in swallowing a dose of the vesicating substance. As he had done that, he had, probably, tried the substance externally, and perhaps could tell them whether it was likely to be as useful as the vesicating material of cantharides.

Mr. SENIER, replying, said that he believed there was now only one presser of croton oil in England, and the oil which he had used was obtained from that source. When Professor Redwood wrote there was more than one source of supply in England, and he believed that Professor Redwood experimented on foreign oil as well as English. He (Mr. Senier) had had very little experience of cantharides in its most concentrated form. The vesicating principle of croton oil would vesicate in two hours, producing a number of watery blisters.

Thanks were accorded to the author of the papers and to Dr. Meek.

The PRESIDENT, in concluding the meeting, wished to say, in parenthesis, that it was a matter of extreme gratification to him, as an old student of the Society, that every paper read that evening had been written by or associated with some student of the School of Pharmacy. This fact showed that students, past and present, were interested in the progress of pharmacy, and it showed the importance of considering the subject to which Mr. Giles alluded in an earlier part of the evening.

Professor ATTFIELD acknowledged the compliment included in what had just fallen from the President. It was particularly pleasing to him (Professor Attfield) as the representative on that occasion of the school to which allusion had been made. The fact which the President had mentioned was largely due, however, to the encouragement which the Pharmaceutical Society had always given to the prosecution of original research, and also to the encouragement which they had given to the School of Pharmacy Students' Association. He believed that all the authors of the papers read that evening had been members or officers of that Association.

The next evening meeting was announced for Wednesday, February 6, 1884.

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.

A meeting of the above Association was held on Friday, November 23, at the Museum and Library, Queen's Road. The President, Mr. G. F. Schacht, in the chair.

Mr. White communicated the result of his observations of *Lithospermum purpureo-cœruleum*, with the object of drawing attention to some hitherto neglected points in the morphology of this beautiful wild flower. Although absent from the greater part of Britain, it grows in many spots in the west of England, and some of its stations being within the area of the Bristol coalfield, it can be regarded as a local plant. There are many old woods and coppices of oak, beech, and hazel nestling in the hollows and on the flanks of the Mendip range of hills where the soil is simply fragments of limestone with a little loam. The *Lithospermum* shelters amid the coarse herbage and entangled briars on the sunny fringes of these woods, seldom penetrating far into the shade, nor yet venturing more than a yard or two into the open ground. Although its mode of growth is well adapted for speedy travel over large tracts of ground, it does not spread; its limits being apparently restricted by some influence not easy to determine.

Botanical writers from the earliest times have named this species "the creeping Gromwell;" but notwithstanding that one or two old authors seem to have been correctly informed, none of the manuals in present use describe accurately the manner in which it is propagated. The plant is variously stated to have either a creeping root or prostrate creeping barren stems, and it is said also that the fruit is but rarely produced. Repeated examination at different seasons has brought out the fact that the root does not creep; that fruits are ripened on every cyme, if not in every calyx; and that the barren stems which rarely spring from a flowering root are primarily erect, then high-arching, and ultimately root at the tip, often at a considerable distance from the parent. These points with some others were illustrated by a series of dried specimens gathered near Congresbury, Somerset.

Mr. Algernon Warren read a paper upon "Scientific Discoveries which have, in the first instance, been the result of Accident." The cases especially dwelt upon were:—The improvements in the manufacture of pottery as developed by Astbury; the discoveries of Geber, Van Helmont, Paracelsus and Roger Bacon, during their vain endeavours to find the "elixir of life" and the "philosopher's stone;" those of Galvani in animal electricity, and the somewhat legendary accounts of the first production of glass and of the first hints obtained of the value of cinchona bark. Mr. Warren urged these considerations upon the attention of the younger portion of his audience as a motive for the exercise of a close observation of the minutest details connected with the processes of pharmacy.

The President then read a communication entitled "Suggestions for the Convenient Preparation of Sal-volatile, with a Note concerning the Element Time in Chemical Changes," in which he drew attention to the excellent paper by Dr. Thresh, read at the Evening Meeting of the Pharmaceutical Society on February 7 last, and especially to the fact that the process therein recommended not only produced good and constant results, but was one easy of adoption even by those whose appliances for manufacture generally were limited. He considered it the duty of pharmacists to insure, as far as possible, that the public obtained, for every individual pharmaceutical preparation demanded, the same thing wherever it was procured; and he hoped Dr. Thresh's recommendations would tempt many who were not in the habit of making their own sal volatile to do so for the future, and thus help to uniformity in this very popular remedy. He had to suggest two modifications of Dr. Thresh's process that would render its execution still more easy. First, that the essential oils be distilled with much less than the whole of the spirit—say one-sixth part—and mixed with the rest; this would permit the employment of much smaller apparatus and lessen the risk of accident. And, secondly, in the preparation of the ammonia solution, if (say in the production of 1 gallon of sal volatile) 4 oz. of powdered carbonate of ammonia, 8 oz. of stronger liquor ammoniæ, and 10 oz. of distilled water were mixed in a stoppered bottle and occasionally shaken *during two or three days at ordinary temperature*, there would be no necessity to heat the mixture to 140°—the molecular re-arrangement by which all the acid carbonate of ammonia is converted into the normal carbonate takes place gradually but completely—60° *plus* a longer time being equivalent for this purpose to 140° *plus* a shorter time. Heating a bottleful of ammonia to 140° might be attended with some amount of risk which would be completely avoided by the adoption of the above suggestion. Then, when the two liquids were prepared in the manner indicated and the aqueous one poured gradually into the spirituous, the mixture would take place without the deposition of a particle of ammonia salt. Undoubtedly, as Dr. Thresh had pointed out, if the ammonia solution were rapidly effected in the cold and added *at once* to the spirit a deposit of ammonia salt (the unchanged acid carbonate) would result, but if the solution were kept for days and then added, all would be well.

These points were illustrated experimentally and attention was drawn to the importance of the factor Time in the completion of, perhaps, all chemical changes that occurred in masses of matter.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

The Scientific Basis of Cookery.

A course of Cantor lectures was commenced on Monday, at the Society of Arts, upon "The Scientific Basis of Cookery," by W. Mattieu Williams. The lecturer introduced his subject by stating that he was not prepared to discourse upon technical cookery, but only intended to treat the subject technicologically, and he remarked upon the rapid progress being made in the extension of a knowledge of cookery among all classes. The technology of cookery, he said, included a branch of organic chemistry which was at present very imperfectly understood; and he compared the kitchen to a chemical laboratory in which certain chemical changes in the organic constituents of food are effected by the application of heat. Referring to the well-known properties of rough and polished surfaces as respectively good and bad radiators, he stated that radiation was the principal agent in the application of heat in cookery, and he also explained the difference between conduction and convection, as discovered by Rumford, which he described as a result consequent upon a philosopher burning his mouth whilst eating rice porirdge. Mr. Williams referred to the popular fallacies existing respecting the simple operation of the boiling of water, many people fancying that water when "boiling hard" is of a higher temperature than when just simmering, and being unaware of the enormous loss through heat becoming latent in the conversion of water into steam. The lecturer attributed the prevailing preference of roasted over baked meat, amongst the people of the middle class, to a prejudice having arisen from the old custom of baking their joints in a common oven, which, like the baker's oven, was also usually heated in a manner unsuitable for the cooking of meat. He advised that, in the operation of baking, meat should be submitted to a high temperature for the first few minutes, in order to obtain a coating of coagulated albumen which would prevent the juices of the meat from exuding; the temperature then to be lowered to the "cooking temperature" of 160° or 180° F., but to be again gradually raised shortly before the meat was completely cooked. Mr. Williams further stated that meat when baked sustains less loss in weight than when roasted, and that there is also less refuse. In regard to the method of cooking eggs by means of water at present in vogue, he considered it a bad one, and said that if an egg were kept in water at a temperature of 160° F. to 180° F. for about fifteen minutes, it would be much preferable to one *boiled* for three minutes, as is the custom, since the albumen of the egg was more uniformly coagulated and left in a more digestible condition; he also incidentally mentioned that he had lately observed that the yoke of an egg coagulates at a lower temperature than the white. The lecturer then remarked that many people believed that boiling and stewing were one and the same thing. This, he said, was completely erroneous, as meat intended to be boiled should be immersed in boiling water and the temperature maintained for the first few minutes to coagulate the outside albumen and thus *keep in* the juices; whilst in stewing the water should be raised gradually from a low to a high temperature in order to *extract* the juices. At the close of the first lecture, Mr. Williams remarked that the French were far in advance in researches in the science of cookery, and pointed out that as far back as forty years ago a commission had been appointed by the Academy of Sciences in Paris to report upon bone soup.

Manufacture of Mineral Waters.

At the ordinary weekly meeting on Wednesday evening, Mr. T. T. P. Bruce Warren read a paper upon "The Manufacture of Mineral Waters." The lecturer remarked at the commencement of his paper that he should purposely omit any account of the history of the manufacture, and only refer to the increase in the variety of non-alcoholic beverages and bottles as compared with those of a few years ago. He believed that this had no doubt induced consumers to regard such drinks less in the light of medicines, and to consider them pleasant and suitable beverages for the table. Mr. Warren stated that not long ago ginger, lemons, sugar, and citric and tartaric acids, were the only vegetable products used in their manufacture, and that these with a few inorganic salts might be said to have constituted the materia medica of this trade; owing, however, to the more general use of aerated waters, artistic skill had been developed and thus they had been greatly improved. One thing of the greatest importance, he said, was the use of pure wholesome water in the manufacture, and to the importance of this requirement the manufacturers were fully alive. Such water was generally obtained by filtering, though methods of distillation and boiling were also practised. The principal impurities of water were then referred to and the means taken to remove them. Mr. Warren next proceeded to give a detailed account of the process of manufacture, and of the machinery employed. He described the manufacture as consisting of three stages; the washing or purification of the carbonic acid gas, the saturation of the water with the gas, and the flavouring. He stated that an improvement had been effected by Mr. Forster in the saturation of the water with the gas. The old method had been to agitate the gas with the water in a copper vessel lined with tin; but by the new process they were allowed to fall through a series of fine perforations, thus becoming thoroughly mixed. The lecturer also mentioned that the whiting used for the generation of gas should be carefully stored, as it was greatly affected by damp, and had a great capacity for absorbing noxious vapours. He considered the operation of bottling a most important part of the manufacture, as if much free oxygen was present in the water the flavourings, especially if they consisted of essential oils, would be seriously affected. The mode generally adopted to overcome this was to exhaust the water of air before introducing the carbonic acid gas. He pointed out that great improvement had been made in the stoppers of the bottles, a great many patents for which had been taken out, the latest having been that of screw-stoppers. The lecturer specially mentioned the late Mr. Hooper as a successful manufacturer of imitation spa waters, which had arisen from a suggestion of Dr. Garrod.

In the discussion which followed, Dr. B. W. Richardson, the chairman, remarked that this paper showed that an important rivalry with alcoholic drinks had been established. Mr. Doyle, in speaking, stated that the demand for machinery for the manufacture of mineral waters had greatly increased, his firm alone having sold last year machines, the aggregate producing capacity of which would probably be about 3,000,000 bottles of soda water per day, some of the larger machines being capable of filling 3000 dozen bottles each daily. Mr. Foster referred to the impetus given to the trade by the introduction of small bottles or "splits," and expressed an opinion that if the sellers of aerated waters would be content with a more moderate rate of profit, one of the greatest drawbacks to the trade would be removed. He added that at present he was engaged in elaborating a method for the bottling of ales, in which all the atmospheric air would be removed from the liquor before bottling, and replaced by carbonic acid gas, and he affirmed that in ale so treated the intoxicating property of the alcohol was considerably modified, whilst the flavour remained unaffected.

Communications, Letters, etc., have been received from Messrs. Moeller, Learoyd, Thompson, Conroy, Samuel, Potter, Griffin and Co., Dyer, Allen, Sandford, Waverley, Fraxinus.

TINCTURE OF NUX-VOMICA.*

BY MICHAEL CONROY, F.C.S.

In the discussion which followed the reading of Messrs. Dunstan and Short's excellent paper on Tincture of Nux-vomica at the recent Pharmaceutical Conference at Southport, I ventured to suggest that the variation in the alkaloidal strength of the samples which they had analysed might possibly be due, in some measure, to the alcoholic strength of the spirit employed in their preparation; since in the table showing the analytical results of the twelve samples, those tinctures of higher specific gravity, and presumable lower alcoholic strength, were, as a rule, richer in alkaloids than those of lower specific gravity and higher alcoholic strength. To make this clear it will be necessary to reproduce Messrs. Dunstan and Short's table.

Analysis of Tinctures of Nux-Vomica.

No.	Specific gravity.	Percent of total alkaloid	Percentage of strychnine	Percentage of brucine.
1	0·8426	0·224	0·077	0·147
2	0·8409	0·262	0·097	0·165
3	0·8438	0·208	0·068	0·140
4	0·8392	0·124	0·049	0·075
5	0·8450	0·360	0·121	0·239
6	0·8378	0·211	0·084	0·127
7	0·8377	0·136	0·046	0·090
8	0·8552	0·181	0·066	0·115
9	0·8398	0·196	0·077	0·119
10	0·8413	0·189	0·087	0·102
11	0·8407	0·168	0·060	0·108
12	0·8436	0·263	0·131	0·132

If this table be analysed by separating the six tinctures showing the higher from the six showing the lower specific gravity, we find that the average specific gravity of the first six is 0·8452 with an average alkaloidal strength of 0·237; against specific gravity 0·8393 and an average alkaloidal strength of 0·183 in the second six, thus:—

Tincture of high sp. gr.			Tincture of low sp. gr.		
No.	Sp. gr.	Percentage total alkaloid.	No.	Sp. gr.	Percentage total alkaloid.
1	0·8426	0·224	2	0·8409	0·262
3	0·8438	0·208	4	0·8392	0·124
5	0·8450	0·360	6	0·8378	0·211
8	0·8552	0·181	7	0·8377	0·136
10	0·8413	0·189	9	0·8398	0·196
12	0·8436	0·263	11	0·8407	0·168
Average	0·8452	0·237	Average	0·8393	0·183

On thus examining the figures, a strong *primâ facie* case against strong alcoholic menstruum presents itself for further investigation, notwithstanding that there are other causes that would affect the alkaloidal strength of the tincture, such as the variable quality of nux-vomica, careless manipulation, insufficient comminution of the seeds, etc. The specific gravity may also vary in a legitimate manner, though not to the extent above shown, from two causes: firstly, by the amount of extractive matter contained in the seeds, which is as variable as the amount of alkaloid they contain, though it does not necessarily follow that seeds yielding a high percentage of extract should give a corresponding amount of alkaloid; secondly, by the dehydrating influence of spirit of this strength upon the powdered seeds which, by abstracting the moisture usually contained, would become of greater specific gravity. On the other hand, it is not at all probable that nux-vomica powder, even if thoroughly dry, could dehydrate the rectified spirit of the Pharmacopœia, so as to produce a tincture of less specific gravity than the menstruum used, as shown in 6 and 7. I am consequently forced to the opinion that a stronger than the official spirit of specific gravity ·838 has been used in these and in some of the other cases of low specific gravity.

A few degrees difference in the strength of an alcoholic menstruum would, in the case of nux-vomica, which contains so much albumen, considerably affect the resulting tincture in strength, from the fact that strong alcohol, by abstracting water, would harden the thick parenchyma of the cell walls, and thus render them impermeable to its action; while the water contained in a weaker spirituous menstruum would swell up and soften the cell walls and thus, by osmotic action, enable this description of menstruum to reach their interior and extract the soluble matter.

With the object, therefore, of testing the action of alcoholic menstrua of various dilutions, the following experiments were put in hand. In each case the B.P. process was followed, and the same nux-vomica used. This was carefully reduced to powder in the usual manner and passed through a silk sieve of 100 meshes to the square inch.

No. 1 made with proof spirit, specific gravity 0·920.

No. 2 made with a mixture of half proof and half rectified spirit, specific gravity 0·882.

No. 3 made with rectified spirit, specific gravity 0·838.

No. 4 made with rectified spirit, specific gravity 0·830.

No. 5 made with a mixture of equal parts absolute alcohol and rectified spirit, specific gravity 0·820.

No. 6 made with absolute alcohol, specific gravity 0·795.

These tinctures after completion were tested as follows:—1000 grain measures of each, representing 100 grains of nux-vomica, were evaporated, and the resulting extract dried until it ceased to lose weight. The alkaloids were next extracted and separated by Messrs. Dunstan and Short's method. The results are fully stated in the following table.

Analyses of Tinctures of Nux-vomica prepared with Menstrua of various Alcoholic Strength.

No.	Sp. gr. of menstruum used at 60° F.	Sp. gr. of tincture at 60° F.	Percentage of dry extract from tincture.	Percentage of total alkaloids.	Percentage of strychnine.	Percentage of brucine.
1	0·920	0·924	1·353	0·209	0·083	0·126
2	0·882	0·886	1·320	0·209	0·084	0·125
3	0·838	0·842	1·056	0·190	0·077	0·113
4	0·830	0·834	0·957	0·119	0·045	0·074
5	0·820	0·823	0·803	0·081	0·030	0·051
6	0 795	0·798	0·748	0·032	—	—

From this it is seen that both the extractive and alkaloidal strengths of the tinctures decrease in proportion as their alcoholic strength increases, except

* Read at a meeting of the Liverpool Chemists' Association, November 22.

in the case of No. 3, which represents the B.P. menstruum. In this, although we find an important decrease in both extract and alkaloid, the proportion of alkaloid to extract is greater than in any of the other tinctures. For instance, No. 2 gives 1·320 grains per cent. of extract to 0·209 grain of total alkaloid, while No. 3 yields only 1·056 grains of extract to ·190 of total alkaloid, whereas to be proportionate with No. 2 it should only yield 0·167 per cent.; thus $\frac{1·056 \times ·209}{1·320} = 0·167$. In Nos. 4, 5 and 6 there is a greater decrease in the alkaloids than is shown in the extract, and this is due to the fact that the oil of the seeds was taken up in these experiments, and more especially in No. 6, by the menstruum used.

In reference to the relative proportion of strychnine to brucine, I scarcely expected to find any variation, and the result, which in each case is the average of two determinations, fully bears this out. Before leaving this part of the subject I must ask to bear testimony to the great excellence of the method devised by Messrs. Dunstan and Short for the separation of these alkaloids. The plan is simple, expeditious and reliable.

The deduction to be drawn from these experiments is that the rectified spirit of the Pharmacopœia, and spirit containing a higher percentage of alcohol, are unsuitable menstrua for the extraction of the active properties of nux vomica, for the reason that they harden up and cannot freely penetrate the cell walls; whilst menstrua of the strength of No. 1 and 2 do this completely, and thoroughly exhaust the powder. Either of these would advantageously replace the rectified spirit now used in the official process, since both produce tinctures of superior quality. No. 2 is superior to No. 1 menstruum, inasmuch that it does not swell up the powder to the same extent, and consequently percolates more freely.

Another important point in connection with this and other tinctures of such powerful therapeutic potency is the adoption of some method of insuring greater uniformity of strength than at present exists. With this tincture some means of attaining this end are of vital importance, on account of the very variable nature of the nux-vomica found in commerce, and some years ago Mr. Siebold suggested that it be made from the extract, which would to some extent attain the object in view. His suggestion, in what may be termed an improved method, appears to have been adopted in the new U.S.P., which directs that 20 parts of nux-vomica, in "No 60 powder," be extracted by percolation with a menstruum consisting of 8 parts of alcohol, specific gravity 0·820 and 1 part of water. The first 90 parts of the percolate is reserved and the remainder evaporated to 10 parts and mixed with the reserved portion. A convenient quantity of this tincture is then taken and evaporated in a water-bath to dryness, and from the weight thus obtained a calculation is made and the tincture diluted with more of the menstruum so that it will contain 2 per cent of dry extract.

The evaporation here mentioned would be quite unnecessary were a less alcoholic and more suitable menstruum employed, since there should be no difficulty in thoroughly exhausting 20 parts of powdered nux-vomica with sufficient menstruum to produce 100 parts. The point, however, to which I wish to allude is the mode of assaying the tincture that is adopted This is defective, inasmuch as it gives extractive instead of alkaloidal strength; whereas with very little more trouble the percentage of total alkaloids could be obtained, and the tincture standardized on this basis.

In conclusion I have to express my thanks to Messrs. Evans, Sons and Co. for supplying the materials and allowing these experiments to be conducted in their laboratories.

VEGETABLE TALLOW FROM SINGAPORE.

BY W. T. THISELTON DYER, C.M.G., M.A., F.L.S.

The very interesting note on the above substance, by Mr. Holmes, in a late number of the *Pharmaceutical Journal* (November 24, 1883, p. 401), requires a word of comment. We have not, as far as I know, received a specimen of the vegetable tallow known as "Minjak Tankawang." But Madame de Vries de Vries, who was lately on a visit to England, brought to Kew, on behalf of Professor Van Eeden, of Haarlem, a specimen of a plant of which he informed Sir Joseph Hooker, in a letter (November 11, 1883), the "Indian name is Minjak Tangkawang, and it yields a fat." I have little doubt, therefore, that this is the plant which yields the vegetable tallow about which Mr. Holmes has written. Madame de Vries de Vries added that Professor Van Eeden "had shown his plant to Mons. Pierre, from Charenton, author of a Flore forestière de Cochinchine, whom perhaps you know. Mons. Pierre thought it likely the plant is no *Hopea*, but belongs to the *Sapotaceæ*."

This opinion is certainly correct. The plant is no *Hopea*, but, undoubtedly, *Sapotaceous*. The curious point, however, is that my colleague, Professor Oliver, informs me that he is unable to refer it to any known genus of the order. For the present then, till more complete material is obtained, it must remain undescribed. Madame de Vries de Vries adds in a subsequent letter that "the plant .... came from Bandjermassing, Isle of Borneo."

The name, Minjak Tankawang, has been applied to many *Dipterocarpeæ*, especially Hopeas, and W. H. de Vriese published in 1861, at Leyden, a folio tract under this name, containing a number of descriptions of new species. It is *à priori* unlikely, however, that any species of *Dipterocarpeæ* would yield a vegetable tallow from the seeds, because the members of the family are characterized by the presence of oleo-resins in the tissues and not of fatty bodies. On the other hand, the seeds of *Sapotaceæ* are rich in the latter class of substances, *e.g.*, argan oil from *Argania Sideroxylon*, mee oil from *Bassia longifolia*, shea butter from *Butyrospermum Parkii.*

I suspect that Mr. Holmes's specimens will prove identical with a substance which has long been known and which in the Kew Museum is referred doubtfully to a species of *Bassia*. We possess specimens of "Tankawang oil" and the decorticated seeds which yield it, which came to us from the India Museum. They are labelled "Borneo, *Bassia* sp." We also have an old Kew specimen labelled "Concrete oil from a species of *Bassia*; Sakarran; Sir James Brooke," which is probably the same thing.

We may fairly, I think, hope that now the origin of this interesting substance has attracted the attention of Mr. Holmes and Professor Van Eeden, the doubts attending it will be cleared up. As a contribution to this end I have written this brief note.

THE PREPARATION OF PURE BENZOIC ACID FROM URINE.*

BY T. S. DYMOND.

[Contribution from the Research Fund of the School of Pharmacy Students' Association.]

In the production of some glycocine from hippuric acid, for the confirmation of the reported synthesis of uric acid, the results of which investigation I partly brought before this Association last year, I obtained as a bye-product—benzoic acid. The preparation of benzoic acid in this way is interesting, because it is indirectly obtained from urine, hippuric acid being derived from that source, and because the use of such benzoic acid, which, as hitherto prepared, retains the odour of urine, is prohibited by British, German and United States Pharmacopœias. This being the case, I have made a few experiments to determine in what way benzoic acid thus obtained differs from that obtained from gum benzoin.

Preparation.—The commercial method of preparing benzoic acid from urine is by boiling putrid urine (which contains the hippuric acid in solution) with hydrochloric acid. A purer body will obviously be obtained at little more expense by first separating the hippuric acid, and this now is frequently done commercially. The phosphates in the urine taken are precipitated by lime. The urine is neutralized with hydrochloric acid, and evaporated to a low bulk. Strong hydrochloric acid is then added in excess, and the hippuric acid which separates is washed and recrystallized and sometimes further purified and decolorized. The purified hippuric acid is then heated with strong hydrochloric acid and the mixture kept at its boiling point till the hippuric acid has entirely disappeared and dark oily drops of benzoic acid have begun to form. On cooling and adding water the benzoic acid crystallizes out in the form of flattened plates, which are washed and dried.

$$\left\{\begin{array}{l} CH_2.(NH.C_7H_5O) \\ CO.OH \end{array}\right. + \left\{\begin{array}{l} H \\ OH \end{array}\right. =$$

Benzamidoacetic Acid + Water= or Hippuric Acid.

$$\left\{\begin{array}{l} CH_2.NH_2 \\ COOH \end{array}\right. + \left\{\begin{array}{l} C_7H_5O \\ OH \end{array}\right. \text{ or } \left\{\begin{array}{l} C_6H_5 \\ COOH \end{array}\right.$$

Amidoacetic Acid or Glycocine. + Benzoic Acid

Benzoic acid thus obtained has that peculiar urine-like odour which quite unfits it for use in medicine.

I have found, however, that when this impure acid is carefully sublimed, it can be obtained in a state of perfect purity and in beautiful crystals, which recrystallize from water in a form different from that in which the acid crystallizes before sublimation, but identical with that in which benzoic acid obtained from gum crystallizes.

Tests.—The only test in the British Pharmacopœia for benzoic acid is that of smell—benzoic acid is to have an agreeable aromatic odour resembling that of benzoin. As gum benzoin differs very much in smell, some specimens containing styrol, and others vanillin, while others have no particular odour, as the specimen of Palembang gum from the Museum of the Pharmaceutical Society, there is much commercial benzoic acid which does not answer to this test and has not the aroma which it is understood gum benzoin should have.

* Read at a meeting of the School of Pharmacy Students' Association, November 29.

In the German Pharmacopœia there are three tests. The acid is to have the smell of benzoin and also an empyreumatic odour, and is to be of a yellowish or yellow-brown colour. This is to ensure the acid being prepared by direct sublimation of the gum. However, benzoic acid thus made, if the operation be performed with care and at a low temperature, may be quite colourless. It is a pity that the acid should be required to be contaminated, simply to prevent adulteration with acid obtained from other sources. In order to obtain it colourless a temperature of 160° C. is quite high enough for the sublimation of the whole of the acid. At first water and dark coloured hydrocarbons volatilize together with some benzoic acid; these must be allowed to escape for two or three hours. The benzoic acid may then be collected, a free outlet being always allowed for the less readily condensible vapours.

Before the end of the operation all these vapours will have passed away and the temperature may be raised even to 230° C. without any risk of contaminating the acid.

The second test is to prove the absence of cinnamic acid, and depends on the fact that the odour of oil of bitter almonds is evolved when cinnamic acid is warmed with an oxidizing agent. It is difficult to get benzoic acid, which has been sublimed directly from gum, always free from cinnamic acid; for all varieties of benzoin occasionally contain this acid, and sometimes it has been said no benzoic acid ('Pharmacographia'); and it is only by the lime extraction method that the cinnamic acid could be got rid of, as it sublimes in the same way as benzoic acid.

The third test is to prove the presence of volatile hydrocarbons, and depends on the fact that known quantities of styrol and vanillin and some other liquid hydrocarbons reduce a known quantity of solution of permanganate of potassium in a certain time. This test is also faulty, for if a few drops of permanganate solution be added to a crystallized solution of the impure urine-benzoic acid, decolorization occurs in a very short time, although no styrol or other aromatic hydrocarbon is present. Almost any organic matter indeed will effect this change.

The United States Pharmacopœia implies that benzoic acid must be made from benzoin by extraction with lime, for the acid is to be white and to have only a faint aromatic odour of benzoin. It is not to have the smell of oil of bitter almonds or stale urine, thus preventing the use of benzoic acid prepared from toluene or from urine.

Two additional tests are given.

1. A solution of benzoic acid in pure cold sulphuric acid, when gently warmed, should not turn darker than a light brown. This is a good test for the absence of organic impurity.

2. Benzoic acid mixed with freshly ignited and moistened cupric oxide should not yield a green coloration to the flame when applied on a platinum wire. This test is meant to prove the absence of chlorobenzoic acid, which may occur as an impurity if the benzoic has been made from toluene. It must be performed with great care, for if the mixture be allowed to get too hot, the cupric oxide combines with the benzoic acid, and colours the flame an intense green. The mass then must be kept moist. It will be seen from these tests that all the Pharma

copœias require that benzoic acid must be prepared from gum benzoin. The German Pharmacopœia directs that it is to be made by sublimation, have a yellowish-brown colour, aromatic odour, and contain a substance (styrol ?) capable of reducing potassium permanganate. Hence the benzoic acid of the German Pharmacopœia is not intended to be chemically pure. The United States Pharmacopœia indicates that it should be prepared by the lime method and be chemically pure. Urine-benzoic acid can never answer to the tests for the former, but when prepared by the method above described, it will be seen that it comes up to the standard imposed by the tests for the latter.

The following table shows how five specimens of benzoic acid compare with each other:—

	Urine benzoic acid unsublimed.	Urine benzoic acid sublimed.	Benzoic acid extracted with lime from Palembang gum.	A commercial specimen of benzoic acid.	Benzoic acid sublimed from Penang gum.
Solution in cold H_2SO_4 when warmed is	Dark brown.	Light brown.	Light brown.	Light brown.	Dark brown.
Mixed with moist CuO gives in the flame	No green tinge.	No green tinge.	No green tinge.	No green tinge.	No green tinge.
Warmed with solution of $K_2Mn_2O_8$ gives	No odour.	No odour.	No odour.	No odour.	Smell of oil of bitter almonds.
A cold solution with $K_2Mn_2O_8$ becomes	Colourless in 5 minutes.	Not colourless in 12 hours.	Not colourless in 12 hours.	Not colourless in 12 hours.	Colourless in 5 minutes.
Crystallizes from an aqueous solution in	Prismatic needles.	Flaky crystals.	Flaky crystals.	Flaky crystals.	Small needles.
Odour	Like urine.	Faintly aromatic.	Faintly aromatic.	Disagreeably aromatic.	Strongly aromatic.

It would appear then that benzoic acid prepared from hippuric acid is totally unfit for use in medicine, unless it has been sublimed. When sublimed its character is entirely changed. Instead of crystallizing from water in large prisms, it does so in flaky crystals like the natural varieties. It has lost its offensive smell and has even a faint aromatic odour. It is purer than the acid obtained by direct sublimation of the gum, for it does not contain any volatile hydrocarbons, and solution of permanganate of potassium was only decolorized after long standing. It is pure benzoic acid and is identical with the specimen of acid extracted by lime from Palembang benzoin.

From these experiments it will also be seen that the absence of urine-like odour in a sample of benzoic acid and its conformity to the United States Pharmacopœia tests cannot be taken as indicating that it has not been prepared from urine.

My thanks are due to Mr. Holmes for the assistance he has given me in the identification of the resins, and to Mr. Dunstan for his suggestions and help while working in the Laboratories of the Pharmaceutical Society.

SKETCHES OF TYNESIDE TECHNOLOGY.*

BY B. S. PROCTOR.

In 1868 Mr. Isaac Lowthian Bell read to the Newcastle Chemical Society its first inaugural address. In December, 1882, it fell to my lot to read the final address to the same Society, and it now is my duty to read to you the first inaugural address of the Newcastle Section of the Society of Chemical Industry.

These events mark certain stages in the chemical history of our neighbourhood, and suggest a review of the changes which have taken place, and which have been to some considerable extent chronicled in the transactions of the former Society.

In 1868 we find Mr. Bell sketching the history of the alkali manufacture on the Tyne, from the days of Dundonald and Losh, in the infancy of the Leblanc process. We find him remarking that other chemical industries of our neighbourhood commenced long before that time, glass manufacture, for example, dating two hundred and fifty years ago. We note, not without agreement, his remark that our local chemical industries being so numerous, and of so early a date, the initiation of a Chemical Society might have taken place before the year 1868.

We find him comparing and contrasting the operations of the test-tube and blow-pipe with the great operations of the tank and the furnace, where bulk and long continued action tend so much to modify the results; and in turn comparing or contrasting the operations of the manufacturer with the greater and more protracted operations of nature, as we read the results tabulated in geological strata. He traces how observation leads to experiment, and experiment to the manufacturing process, quoting in illustration Neilson's adoption of the hot blast, and Pattinson's process for the desilverization of lead.

He points to the combination of mechanical ingenuity and chemical skill which produced Swan's photographic carbon printing, a combination of talents which is highly desirable in the experimental chemist, and absolutely essential to any distinguished success on the part of anyone developing a new chemical industry—a position in which my illustrious predecessor has become so well known. Mr. Bell then points to the aid rendered by chemical knowledge when the Neapolitan Government raised the price of sulphur, and how esparto grass was brought to the relief of the paper manufacture when the supply of rags was unequal to the increasing demand for printing paper—a temporary difficulty proving in these, as in many other cases, to be the seed of future development. In commercial chemistry it is the money difficulty which is usually the incentive to the new departure. In theoretical chemistry the incentive is generally a difficulty in explaining some particular phenomenon, as illustrated in Mr. Bell's next example, how the difficulty of reasonably accounting for Fraunhofer's lines incited many observers to study the subject, and, ultimately leading Kirchhoff to the first steps in spectrum analysis, laid the foundation of stellar chemistry. Mr. Bell next illustrates with an experiment the phenomenon of supersaturation and the starting of crystallization by the con-

* Address delivered on October 4 to the Newcastle Section of the Society of Chemical Industry on the occasion of the opening of the Session 1883-84.

tact of a mote-laden atmosphere. He sketches some of the theories regarding the cause of air so acting, and connects these phenomena with the initiation of putrefaction and disease by the floating of germs in the air. Finally he urges greater economy in the use of fuel, that the root of our prosperity may be lasting. Many of these subjects have had repeated notice at the meetings which we have held during the fourteen years of our existence as a Newcastle Chemical Society, and we note the progress which has been made in knowledge by the papers which have been read and the discussions which have taken place in connection with them.

Turning again to the first of these subjects, first in importance as well as first in order—the alkali manufacture — we find numerous contributions of matter relating to it. First, the late Mr. R. C. Clapham, in 1870, gave us an interesting paper on the manufacture of soda from salt by its decomposition with litharge, a process introduced by Lord Dundonald in 1790, and worked on a manufacturing scale by Mr. William Losh, in 1799, with the striking result that 100 tons of salt treated with 300 tons of litharge yielded 3 tons of caustic soda. The undecomposed salt was of course recovered and the lead re-smelted for another operation. With so small a yield from so large an operation it is not surprizing to learn that the value of a 70 per cent. caustic soda was then £85 to £90 per ton. The process which Mr. Clapham himself worked in 1869 to 1870 at Walker was a modification of this as patented by Mr. Bachet. But with all the progress of theoretical and practical chemistry during three quarters of a century, the difficulties of the process had been but partially overcome, and the gain in this direction had been outstripped by the greater advances in other methods of manufacture and the consequent progress downwards in chemical prices. Though Mr. Clapham's experiments led to effecting a decomposition of about 50 per cent. of the salt instead of 5 per cent., to using the oxide of lead many times without resmelting, and to avoiding small losses of lead by refinements of operation—though the great sulphuric acid chambers were rendered unnecessary, and the heaps of tank waste promised to be no longer a thorn in the side of the chemical works, yet the process was relinquished as being less satisfactory than that of Leblanc.

In December, 1870, Mr. Glover tells us in his inaugural address that the alkali manufacture still awaits the coming man, not to introduce a shorter process than the Leblanc, but rather to perfect that system. Now we must admit, though Mr. Glover cries out against the imperfection of the Leblanc method and the losses of soda that occur at its various stages—the loss of 2 or 3 per cent. in converting salt into sulphate, and the loss of 10 per cent. in converting sulphate into soda ash—this margin of theoretically preventable loss is too small to encourage any hope of the perfecting of the process, prolonging its vitality in the face of any new series of reactions which could give a substantial advantage in other respects.

At the meeting in March, 1872, Mr. Clapham again reported the progress made in trying the Bachet system on the manfacturing scale, and in his paper he said that the experiments "in a merely commercial sense are not yet successful."

It is to the honour of Mr. Clapham and his partners that he battled so long against the difficulties of making a new process profitable. Had the pecuniary result been satisfactory, paying the way of work and utimately paving it with gold, we should have heard much of him as a pioneer of progress, and it is well for us to remember and to honour the man who works in faith and reaps no reward. It is not, however, without some feeling of satisfaction that we see the soda manufacture saved from association with such an insidious poison as lead. Soda enters continually into our medicine, our beverages, and our food, besides its application to our skins as soap; and if a fraction only of the 5 per cent. of lead which he lost found its way into these articles of daily and hourly consumption, the health of the community would almost certainly suffer.

Dr. Lunge in his inaugural address of October, 1872, gave an account of an alkali process which he had attempted to found upon the reaction described by Professor Wagner, in which bicarbonate of baryta effects the decomposition of sulphate of soda. This Dr. Lunge modified by using sulphate of soda, carbonate of baryta, and carbonic acid, obtaining his carbonate of baryta by precipitating the sulphide with carbonic acid, and obtaining his carbonic acid from a limekiln. There are two points in which this process is essentially wanting in the characters likely to make it attractive: the most important is that it starts with sulphate of soda instead of salt, and consequently leaves untouched the necessity for the sulphuric acid works and the consumption of the equivalent of HCl. In the second place it works with a poisonous material. Baryta, however, is of a character much less objectionable than lead. But these objections would not have retarded its adoption had the pecuniary experience proved favourable. The obtaining of the theoretical yield of alkali, instead of losing 12 per cent., as is common in the Leblanc process, affords no compensation for the increased cost of working, though it may be theoretically better chemistry to obtain the greatest possible yield and a product of the greatest possible purity.

After describing his own experiments, which had not threatened to disturb the old lines of action, Dr. Lunge notices such innovations as at that time were more imminent of a revolution. "What between Hargreaves, Young, Weldon, and Deacon, not to mention many others," says Dr. Lunge, "nearly all the time-honoured plant of the alkali works seems to be doomed to destruction." He adds, however: "Somehow or other the great revolution has not yet been accomplished. The old plant is still in existence everywhere, only augmented here and there by an appendix according to Weldon or Deacon."

In the following year Dr. Lunge again comments upon the alkali manufacture, but in 1873 the ammonia process had come into prominence—a process which had its origin under patent by Dyar and Hemming in 1838, and which had undergone improvements at the hands of various manufacturers between that time and 1873, but never gained a footing as a successful competitor of the Leblanc system till about that time, when, as Dr. Lunge informs us, "many factories are in the course of erection, one of them for a production of nearly 100 tons of soda ash per week." But he still looks upon its position as only threatening rather than actually competing with the older one, for he adds: "If the ammonia process really should be the process of the future, it is quite evident that those localities will have the best chance for it where strong brine is to be had for next to nothing, and that the manufacture of alkali will shift to different localities from the present;" and he exhorts the workers by Leblanc's method to use every care and adopt every improvement, that they may be able to compete with any other process in the future.

In 1874 Mr. John Pattinson reviews the progress of a few preceding years, and comments upon the secrecy which at that time surrounded the proceedings of Messrs. Brunner and Mond, at Northwich, but quotes the opinion at that time held by Mr. Weldon, that the ammonia process is "so slow, and the apparatus so expensive, that it could not be economically worked." In the next paragraph Mr. Pattinson reports that the "Hargreaves process of decomposing common salt is now making considerable progress." Again, in 1875, he reports that the alkali manufacture "in its main features still remains the same as when it left the hands of the famous Leblanc." "The only rival plan which has hitherto met with any measure of success is the so-called ammonia process. In England this process is now carried on, somewhat extensively I believe, by Messrs. Brunner and Mond." So we note the quiet, almost stealthy advance of this great revolution. Leblanc had ruled so long, competitors had been so many and so short-lived, that it was difficult to believe anyone would come with power to overthrow the elaborate and long-established system of the alkali works. The excellent quality of the ammonia-soda is noted with appreciation, and Mr. Pattinson, speaking with the caution of one who knows that he does not know all particulars, adds, "It is said that the plant is very liable to get out of order, and that the alkali is produced at a very high cost;" and, "Moreover, it is said that 5 per cent. of the ammonia used in the process is lost for every ton of alkali made." The last paper on the alkali manufacture which appears in the transactions of the Newcastle Chemical Society is from the German of Hasenclever, and is mainly devoted to reviewing the relative advantages and importance of the Leblanc and the ammonia processes in the production of German alkali. But now, in 1880, they are regarded as equals in importance, if, indeed, the ammonia process has not asserted its superiority; for in the estimation of their relative costs the Leblanc process only shows to equal advantage by including in this estimate the value of hydrochloric acid as 1*s.* and the recovered sulphur as 3*s.* on the 100 kilos. of 100 per cent. soda produced, and the writer admits that "on the relative advantages of the one process or the other no exact judgment can as yet be formed." Since that time the Leblanc process has had a desperate struggle for life. At any rate, in our own neighbourhood this is evidenced by the numerous ruined castles of that industry which stud the Northumbrian shore of the Tyne.

In your society, gentlemen, I feel that it would be presumptuous to offer, or even to hold, any opinion on the future prospects of the alkali trade of the Tyne. I will therefore pass on to notice more briefly some of the other subjects which offer some material for technical history, as they are recorded in our five small volumes of transactions.

Of the various chemical operations which have a special local interest, the desilverization of lead is next in importance to the alkali manufacture. The Pattinsonization of lead has remained essentially the same as it was when first worked out by the late Hugh Lee Pattinson, and is the mode by which the greatest part of the lead of commerce is purified up to the present time. The first notice of this subject in our transactions is by Mr. John Pattinson, in his address, in October, 1875, where he briefly describes Rozan's improvement upon Pattinson's original mode of working, and then describes the modification of Parke's method as worked by Messrs. Locke, Blackett, and Company, in which the silver is separated by adding zinc to the melted lead. Both these processes are again alluded to in 1878 by Mr. Clapham, but without indicating any change in the mode of working. A month later Mr. N. Cookson presented us with a valuable paper on the Rozan process as carried on at his works.

In 1882 we had short but important communications from Mr. Glover and Mr. Cookson, in which they dissipate the fiction that the alloys of lead with small proportions of antimony or copper are less acted on by sulphuric acid than is pure lead.

Sulphur, its economy and recovery from alkali waste has been under consideration at several of our meetings. Perhaps the most important of these occasions was the supplementary meeting to our first session, when Mr. Mond described the process he had then recently introduced, blowing air through tank waste till partial oxidation is effected and soluble sulphur compounds formed, including hyposulphite of lime, bisulphide of calcium and sulphydrate of calcium, the proportions of which can be regulated by the degree of oxidation, and when so regulated the addition of HCl effects the precipitation of sulphur without evolution of sulphuretted hydrogen.

In the following year sulphur comes in for the passing comment that its disappearance from the alkali works, having abdicated in favour of pyrites, was the occasion of the appearance of the copper manufacture on the Tyne. Notwithstanding the importance of the subject nothing more of note was submitted to the Newcastle Chemical Society.

Economy in consumption of fuel has been treated in many papers, but only in an incidental way. The subject being a pressing one in every manufacture, and in almost every process, has been continually before us as an element, favourable or otherwise, in almost all proposed changes. Fuel, as coal and gas, has been the subject of several papers of importance, Mr. Pattinson's on gas and gas-burners having excited much interest, especially in this neighbourhood. In the first of these papers he showed that burners in actual use in Newcastle were only capable of yielding a light equal to $3\frac{4}{5}$ candles from a consumption of gas which should have produced $17\frac{3}{4}$ candle-light if burned to the best advantage. The pointing out of so glaring an extravagance could not fail to attract attention, both on the part of consumers who were getting less than quarter the value for their money, and on the parts of producers of gas who had a reputation to keep up regarding the illuminating power of their product. Nor were the makers of gas-burners slow to see the advantage of a paper which showed that new lamps were better than old ones. This paper was followed by a second from the same author at the next meeting (Feb., 1876), in which he pointed out the merits of the most recently improved burners, and of the clear glass and obscured globes.

In January, 1882, he again addressed us on the subject of gas-lighting, his object on this occasion being to show the merits and demerits of increasing the illuminating power of gas by impregnating it with the vapour of naphthalene, a subject which at the time was attracting much attention in the town. Improved Bunsen burners was the subject of an interesting paper by Mr. Wallace in 1875.

In 1876 the explosions of coal-dust in mines was the subject of comment from Professor Marreco, whose experiments in that direction were of great importance; and in 1878 Mr. Pattinson commented on the quality of the small coal used on the Tyne. Closely allied to these are several important papers on furnaces.

In 1872 Mr. Gibb described his mechanical calcining furnace. Jones and Walsh's decomposing furnace formed the subject of a paper by Mr. Clapham in 1876; and Mr. Mactear described his development of a mechanical furnace in its application to alkali manufacture in 1878. In the following year Mr. Berkley gave us a paper on magnesium limestone bricks as a furnace material capable of withstanding the highest heats which a furnace can produce.

At the meeting in December, 1878, Mr. Swan exhibited a rod of carbon which had become bent while heated *in vacuo* by a powerful electric current, remarking that it had become curved "as if from softening." The sooty deposit which had taken place on the inside of this lamp formed the subject of a note by myself in March, 1879, and another from Mr. Swan in December of the same year. The conclusion at that time arrived at was that the carbon was mechanically carried from the ignited filament to the sides of the containing vessel by the action of the residual air, and not truly in the condition of vapour. In connection with this, we should probably ask, What is vapour?

In the *Philosophical Magazine* for July, 1883, Dr. Fleming describes the deposit of copper on the inside of Edison lamps, apparently according to the laws of radiant matter. One of the points of difference between the Edison lamp and that of our townsman is that Edison unites his carbon to the platinum conducting wires by means of copper clamps, the carbon filament being electrotyped with copper to insure good electrical contact. In Swan lamps the globe contains no material but the carbon film, platinum wire conductors, and an infinitesimal residuum of air. Dr. Fleming says that when carbon is deposited on the inside of the Edison lamp it is in a continuous coat, but when copper is so deposited the molecules appear to be thrown off in straight lines from the point of heated metal, so that a shadow of the carbon filament is thrown upon the opposite side of the globe, the shadow consisting of a line of clear glass upon which no copper has been deposited. In Swan lamps which I have had the opportunity of observing (and there are several here on the table for your inspection) I have never seen such a shadow in either the carbon or the platinum deposit.

My son, Mr. Charles Proctor, who is electrical engineer at the Swan Works, at Benwell, informs me that these carbon deposits which occur when a lamp is overheated occur even more in lamps with the highest *vacua* than in those less perfectly exhausted. This would rather discourage the idea of the molecules being carried by currents in the residual air, and as yet we are wanting in evidence of the molecules being thrown off in radiations, and equally wanting in any indication of the carbon having been in a truly gaseous condition.

As the highest temperature to which the carbon can be raised fails to give any appearance of softening, I think we must give up any idea of the bending noted in 1878 being consequent upon an incipient plasticity; and if the smoky deposit is supposed to be the result of vaporized carbon we may also suppose that it cannot be melted except under the combined action of heat and pressure.

Several lamps on the table illustrate the condition of the smoky deposit. There are four in which the deposit has accompanied the formation of an arc, and four in which the arc has not been formed, or the current has been stopped at the moment of its formation. In none of them can any symptom be observed which would indicate such a radial projection of molecules as to throw a shadow of the filament on the opposite side of the globe. There are also two broken globes, in one of which you may notice a patch of the deposit has been burned off by the heat of a spirit lamp, showing that the deposit is almost entirely carbon. In the other fragments the purple-black tint shows that an arc had formed by fracture close to the platinum wire, scattering platinum upon the glass almost free from carbon, as the film is little affected by heat, and almost entirely removed by *aqua regia*. These deposits have all been formed intentionally by passing through the lamps stronger currents than they were intended to carry.

(*To be continued.*)

AMERICAN DRUGS.*

BY J. MOELLER,

Botanist and Microscopist of the Imperial Forest Institute, Mariabrunn, near Vienna.

The Americans are eagerly investigating their indigenous flora for substitutes for the drugs of the old world. Their endeavour toward an independent materia medica is, without question, perfectly proper, and should they occasionally in this endeavour overshoot their mark (a something which the American nature is prone to do), it should not be forgotten that our knowledge of the remedial properties of our drugs was not achieved at one stroke, but that we are indebted for it to the experience of a thousand years.

It is very unjust, in my opinion, to regard with suspicion, as is generally done, everything bearing American endorsement; a previous thorough investigation would seem to be a matter of justice. If several of the American drugs which have of late years been heralded as specifics have not fulfilled the promises made for them, a remembrance on the other hand of our experience with several preparations of European origin and endorsement will move us to forbearance. In this manner the sanguine expectations aroused by extravagant claims have a good effect; the whole world is stimulated, and even impelled, by them to give the drug a trial, and in a short time judgment is passed on it. In a few weeks the excitement is past, and not unfrequently we have as a result an acquisition to our medical treasures, as, for instance, in the case of cundurango and salicylic acid. Such discoveries are, it is true, not made every year, but, it seems to me, that the least important and even the most insignificant are worthy of cognizance.

The well-known house of Parke, Davis and Co., of Detroit, Michigan, U.S., have most obligingly furnished me, for experiment, samples of the crude drugs from which their widely-known pharmaceutical preparations are made. These samples form the basis of the following descriptions:—

I. CORTEX RHAMNI PURSHIANÆ (CASCARA SAGRADA).

Convex or quill-shaped pieces of bark, three finger-breadths or more in width, and something over 2 mm. in thickness, violet-brown and smooth on the exterior surface, and Morocco yellow and finely wrinkled on the inner surface. In the older, superficially grooved specimens the thin corky, brownish layer peels off in places from the ochre-yellow net-like base; in the younger, occasionally quill-shaped bark, the superior surface is broken up into irregular divisions—a finger-breadth apart, pointed at both ends and about 1 mm. in width at the middle.

The bark breaks with a short fracture; the external broken surface is smooth; on the internal the greater part is thickly studded with very delicate brush-like fibres of at most 1 mm. in length. To the unaided eye the diagonal incision appears nearly homogeneous. Under the lens one sees dispersed on the outer part bright spots, in the bast radiant streaks, with irregularly disposed diagonal lines between them.

Microscopical Structure.—The cork membrane numbers in a thickness of 0·045 mm. from 8 to 12 series of regular smooth somewhat thick-walled but never sclerotic cells, and borders directly on the tangentially disposed primary bark, which here and there maintains

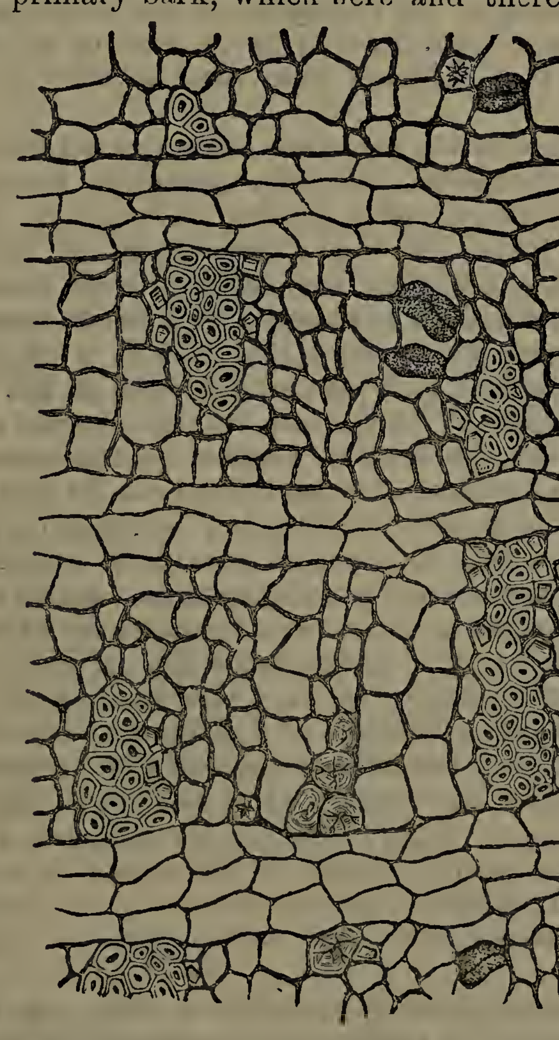


Fig. 1.—Transverse section through the bast layer.

a collenchymatic character. There is no cork. In the parenchyma of the bark are found, scattered irregularly,

* Reprinted from the *Therapeutic Gazette* and translated from the *Pharmaceutische Centralhalle*, 1882, Nos. 28, 31 and 33. We are indebted to the courtesy of Messrs. Parke, Davies and Co., of Detroit, for *clichés* of the original engravings illustrating this series of articles.

groups of spherical stone cells (up to 0·4 mm. in diameter), whose elements are not increased, which are thickly disposed and which are accompanied by individual rhomboidal crystals while in the thin-walled parenchyma crystalline glands predominate. The inner bark (Fig. 1) is usually separated into two or three divisions of very uniform breadth by the medullary rays. These consist chiefly of soft bast in which the ethmoidal tubes are distinguishable on cross section from the narrower and rounded parenchyma cells by their wider and irregular lumen. The ethmoidal tubes are connected by several (4–6) wide sieve-plates of quite porous structure and covered with a thick callus in the young bast layers; on the radial lateral surfaces they have rounded sieve fields. The parenchyma cells are coarsely spotted on the radial and horizontal surfaces, and in a tangential direction they are loosely united and partially separated. The bast fibres form small plates usually of two or three rows which extend over only a few bast rays and are disposed alternately among the neighbouring plates. They are surrounded on all sides by chamber fibres with separate crystals, while the bast parenchyma has but a few glands.

Groups of stone cells similar to those found in the middle bark are rarely found in the bast. The radiations of the medulla are very slight and consist of thin walls between the bast fibres. They contain no crystals but have instead a friable, lemon-yellow substance (rhamnoxanthin ?) which dissolves in water with a yellow, but which when dissolved in cold potassa lye assumes a dirty red colour. Starch is absent from all parts of the bark.

Cascara sagrada differs very clearly from the "cortex frangulæ" which is officinal in the German, Norwegian, Swedish, Danish and Russian pharmacopœias, in the thickness and fragility of the bark, the frangula bark being at most 1 mm. in thickness and of a tough fibrous nature. An excellent distinctive feature of the American variety is the groups of stone cells found in the middle bark and sparingly in the bast. These were also found to be absent in other varieties of *Rhamnus* examined by me (see J. Moeller, 'Anatomie der Baumrinden,' Berlin, 1882). It is also noteworthy that there is a hardening of the radiations of the medulla between the groups of bast fibre, as in the case of the *Rhamnus tinctorius*, thus differing from most of the other Rhamnaceæ.

The source of the cascara sagrada (sacred bark) is the *Rhamnus Purshiana*, DC. (*Rh. alnifolius*, Pursh., *Frangula Purshiana*, Cooper), a shrub or tree 7 m. in height, which is found on the Pacific slope of the United States. Its branches are covered with down. The leaves are elliptical in shape, 5 to 8 cm. in length and 3 to 8 cm. in width, having a leaf stalk of 2 cm. in length, blunt at the base, pointed and dentated at the margins. When young the leaves are thickly covered with hair, but later become smooth, similar to the leaves of the *Frangula Caroliniana*, Gray, indigenous to the southern states. The flowers are disposed in dense corymbs, are small and white, and develop into black triangular fruit the size of a pea, each containing three shining seeds.

Cascara sagrada seems to be identical with Chittem or Shittem bark, under which name Ed. A. Mayer learned as early as 1850 that the bark was used by the Indians and trappers of California as a cathartic. More recently it has been very extensively employed in America, where it is regarded very highly as a remedy in constipation and dyspepsia. Dr. J. R. Boyd, for instance, regards it as being as nearly specific in its action as quinine (!) and finds in addition that as a remedy in chronic constipation small doses are more beneficial than large doses.

Two preparations manufactured from the bark are almost exclusively employed: an alcoholic extract and an elixir, made with dilute alcohol and glycerin, and the oils of orange and cinnamon, etc. A formula for the preparation of these was submitted by George W. Kennedy to the American Pharmaceutical Association (reprinted in the *Druggists' Circular and Chemical Gazette*, August, 1881, and in the *Pharmaceutical Journal and Transactions*, September, 1881). Complaints are already made of the existence of false varieties in the market. In the March, 1882, number of the *Therapeutic Gazette*, it is stated that owing to the ignorance of the drug-gatherers a large quantity of worthless and inert bark of other varieties has been placed on the market.

(*To be continued.*)

CALIFORNIA OLIVE OIL.*

Adjoining the Hollister place is the 2000 acre ranch of Mr. Ellwood Cooper, which is the model country place and fruit farm. It is almost unnecessary to rehearse the statistics of the 150,000 eucalyptus trees of fifty different varieties, the 12,500 almond trees, the 4000 walnut, the 3500 olive, the 200 fig, the 200 vine, and the odd hundreds of other fruits. Mr. Cooper was the first to introduce the eucalyptus tree to California, and has seven miles of windrows and shade trees of this one species on his place. A greater distinction has come to him in the last few years, as the first one in this country to engage in the manufacture of olive oil from olives. Don Josef de Galves brought the first olive slip to California in 1769, and around all of the old Franciscan missions are groves and remnants of olive groves that sprang from those original cuttings. Mr. Cooper planted his first olive slips in 1873, and he has now a fine grove in full bearing, although the trees are mere saplings in point of age to some of the century-old olive trees in Italy and the south of France. To the inexperienced an olive tree looks very much like a willow tree, save that the leaf is darker and the under side of it is of silvery white, that shows with beautiful effect when stirred by the wind. Botanically it belongs to the jasmine family; has an evergreen foliage; produces fruit in seven years when grown from the seed, and in four years when grown from a cutting. It blooms about the first of May, and the fruit ripens from November to January. The olives for picking are gathered in September or October, before they are fully ripened, and put to their bath of wine, and the oil is made in mid-winter.

The oil is made in a wooden building at the back of the residence house, and the exquisite neatness and cleanliness of the place is even accented by frequent signs warning off all smokers and tobacco scented people. So particular is Mr. Cooper that he employs no one at the oil works who uses tobacco in any form, and everything is done to prevent the delicate article from absorbing any taint or odour. The oil works are kept dark and cool, and at this season are closed and barred. There are great pans where the olives are first shovelled in and crushed under two revolving stone wheels. Following that, the pulp is thrown into tanks, pressed, allowed to settle, and then skimmed off, strained three times through cloth, once through paper, and finally bottled. The first quality of the oil is put up in long quart bottles bearing the maker's name on cork and glass. Very little of the second quality oil, resulting from the second pressing of the pulp, is made; but when it is prepared for the market it is put up in pint bottles and duly labelled as second quality.

As to the profits to be realized from olive oil after the first ten years, one has only to count up the facts to be gathered on the Cooper place. The olives are planted with seventy trees to the acre. The average yield of one tree in a good year is twenty gallons of olives, from which three gallons of oil are made. The oil is sold at wholesale at 1 dollar for each quart bottle, and counting at this rate an acre of olive trees ten years old will give 800 dollars clear returns in oil. During this last winter 14,000 bottles of oil were made on the Cooper place.

* From the *Oil, Paint and Drug Reporter*, Nov. 14.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 15, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

THE FUTURE OF CINCHONA CULTIVATION.

WE have just received a copy of an official report upon the Government cinchona plantations in the Nilgiris which promises to mark an epoch in the history of cinchona cultivation. It is from the pen of Dr. TRIMEN, formerly of the British Museum and now Director of the Royal Botanical Gardens, Peradeniya, Ceylon, who in complying with a request that he would inspect and report upon the "botanical problems" presented by the Nilgiri Cinchona Plantations has introduced passages that will ruffle the complacency of more than one "authority" and no doubt provoke "official" replies. In fact Dr. TRIMEN's description of the botanical aspect of the Madras plantations is not surcharged with *couleur de rose*, and appears to show that the measure of success which has attended this grand experiment in acclimatization has been attained in spite of numberless mistakes, involving the nomenclature of the different varieties or species of cinchona under cultivation in an almost inextricable confusion. Some suspicion of the existence of such a state of things has probably passed through the minds of those who have followed the literature of the subject even so far as it has appeared in these pages, but few would have anticipated there were so many and wide differences of opinion respecting the botanical identity of the plants grown as are disclosed in this report. Dr. TRIMEN's opinion of the situation may be gathered from a remark with regard to some of the best-known writers upon the subject, that whilst recognizing the many and great services they have rendered to the cinchona enterprise, yet, as a botanist, he thinks it much to be regretted that circumstances should have thrown this very difficult genus into the hands of those who have had so little of the requisite training and experience in systematic botany for dealing with it effectively. He considers it ought to be generally understood that "however eminent a writer may be as a quinologist, "a traveller or a gardener, if he can see important "botanical characters in the height of a tree, the "chemical constitution of its bark, or the colour of "its leaves, he is *ipso facto* disqualified to pronounce "on questions of classification." A number of published names have, however, Dr. TRIMEN says, been defined by nothing more than some such botanically trifling or variable distinctions and should not be recognized until properly characterized, since there is nothing about the genus *Cinchona* in its botanical aspects to warrant it being treated on any principles differing from those the systematist is ordinarily accustomed to employ, and for authors who know little of these principles or have had no experience in the application of them to other groups of plants to attempt to arrange the forms of so involved and complicated a genus can only lead to failure and confusion.

It would be almost impossible, as indeed it would be useless, to compress within reasonable limits in these columns an intelligible *résumé* of the elaborate criticism by Dr. TRIMEN upon the nomenclature which obtains in the cinchona plantations in Southern India. It is more satisfactory to be able to say that in reading this report one becomes impressed with the fact that the writer has a good grip of a most perplexing subject, and that whether he succeeds or not in establishing all his contentions his evident thoroughness is an element in favour of the evolution of order from the present confusion. Few will feel disposed to oppose his plea for uniformity, or to dispute that it is desirable that the same plants should bear the same names in India and Ceylon and elsewhere, and that obsolete, incorrect or duplicate names should be abandoned. As an instance of the necessity for reform, it is stated that in the Dodabetta plantation alone no less than three different cinchonas are called "crispa," whilst the one of the three to which it is rightly applied is so ill-defined that the name might well be dropped altogether. Moreover, there appear to be several names applied to real or supposed hybrids that might be dispensed with as incorrect or misleading.

So far Dr. TRIMEN speaks as a botanist, and it must be admitted that one essential to the resolution of the existing chaos into order is the authoritative determination of the botanical nomenclature of the cultivated cinchonas. Such determination would be to the cinchona grower a great boon, as facilitating his acquisition or avoidance of certain kinds. But this is not all. As long as two or three names are applicable to one and the same plant, or as many different plants are included under one name, any general deductions drawn from comparison of experimental results would probably only be misleading; but when a distinct understanding has been arrived at as to the exact species or varieties that are to be considered to be indicated by particular names, equally in other countries as in India, the way will be cleared for more satisfactory investigations. As pointed out by Dr. TRIMEN, the range of difference in the proportions and quantities of the alkaloids in barks from trees of identical botanical type is very large, and the same is true of barks from different plants raised from the seeds of the same tree. Barks from plants having their origin in cuttings from one and the same tree also yield different results upon analysis, although it is known that the stock has no influence on the grafted shoots; even the cause of the increase of alkaloids in renewed bark is but little understood, and the influence of age upon alkaloidal composition in the various species can only be guessed at from experience. Dr. TRIMEN, therefore, urges that the recent appointment of a distinguished botanist as superintendent of these plantations may be supplemented by the appointment of a chemist, whose duty it shall be to assist in working out these most important problems. Dr. TRIMEN is of opinion that the chemist must be on the spot among the trees constantly and always in readiness to work in unison with the superintendent as one man at jointly planned investigations, and it must be admitted that there is much reason for the view he takes. At the same time it is, however, to be borne in mind that if the chemist entrusted with these duties is to render any real service he must possess, not merely a general acquaintance with the chemistry of cinchona alkaloids, but a thoroughly practical familiarity with this special and difficult branch of analysis. It may not be easy to provide at once for such work being carried on at the spot, but it is a matter of such importance as to merit consideration how it can best be done at the earliest possible time. Since the sudden resignation and disappearance of Mr. BROUGHTON, eight years ago, little, if any, chemical investigation has been carried on in connection with the Madras plantations; but we think this work might now be advantageously revived, on the lines recommended in this report. After all it is not the propagation of any particular species of *Cinchona* or the supply of large quantities of bark that is the ultimate object of these experimental plantations; but rather the working out of the conditions most favourable to the production of the febrifuge alkaloids. In the present state of our knowledge, the most promising method for the improvement of cinchona trees as alkaloid yielders appears to be selection in cultivation based on chemical analysis. This Dr. TRIMEN proposes to effect by the isolation of trees that yield barks giving upon analysis high proportions of the more valuable alkaloids, the taking of proper precautions to prevent cross-fertilization, the exercise of care in collecting seed, the analysis of bark from a selection of the resulting plants, the destruction of all the young plants that do not reach the standard of the parent plants, the isolation of the best of the progeny, and the repetition of this process for several generations.

It may be hoped that this view of the case will commend itself to the judgment of the Indian Government, as being consistent with the policy which first prompted the establishment of the plantations; for there is more than a suggestion in the present report that the scientific and experimental phase of the undertaking has, since the death of Mr. McIVOR, been somewhat eclipsed by more commercial aspirations, and that indeed the plantations have recently been overworked for the sake of obtaining large returns of bark. However this may be, it has now been sufficiently demonstrated that cinchona cultivation may be carried on remuneratively, and that even from a commercial point of view the State cinchona plantations have been a profitable investment. But the production of bark for the sake of money gain only may well be left to private enterprise, and there would be a fitness in devoting the resources of the establishment in Madras, where the great acclimatization experiment was initiated, primarily to scientific investigation having for its object to obtain the results most beneficial to humanity. In conclusion, we would heartily endorse the recommendation of Dr. TRIMEN that the Government should take care to secure an accurate record of all the experimental work carried on, whether in the plantations or the laboratory, and that the results should be promptly made available to the public in annual reports, which ought also to be easily obtainable by any person wishing to refer to them, and not confined to officials and a favoured few among outsiders.

THE PROPOSED HEALTH EXHIBITION.

THE definite appointment of an Executive and a General Committee, charged with the duty of making the necessary arrangements for holding an International Health Exhibition next year at South Kensington, has been backed up by a donation of ten thousand pounds from the Corporation of London and the city guilds, with a promise of further monetary help if required, so that it is now morally certain that the enterprise hinted at by his H.R.H. the Prince of Wales when closing the Fisheries Exhibition will be an event of the year 1884. The term "Health" will be very inclusive, since it is intended that all applications of modern science and improved sanitary practice to dwellings and workshops and to food and dress shall be illustrated as far as possible, and the display must therefore necessarily touch at several points subjects that are of great interest to pharmacists. The collections of substances used as food in different parts of the world, for instance, and also illustrations of food adulteration, if given with discretion, will be almost sure to furnish valuable contributions to that *omnium gatherum* of information which every pharmacist is presumed by the public to possess. The same remark will apply to many sanitary contrivances concerning the merits of which he is not unfrequently asked to express an opinion. Further, just as medicine is well represented upon the Executive Committee, drugs and medicinal preparations are not likely to be few. Whatever may be the general effect, however, of the exhibition in promoting the health of the community, we cannot say that we are very sanguine as to the exhibition exercising any particularly beneficial influence upon the practice of pure pharmacy. It seems to have become a recognized practice in connection with all such undertakings that the exhibitors shall be allowed to recoup themselves partially for expenditure consequent upon the display of their goods by presenting these to the public accompanied with the exhibitors' own accounts of their virtues. With many classes of goods any disadvantages attending this practice stand some chance of being rectified by the opportunities afforded, by inspection, of forming a correct judgment as to the trustworthiness of the recommendations; but, unfortunately, with respect to substances or preparations put forward as medicines, this is notoriously not the case. The occasion will be so favourable for the display of specialties and proprietary preparations under an appearance of authoritative sanction that it is not likely to be neglected, and even if an arrangement be made to exercise some control as to the articles that are allowed to be shown, the task will be an extremely difficult one. But of this we see no sign, and in the absence of such a provision, the specialists and quacks will have this part of the field to themselves.

On Monday next, in accordance with notice, the election of six annuitants on the Benevolent Fund will take place, in the House of the Pharmaceutical Society, 17, Bloomsbury Square. Although the number of candidates in excess of those to be elected is small, the work of going through so large a number of voting papers will be heavy; the services of a considerable number of scrutineers will therefore be desirable, whilst the attendance at the formal meeting is usually small. We think we need only mention this difficulty to ensure the necessary help, and we think it should be understood that any subscriber or donor to the fund who is entitled to vote at the election is also eligible to act as a scrutineer, whether he be a member of the Pharmaceutical Society or not. Whilst writing upon the subject, we cannot help referring with regret to the fact that was mentioned at the meeting of the Council last week that the receipts on behalf of the Benevolent Fund were at that time at least six hundred pounds less than those of last year.

* * *

The next Evening Meeting of the North British Branch of the Pharmaceutical Society will be held in the Society's Rooms, 119A, George Street, Edinburgh, on Wednesday, the 19th inst., when papers will be read entitled, "Solubility of Calcic Hydrate at Different Temperatures," by Mr. T. Maben; "Salicylate of Soda," by Dr. Stevenson Macadam, and "Hippurate of Soda," by Mr. Peter Boa. The chair will be taken at half-past eight o'clock.

* * *

During a discussion at a recent meeting of the Dimbula Planters' Association, in Ceylon, some astonishing statements were made with respect to the effect of "shaving" the bark of cinchona plants upon the yield of alkaloids. A Mr. Paterson, giving his experience with trees eleven years old, stated that the original shaving yielded equal to 1·96 per cent. of quinine sulphate; the first renewal, 5·76 per cent.; and the second renewal, 7·05 per cent. This planter, however, recommends that the trees should not be shaved more frequently than once a year; but other speakers were of opinion that the operation might be effected advantageously at shorter intervals, and one stated that he had found it answer to shave trees of from three to five years old and that by leaving alternate strips he expected to be able to shave them every three months. A Sub-Committee was appointed to draw up a report on cinchona culture in the district.

* * *

An attempt is being made, with some prospect of success, to introduce the cultivation of cinchonas into the North Island of New Zealand. The planter who has initiated the experiment, and who formerly had charge of a large cinchona plantation in India, commenced operations last year, and he states that he has already raised upwards of three quarters of a million seedlings, a considerable proportion of which have been sold to other planters at remunerative prices.

* * *

According to a quinquennial report recently presented by the French Minister of Commerce the number of *pharmaciens* in France increased from 6232 in the year 1876 to 6443 in 1881.

* * *

The *Bulletin de la Société de Pharmacie de Sud-Ouest* records a case of poisoning that occurred recently in Toulouse, in which the assumption that morphia was the poison gave rise to a newspaper hubbub about the carelessness of pharmacists in supplying poisons of a kind not unknown in this country. A legal inquiry having been instituted, however, the results of the analysis of the stomach, etc., taken in conjunction with the physiological symptoms observed, led to the conclusion that death had been caused by nicotine.

* * *

Her Majesty's Consul at Charleston, referring in a recent report to the adulteration of oil of turpentine with petroleum products in different proportions, says that the admixture of 10 per cent. of "petroleum benzine" is the form that appears to be the most successful, since a sample of oil of turpentine so sophisticated cannot be distinguished by the eye or nose from a genuine one. As to the method of examining oil of turpentine for such an adulteration, reference may be made to the paper by Dr. Armstrong (*Pharm. Journ.*, [3], xiii., 584).

* * *

Her Majesty has been pleased to confer the honour of a baronetcy upon Mr. William Bowman, F.R.S, and upon Mr. Joseph Lister, F.R.S.

* * *

The next meeting of the Chemical Society will be held on Thursday, December 20, at 8 p.m., when papers will be read on the "Researches on the Constitution of the Gums of the Arabin Class," by Mr. C. O'Sullivan; "On the Decomposition of Ammonia by Heat," by Messrs. Ramsay and Young; and "On the Dissociation of the Halogen Compounds of Selenium," by Messrs. Ramsay and Evans.

* * *

A meeting of the School of Pharmacy Students' Association will be held on Thursday next, December 20, at 8 p.m. A paper upon "The Relation of Pharmacy to Therapeutics," will be read by Mr. R. W. Giles, and the Reporter upon Materia Medica, Mr. W. Elborne, will make a communication upon "Munjeet in Chiretta."

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, December 5; the President, Mr. James E. Brunker in the chair.

Present:—The Vice-President, Mr. H. N. Draper, F.C.S.; Drs. Collins, Montgomery; Professor Tichborne, Ph.D.; Messrs. Allen, Doran, John Evans, Grindley, Hayes, Hodgson, Minchin, Payne, Simpson and Wells.

The Registrar read the minutes of the last meeting which were confirmed.

The Registrar read a letter from Right Hon. G. O. Trevelyan, the Chief Secretary for Ireland, stating that he had received the letter of the Registrar stating that a deputation from the Council desired an interview with him in reference to some points connected with the state of the law as to pharmacy and the sale of poisons in Ireland. He would be going to Scotland in a few days; and after his return, if the Council communicated with him, he would arrange as to the day on which he would receive a deputation from them.

The President suggested that a deputation should be named now.

Mr. Grindley: I do not think it should be confined to one or two. As many of the Council ought to attend as can.

Mr. Payne: Some representative men on both sides of the question would be better than a very large deputation.

The President: If there be any difference of opinion it should be argued at the Council table. We must decide on what we want here. Everything that we want has already gone before Mr. Trevelyan in writing.

Mr. Hodgson said the feeling seemed to be that it should be open to every member of the Council to go on the deputation.

Dr. Collins said that was the course pursued in a late deputation from the Apothecaries' Hall. If there were any differences of opinion these had better be settled now.

Mr. Wells: The only point on which we differ is as to whether there should be a second grade or not.

Mr. Hayes said that outside the Society there was a desire amongst chemists and druggists to be registered in order to prevent the continuance of a practice which was evidently intended to be prevented by their Act, namely, the sale of poisons without hindrance by new chemists and druggists who were continually springing up.

Mr. Wells said they were all agreed that only registered men should be allowed to sell poisons; but there was a difference of opinion as to the establishment of a second grade, which would be perpetuated.

Mr. Minchin observed that the establishment of a second grade would not affect members of the Society who carried on business in the metropolis, but it would be ruinous to those in the country to have the legitimate drug trade and sale of poisons taken out of their hands, because in the country towns the prescriptions of medical practitioners would not anything like suffice to maintain the pharmacists.

Mr. Hodgson: This discussion is out of order. If we are to discuss these matters at all we must have a special meeting for the purpose.

The President: The only question at present before us is whether a special deputation should be appointed, or the entire Council should attend. I think it better now for us to pass to the next business with the understanding that in case Mr. Trevelyan decides on receiving the deputation before the January meeting a special meeting will be called. The question must then be settled whether it is the wish of the majority of the Council that a grade of registered druggists should be made perpetual or not. The Council of last year expressed an opinion that such a grade might with advantage be introduced.

A letter dated November 12 was read from Mr. James Leahy, of Clonmel, asking for exemption from the course of practical chemistry, on the ground that he had been for eighteen years at the business of compounding.

Mr. Payne moved—

"That Mr. Leahy be informed that the Council cannot see its way to departing from the rule laid down respecting a certificate of having attended a course of practical chemistry."

Mr. Allen seconded the motion, which was agreed to.

The President said a letter had been received from Mr. Hardy which was not on the notice paper. If the Council desired, it could be read; but it merely urged points in reference to which they were still awaiting a communication from the Solicitor-General, and therefore were not prepared to give any decided answer.

Mr. Wells: I do not think there would be any use in reading the letter.

The Registrar was directed to inform Mr. Hardy that no reply had as yet been received from the Solicitor-General.

On the motion of Mr. Minchin, seconded by Mr. Payne, the four gentlemen who had acted as examiners for the past year were re-elected.

Dr. Montgomery remarked that he thought the gentlemen who were appointed by the Council to attend as visitors at the examinations should hold a more prominent part than they did. They were in a curious position; they seemed to have no voice in the examination, and from what occurred last day he thought it would be well if their duties were defined.

The President: You will have to give notice of a motion in order to discuss that.

Mr. Draper: It could be put in the agenda for the next meeting.

Notice of motion was handed in by Dr. Montgomery on this subject.

A letter was read from Dr. Kaye, Q.C., Clerk to the Privy Council, enclosing a copy of a memorial which the Privy Council had received in reference to the proposed new regulations of the Society which are at present under the consideration of the Lord Lieutenant and Privy Council, and saying that in the event of the Council deeming it expedient to comply with the prayer of the memorial it would be necessary to re-submit the proposed resolution, in an amended form. The memorialists stated that they had passed the Preliminary examination; that according to a resolution of the Society, published in the 'Calendar,' for 1883, candidates were eligible for the final examination who had been practically engaged in compounding and dispensing for two years in the establishment of a pharmaceutical chemist or apothecary keeping open shop; that a new regulation had been adopted, but not yet sanctioned by the Privy Council, enlarging the period to four years, and that it was proposed to give that regulation a retrospective effect from January, 1883; that the memorialists and many others similarly circumstanced had been induced by the regulation at present in force to enter on the study of the profession in the belief that a period of only two years' service in compounding and dispensing would be required; that they would be most unfairly and injuriously affected if the Privy Council sanctioned the making retrospective of the new rule requiring four years' service; and they, therefore, prayed the Privy Council to amend the resolution so as to prevent the rule from having any retrospective effect.

The Law Committee in reference to the foregoing letter and memorial, which had been considered by them, recommended that the resolution in question should be amended so that the new rule should not come into force until January 1, 1884.

The President observed that the resolution establishing the new rule as to apprenticeship was adopted by the Council last January. It was sent to the Privy Council and was returned by them in an elaborate form last April to the Council of the Society and was, after due consideration, accepted by the latter on June 6, and returned to the Privy Council for confirmation; and since then the whole matter had lain in abeyance. The memorialists had gone in for and passed the Preliminary examination practically under the old bye-law, which was the one printed in the Calendar for the present year. The communication from Dr. Kaye gave a very strong hint that what these gentlemen asked for was only reasonable. The recommendation of the Law Committee was that the Privy Council should be asked further to amend the resolution so as to bring the new rule into force from January 1, next.

Mr. Grindley: We are not in a position to refuse this memorial.

After some further discussion—

Professor Tichborne moved that the recommendation of the Law Committee in relation to the communication received from the Privy Council be adopted.

Mr. Doran seconded the motion, which was agreed to *nem. con.*

On the motion of Mr. Wells, seconded by Mr. Grindley, the rest of the report of the Law Committee was adopted.

Mr. Grindley observed that all the members of the House Committee had not been summoned to its recent meeting.

The President explained that the Committee had not met since last Council meeting. The intention in placing the matter on the notice paper was to settle the question of office hours.

Mr. Draper said that technically Mr. Grindley was right, but practically the business of the Committee had been done by a few members who put their shoulders to the wheel and worked very satisfactorily.

Mr. Payne said the work of the House Committee had been splendidly carried out.

The President said it was necessary to make a regulation as to the days and hours at which the Registrar, Mr. Fennell, should attend at the Society's rooms.

After a brief discussion,

On the motion of Mr. Hayes, seconded by Dr. Collins, it was resolved—

"That the Registrar should attend at the rooms, 11, Harcourt Street, on Mondays, Wednesdays and Fridays, from 10 to 12 o'clock noon, and that notification of this rule be placed on the door-plate."

The following gentlemen passed the examination for the licence as pharmaceutical chemist, held on October 3 and 4, and were registered as pharmaceutical chemists on November 7:—Messrs. Robert Carse, Dungannon; Robert Duggan, Rathmines, Dublin; Thomas Johnstone, Belfast; Patrick Kelly, Dublin; Alfred McBride, Dundalk; Robert William McKnight, Belfast; Patrick Merrin, Dublin; and Henry O'Reilly, Dublin.

The following licentiates were elected Members of the Society:—Henry Conyngham, 11, Upper Baggot Street, Dublin; John Starrett Shortt, Kells, co. Meath; John Dillon Crinion, 67, Talbot Street, Dublin.

The Council then adjourned.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fourth general meeting of the thirty-fifth session was held at the Royal Institution, on Thursday evening, November 22; the President, Mr. Edward Davies, F.C.S., F.I.C., in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations were announced:—The *Pharmaceutical Journal*, from the Society; and the *Canadian Pharmaceutical Journal*, from the Editor.

Mr. A. H. Mason exhibited pieces of granite faced with powdered rhubarb, which he had found as an adulterant in some original cases of East India rhubarb root as imported. The fraud was so well perpetrated that the miller failed to detect the pieces of stone when the root was placed in the drying-room before powdering, the size and shape of pieces resembling that of the root. The adulteration represented 2 per cent. of the bulk.

Dr. Symes presented to the Museum a specimen of pao-pereiro (*Geissospermum Vellosi*), used in Brazil as a tonic and febrifuge, intensely bitter and containing an alkaloid "geissospermine." He also exhibited a specimen of Batata de purga, or Brazilian jalap (*Piptostegia Pisonis*) tuber, 8 inches long and 3 inches in diameter, used as an aperient in Brazil; its activity being dependent on a resin which is readily extracted by alcohol.

Mr. Davies exhibited a specimen of urine passed by a person recovering from carbolic acid poisoning. It was dark, almost black in colour, and on distillation with sulphuric acid gave a distillate containing both phenol and cresol. There was a distinct smell of phenol in the distillate; it gave the reaction with ammonia and hypochlorite of sodium, and bromine gave an abundant precipitate of tribromophenol (recognized by its crystalline form) and tribromocresol. If distilled without sulphuric acid only a trace of phenol was found, and also when an attempt was made to extract it with ether. It is, therefore, thought probable that the phenol and cresol were in some form of combination.

Mr. Parkinson drew attention to some tinct. opii he had recently made, which after the usual period of maceration would not give a clear filtrate. He had tried various thicknesses of filtering paper, but to no effect. He said the opium was obtained from a most respectable house, costing a fair price, and of apparently good quality.

Mr. Conroy said that he had met with one or two samples of such opium. The difficulty experienced was due to the fact that the opium was adulterated with Bassorah gum, and tincture made with such opium would be very deficient in morphia strength.

Dr. Symes thought that Mr. Parkinson must have worked on opium containing a considerable quantity of mucilaginous matter, and that he had used a weak spirit for extracting it. He had once found a specimen of Persian opium, which gave similar results, although it had a higher morphia value. His results led him to believe that under ordinary circumstances a weaker spirit than that ordered in the B.P. for making tinct. opii would be an advantage.

The President then called upon Mr. Michael Conroy, F.C.S., to read a paper on "Tincture of Nux-Vomica."

The paper is printed on p. 461, and gave rise to the following discussion:—

Mr. A. C. Abraham in moving a vote of thanks to Mr. Conroy for his able communication, alluded to the importance of the subject and the great value of the tabulated information placed before the meeting. He confirmed Mr. Conroy with respect to the great difficulty, if not impossibilty, of extracting nux-vomica, when in fine powder, with the menstruum of the British Pharmacopœia. He had obtained from a sample of tincture which he had recently made and carefully extracted 1·08 grains of extract from 100 fl. grains of tincture. This lot, he said, occupied about six days in percolation. He thought that there could be no question that a weaker spirit was required for the purpose and was glad to see that Mr. Conroy nearly agreed with the German and French Pharmacopœias as to the strength required.

Dr. Symes, Ph.D., in seconding the vote of thanks, considered the results obtained by the author of the paper as of very considerable importance. They fully confirmed the position which he had often taken and which he still maintained, namely, that it was absurd for the Pharmacopœia (or its compilers) to assume that all drugs could be properly exhausted by means of the two strengths of spirit contained therein for that purpose.

Mr. Conroy having briefly replied, the motion was put from the chair and carried by acclamation.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fourth meeting of the sixth session was held in the Pharmaceutical Society's rooms, 119A, George Street, Edinburgh, on December 5, at 9.15 p.m. Mr. Claude F. Henry, President in the chair.

The minutes of the previous meeting having been read and confirmed, the President called upon Mr. G. R. Fowler to read a paper on "Elementary Chemistry," which was the first of a series intended for the younger members of the Association.

During the course of the paper, the essayist illustrated various points by several successful experiments and diagrams.

The President in moving a vote of thanks to Mr. Fowler, said that the Association could not forget that it was on the suggestion of Mr. Fowler that the series of elementary papers had been arranged, and it was gratifying that he gave practical support to the scheme. The presence of so many apprentices proved that they appreciated the proposal, and he was sure that all would join with him in moving a hearty vote of thanks to Mr. Fowler.

Mr. Aitken seconded the motion, which was heartily accorded.

A discussion followed, in which Messrs. Boa, Crowden, Hill, MacAlley and MacEwan took part, and Mr. Fowler replied.

The Secretary then submitted several queries. To the first of these, viz., "Wanted, a distinctive test for a sulphocarbolate," Mr. MacEwan gave the following:—

The following indications are the most trustworthy proofs of the identity and purity of a sulphocarbolate:—

Negative.

1. The salt should not have the slightest odour of carbolic acid.
2. Alkali and zinc sulphocarbolates should be free from pink coloration.
3. An aqueous solution should not give a precipitate with barium chloride.

Positive.

4. Heated to charring, carbolic acid is vaporized—recognized by its odour. The residue treated with water and filtered should indicate presence of *sulphate* with barium chloride (U.S.P.). (Salicylates so treated give a residue containing *carbonate* only.)
5. An aqueous solution of the salt gives a violet coloration with ferric chloride (U.S.P.) The colour is discharged by an acid or alkali, the latter precipitating the iron as hydrate. The violet coloration is readily obtained with a 1 per mille solution of the salt. (Salicylates also give the coloration, but it is much more intense: moreover, an aqueous solution of a salicylate gives a copious precipitate of salicylic acid on the addition of a mineral acid, whereas a solution of a sulphocarbolate remains clear.)
6. A gram or so of the salt heated with a few c.c. of nitric acid in a test-tube forms a yellow solution, NO_2 being evolved; on diluting with water, yellow crystals (picric acid) separate. Filter or pour off a portion of the clear solution, and it will be found that barium chloride forms a precipitate insoluble in nitric acid. Another portion of the solution may be used for the picrocyanic test, by adding to it a few drops of potassium cyanide solution and ammonia to alkalinity, then boil; the solution becomes blood-red.

Notices of queries for next meeting having been given, the President intimated that it would be held on December 26, when Mr. George Coull, an apprentice member of the Association, will read a paper on "Some of the Gum Resins of the Pharmacopœia." The meeting then adjourned.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

On Friday, November 30, the associates of the above Society were entertained at a *soirée* in their new room, in the Sunday School Union Institute, Shakespeare Street, by the President, Mr. Councillor Fitzhugh, F.C.S., and the Vice-President, Mr. J. Wilford. A majority of the young men were present to do justice to the good things provided both for mind and body. The Council was represented by Messrs. W. H. Butler, A. Smith, C. W. Warriner, M. H. Humphrey, and C. A. Bolton, Hon. Sec. Various specimens of interest to the trade of the chemist were exhibited. Mr. B. Sturges Dodd, Hon. Sec. of the Naturalists' Society, exhibited a splendid collection of typical forms of British marine plants (including many edible species), and also a small but very interesting collection of European shells and minerals. Mr. F. H. Spenser exhibited an apparatus illustrating the various phenomena connected with the sun, earth and moon; also a number of Patterson's zoological charts; Mr. G. Inger, a number of galvanic batteries; Mr. J. H Haywood, electrical apparatus and stereoscopic views; Mr. William Widdowson, a large series of mounted indigenous plants; Professor Clowes, the spectroscope, specimens of crystals and a plate showing the new method of protecting iron by oxidation; Mr. A. Rogers, a microscope and uranium glass, the Society's microscope being shown by Mr. W. H. Parker. A most enjoyable evening was spent, the associates showing their appreciation of the efforts made on their behalf by careful examination of the objects and questions asked upon points they could not quite understand. After a vote of thanks to the gentlemen who had contributed to the enjoyment of the evening, the meeting separated at a late hour.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

A meeting of the above Association was held on Wednesday evening, November 28, at 23, Burlington Chambers, New Street, Birmingham. The President, Mr. J. Lucas, in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. A. E. Robinson, F.C.S., read a paper entitled "Michael Faraday: the Man and the Chemist." The lecturer commenced by pointing out the direction scientific research has taken and is taking in the destruction of the barriers existing between any two or more departments of science, and consequently the close scientific relationship existing between the discoveries of Faraday in relation to physical science and the researches of Darwin in connection with natural science. The various phases of Faraday's earlier life were then briefly portrayed,—the blacksmith's son, the bookbinder's errand-boy, the journeyman bookbinder,—and then his desire to escape from trade which he thought vicious and selfish, and to enter into the service of science, under the idea that it made its pursuers amiable and liberal, which induced him at last to take the bold and simple step of writing to Sir Humphrey Davy, expressing his wishes and a hope that if an opportunity came in his way he would favour his views. Davy's reply telling him to "stick to business," as "Science was a harsh mistress," was only the prelude to the ultimate engagement of Faraday as assistant in the laboratory of the Royal Institution, and the next view we have of him is as companion to Sir Humphrey in his continental tour, obtaining a glimpse of his association with the foreign *savants* in some of their investigations. The lecturer then read a few extracts from Faraday's diary and letters (written at this period), with the intention of showing the penetration and descriptive power of the young philosopher. Faraday returned to England about the middle of 1815, and the rapid progress in his self-education for the next five years is witnessed principally in the lectures delivered before the City Philosophical Society. It was here pointed out that Faraday, although doubtless much occupied with his literary productions and his work in connection wich the Royal Institution, yet still found time to prosecute important scientific research. Amongst his numerous papers in the *Quarterly Journal of Science* were briefly noticed his investigations on "Steel and its Alloys," "On Compounds of Chlorine and Carbon," and "On the passage of Gases through Capillary Tubes," the latter research doubtless being the first step on the ladder of the law of gaseous diffusion so extensively elaborated by Professor Graham. The subject matter of that memorable paper on "Fluid Chlorine," read by Faraday before the Royal Society, March 13, 1823, was then discussed at some length, and the great importance of apparently so small insignificant a fact as that of converting a gas into a liquid was shown by its undoubtedly being the preliminary step in the discovery by Faraday, in the condensed gas of the Portable Gas Company, of that now historic substance benzine, a substance both theoretically and commercially speaking of inestimable value. The extreme volatility of these condensed substances, and hence their value in industries requiring the production of artificial cold, was then alluded to and experimentally illustrated. Faraday's election as Fellow of the Royal Society in 1824 and the sad but certain opposition of Sir Humphrey Davy having been commented upon, the lecturer passed on to consider that portion of his life history which decided his choice between the pursuit of wealth and the pursuit of science. The lecturer then briefly described the application of his greatest discoveries—Magneto-electric induction and current electric induction to telephony and electric lighting, and then referred at length to Faraday's researches in electro-chemistry, and his ultimate discovery of the law of electrolysis, which to-day is practically where he left it. Faraday's appointments as Fullerian Professor of Chemistry at the Royal Institution and as Scientific Adviser at Trinity House were then alluded to, and the admiration and regard in which he was held by his scientific contemporaries was illustrated by the degrees, titles and honours which showered in upon him from all quarters of the globe; the enumeration of them, however, being fitly closed with the pathetic refusal to allow himself to be elected president of the Royal Society. Faraday's numerous other researches were not touched upon, they being connected with the phenomena of electricity and magnetism, but the correlation of forces (to completely establish which was the main desire of Faraday's life), was illustrated experimentally, *electricity* evolved from the *chemical action* taking place in a galvanic battery being shown to produce *sound*, *light*, *heat* and *magnetism.*

The paper was illustrated by various experiments and a series of water-colour drawings and engravings.

The President proposed a hearty vote of thanks to Mr. Robinson for his paper; the proposition was ably seconded by Mr. Barclay, and on being put to the meeting was unanimously carried.

OLDHAM CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

On Thursday, November 29, 1883, Mr. C. G. Wood read a paper before the members of the above Association, in their room, Church Institute, on the subject of "The Manufacture and Purification of Iodine."

After giving a short account of the discovery of the element, the essayist described the various processes of the treatment of "kelp," which were well illustrated by diagrams of the various apparatus used. He then described the process of purification by sublimation, noting particularly many important precautions which have to be taken to insure the pure article, and also completeness of the operation.

After the essay Mr. Lees proposed a vote of thanks to Mr. Wood, and remarked upon the advantage of diagrams, as they showed at a glance the meaning of the essayist more clearly than if the apparatus is simply described.

Mr. Swinbourne seconded the vote of thanks, which was passed unanimously.

Mr. A. E. Martin, President, occupied the chair.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on December 6. Dr. W. H. Perkin, F.R.S., President, in the chair.

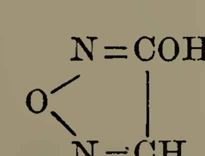
During the evening the following gentlemen were declared by the Scrutators of the ballot, Messrs. A. J. Greenaway and A. K. Miller, duly elected Fellows of the Society:—Messrs. F. A. Blair, T. J. Barr, C. J. Baker, L. Briant, R. G. Durrant, Kamchaudra Datta, L. L. Garbutt, A. E. Harris, T. Hart, W. Irwin, S. Johnson, R. Jackson, H. C. Lee, W. H. Martin, C. E. Potter, B. M. H. Rogers, C. W. Stephens, P. H. Wright, H. A. Wetzel, W. G. Whittam.

The following certificates were read for the first time:—Messrs. B. H. Brough, G. Daubeney, C. C. Hutchinson, W. S. Kilpatrick, E. Matthey, J. W. Pallister, H. Peile, S. G. Rawson, W. Robinson, F. M. Rogers, R. Romanis, W. O. Senior, T. Stenhouse, J. A. Voelcker.

The following papers were read by the Secretary—

On the Constitution of the Fulminates. By E. DIVERS and M. KAWAKITA.—The attention of the authors has been drawn to the chemistry of the fulminates, through the recommendation of mercury fulminate, by Steiners, as a source of pure hydroxyammonium chloride, a fact previously discovered by Carstanjen and Ehrenberg. The authors find that pure hydroxyammonium chloride free from ammonia is obtained by the action of strong hydrochloric acid on moist mercury fulminate, as stated by the above chemists; they find, however, that much hydrocyanic acid is also formed, although not a trace is produced if the fulminate be dry, a theoretical yield of hydroxyammonium chloride being obtained. This substance is strongly acid to litmus paper. The authors ascertained that the whole of the carbon in mercury fulminate, when treated with concentrated hydrochloric acid is converted into formic acid. The authors have utilized this reaction to make an analysis of mercury fulminate, the mercury being precipitated by hydrogen sulphide. They obtained the following numbers:—Mercury, 70·40 per cent.; nitrogen, 9·85 per cent.; carbon, 8·17 per cent. Not a trace of oxalic acid is produced in the above decomposition.

Theory of the Constitution of Fulminates. By E. DIVERS.—After discussing the various formulæ suggested by Berzelius, Kekulé, Armstrong and Steiner, and a lengthy consideration of the formation, decompositions and properties of the fulminates, the author gives the following as the probable constitution of fulminic acid—



On Liebig's Production of Fulminating Silver without the use of Nitric Acid. By E. DIVERS and M. KAWAKITA.—According to Liebig fulminating silver separates in large needles and without ebullition, when nitrous acid is passed into an alcoholic solution of nitrate of silver. The authors have repeated this reaction and obtained crystals, but they consisted of silver nitrate with a trace of some organic silver salt, which is not fulminate. A second experiment, in which silver nitrate and silver nitrite were added to alcohol and nitric acid, sp. gr. 1·35, then dropped in with shaking, also gave no fulminate. The authors conclude that even nascent nitrous acid, alcohol and a silver salt, do not yield a fulminate, but that an energetic oxidation of the alcohol by a mixture of nitric acid and either mercury or silver nitrate alone seems to be effective. The paper concludes with an account of some unsuccessful attempts to form fulminating copper.

Dr. Armstrong then read a short note—

On the Constitution of the Fulminates. By H. E. ARMSTRONG.—In this note the author defends his previous views as to the constitution of fulminic acid, or rather a slight modification of them (HO.N)C.C.H(NO), against the criticisms of Dr. Divers in the previous paper, and briefly considers the probable nature of the reaction between alcohol, nitric acid and mercury. It is not probable that the fulminate is the immediate product of the action of nitrous acid (this note was written before the last paper of Divers and Kawakita was received) upon alcohol, and it is almost certain that alcohol when treated with dilute alcohol has its atoms of hydrogen displaced one by one by hydroxyl; thus a body having the constitution $CH_2(OH).CH(OH)_2$ is formed, and this body the author regards as the primary source of the fulminate, which is formed by the simultaneous or perhaps consecutive action of nitrous acid and hydroxylamine.

Dr. Gladstone said it ought to be remembered that the formula of a substance depended to a great extent upon the reactions by which it is produced, and that it was often very difficult to find a formula which expressed all reactions. He should have liked the formula to have expressed more clearly the formation of sulphocyanide and urea by the action of ammonia and hydrogen sulphide.

Dr. Armstrong said it was not possible to express all reactions in all cases, because the products were often not immediate, but formed by secondary decompositions.

The President thought some light might be thrown on the subject by investigating the secondary products of the oxidation of alcohol as to the formation of formic acid. It was very gratifying to receive communications from Japan, where the facilities for research must be small; possibly such communications might serve as a stimulus to chemists at home to give a little more time to research.

The Secretary then read a paper entitled—

Experimental Investigations on the Value of Iron Sulphate as a Manure for certain Crops. By A. B. GRIFFITHS.—In a previous paper (*Chem. Soc. Journ.*, 1883, Abstracts 496) the author gave the results of some experiments as to the effect of iron sulphate on the growth of single plants. In the present paper he gives the results obtained on the large scale on plots of land near Bromsgrove, Worcestershire, with crops of beans and wheat. One plot was treated with commercial crystallized ferrous sulphate, 56 lbs. to the acre, the other was left in its normal state. The total weight of the dry crop (grain and straw) from the plot manured with ferrous sulphate was 5882 lbs., from the normal plot 4487 lbs.; the former yielded 56 bushels of beans, the latter 35 bushels. The ash of the entire plant and of the pods in the plot manured with iron manure contained much more iron and phosphoric acid than those from the normal plot. The beans from the two plots exhibited but little difference in these respects. In the case of the wheat crops, although the iron manure produced much heavier and finer plants, the ashes did not show much difference as to iron and phosphoric acid. The author has also grown some plants in pots, exposing each pot to a different portion of the spectrum. The soil in which they grew contained ferrous sulphate. Those plants growing in the yellow yielded an ash containing 2·5 per cent Fe_2O_3; those in the violet 0·15 per cent. Fe_2O_3.

Mr. Warington said the paper contained many valuable facts, although some of the statements seemed to require modification or further investigation. There seemed to be no doubt that an increase of 21 bushels of beans was obtained by the addition of the ferrous sulphate; the author seemed to have overlooked the fact as to the increase of phosphoric acid, that one crop had many more pods than the other, and so the increase of phosphoric acid was only an increase in the relative number of pods. He was very sceptical as to the occurrence of crystals of ferrous sulphate mentioned in this and the previous paper, in proximity to the chlorophyll granules.

The Society then adjourned to December 20, when a paper, "Researches on the Constitution of the Gums of the Arabin Class," by C. O'Sullivan, will be read.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, November 29; Mr. H. G. Greenish, Vice-President, in the chair.

Mr. T. S. Dymond read a paper on "The Preparation of Pure Benzoic Acid from Urine," which is printed on p. 463 of the present number of this Journal.

A discussion followed the reading of the paper, in which the Chairman, Secretary, Dr. Senier, Messrs. Cripps, Job and Short, took part.

The Reporter on Practical Pharmacy, Mr. R. A. Cripps, then made a report on "Tincture Deposits."

A discussion followed, in which the Chairman, Secretary, Dr. Senier, and Messrs. Job, Ranken and Short took part.

It was announced by the Secretary that the Executive Committee had elected the following members as a Committee of Reporters on Science for the ensuing session:—

Pharmacology	Mr. H. G. Greenish. (Chairman).
Practical Pharmacy	Mr. R. A. Cripps.
Botany	Mr. E. Baily.
Materia Medica	Mr. W. Elborne.
Physics	Mr. H. Allen.
Organic Chemistry	Mr. W. R. Dunstan (Secretary).
Inorganic Chemistry	Mr. A. J. G. Lowe.
Analytical Chemistry	Mr. C. Thompson.

A grant from the Research Fund had been made to Mr. T. S. Dymond for investigations connected with the synthesis of uric acid and some of its bye-products.

The meeting then adjourned.

A special general meeting of the Association was held on Tuesday, December 4, Professor Attfield, F.R.S., President, in the chair.

A code of revised rules was submitted by the Executive Committee, which after some discussion of details was adopted.

The Secretary was instructed to send a copy of the revised rules to the Council of the Pharmaceutical Society for its sanction.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the Chemists' Assistants' Association, held November 28, 1883, Mr. Parkinson (President) in the chair, a paper on "Essential Oils, their Derivation and some of their Uses," by Mr. W. A. Wrenn, was read by Mr. J. H. Hartridge.

The author stated that it was his intention to extend his subject over two papers:—First, he would deal with those essential oils which are cultivated in England and which can be more strictly called medicinal; and in the second paper he would treat of those which are more or less aromatic, and perhaps less used in pharmacy. Ol. anethi from *Anethum graveolens* was the first oil mentioned. It was stated that there are two very distinct kinds of dill seeds in the market, although both are regarded as coming from the same species of *Anethum*. The seeds are said to yield about 3·5 per cent. of oil, which when freshly distilled is almost colourless, but on keeping gradually changes to a deep straw colour, and when allowed to oxidize slowly the original odour is almost completely lost. The oil is distilled in England from the seeds when scarcely ripe, about the end of August. The specific gravity varies from ·842 to ·858, the oil which first comes over being about six degrees lighter than the after-product. Ol. anthemidis from *Anthemis nobilis* was next mentioned, attention being drawn to its peculiar greenish colour when fresh. The specific gravity of this oil is ·979 to ·983; the oil becomes lighter on keeping owing to a deposit taking place: its use as an antidote in cases of poisoning by strychnine was noticed. Ol. coriandri, from *Coriandrum sativum*, was alluded to as being used in the syrup of senna; the yield of oil from the seeds is only about ·5 per cent. Ol. carui from *Carum Carui.*—These fruits were stated to yield about 3 to 7 per cent. of oil, having a specific gravity of ·952 to ·966, consisting of two bodies, viz., a thin oil, termed carvol, and a camphor-like body, carvene. Ol. menthæ piperitæ obtained from *Mentha piperita.*—The author here confined himself to oil produced from plants cultivated in England, the number of acres under cultivation in England in 1883 being as follows:—Mitcham and neighbourhood, 250 acres; Cambridgeshire, 200 acres; Market Deeping and neighbourhood, 300 acres; and Hitchin only a few acres. The yield of oil varies according to the dry or wet state of the herb; as a rule the product is from ·2 per cent., and in exceptional cases as high as ·9 per cent. By submitting the oil to a temperature of 20° or 25° C., white needle-shaped crystals, called "peppermint camphor," are produced; these crystals are almost identical with menthol, now so much used as a remedy for neuralgia. The specific gravity of the oil is from ·845 to ·915. Oleum pulegii, oleum rutæ and oleum sabinæ were briefly mentioned, and the paper was brought to a conclusion with a description of ol. lavandulæ, dealing chiefly with the cultivation of the plant in this country.

A short discussion followed, in which the President, Messrs. Burnett, Cracknell, Palmer and Winfrey took part.

At a meeting of the above Association, held on December 6, 1883, Mr. Parkinson (President) in the chair, a paper on "Digestion" was read by R. Wharry, M.D.

Dr. Wharry opened his paper with a short note of the average amount of food and the nature of it required per diem by a healthy man having a fair amount of out-door exercise. The classification of foods was then given, being as follows:—Organic and inorganic, the organic being sub-divided into nitrogenous and non-nitrogenous, while the non-nitrogenous were again sub-divided into hydrocarbons or fats and carbohydrates or amyloids, including the starches and sugar. It was stated to be impossible to sustain life very long upon a purely nitrogenous or a purely non-nitrogenous diet. The chemical changes which the food undergoes by the action of the saliva upon it were described, as also the action of the gastric juice upon the masticated food, rendering it ready for absorption; the action of the bile was alluded to, its chief use being to emulsify the fatty constituents of the food, thus preparing them for absorption; the pancreatic juice also acts at the same time as the bile. The *succus entericus* was next mentioned; it is a fluid secreted by the numerous tubular glands that open everywhere on to the surface of the intestine, but as it is difficult to isolate it information about it is only very limited. Dr. Wharry then fully described the absorption of the food thus prepared, mentioning the absorption through the walls of the minute blood-vessels into the blood. The action of purgatives on the organs which take part in the process of digestion was briefly alluded to.

A long discussion followed, in which the President, Messrs. Braithwaite, Briggs, Burnett, Cooper, Cracknell, Millhouse, Warrick and Winfrey took part.

A hearty vote of thanks to Dr. Wharry for his interesting and valuable paper, proposed by Mr. Winfrey and seconded by Mr. Braithwaite, was carried unanimously, and the meeting then adjourned.

SOCIETY OF ARTS.

The Scientific Basis of Cookery.

In the second Cantor lecture upon "The Scientific Basis of Cookery" last Monday, Mr. Mattieu Williams referred in detail to the process of frying. He stated that in this country the operation is understood very little, and he believed it was a common opinion, in regard to fish especially, that the oil or grease was merely used to prevent the substance being cooked from adhering to the pan. He said people were under the impression that if more oil than was sufficient for this purpose were used it would not only be wasteful, but would make the fish oily; but in fact fish should be entirely immersed in fat, for so long as the temperature was maintained above 212° F., the steam from the water contained in the fish would effectually prevent any oil entering it. The loud frizzing noise heard when the fish was first put into the heated oil was due to numberless explosions of superheated water vapour The method commonly followed of laying the fish upon a greasy iron plate would, on the contrary, give a greater opportunity for the fat to saturate the fish, as when one side was browned, the fish was turned over and became cooled below 212° F.; and as soon as the temperature became so low, the steam which had previously kept the fat out, now condensed and the fat was sucked in. As the fat when used in a large quantity could be used more than once, liberality in this respect would be more economical than the ordinary mode of only greasing the pan every time it is used. The lecturer then enumerated the constituents of animal food, referring first to albumen, which he said was first used in the body as a lubricating agent, and after doing service in that way was utilized as a nutritive fluid. In referring to gelatin, as composing the cell walls, membranes and tissues of the body, he pointed out that in its natural condition it is insoluble in cold water, but that after continued immersion in hot water it became soluble and was obtained in the condition familiar in calves'-foot jelly and similar preparations. He added that an attempt had been made to distinguish between the raw and cooked substance, by naming it in the one condition "gelatin" and in the other "gelatine." He also referred to other bodies resembling gelatine, such as chondrin, occurring in the tendons, and fibroin in spider's web, silk, etc. In comparing albumen and gelatine, the lecturer pointed out that, when heated, albumen is converted from a viscous liquid into a solid, but that gelatine, on the contrary, if the temperature be kept below 212° F., changes from a solid into a liquid state. He further pointed out that although the Bone Soup Commission of the French Academy came to the conclusion that gelatine is not a nutritious substance, further experiments had qualified this opinion and shown that it was more correct to say that it was incapable of supporting life when used alone. The lecturer, in noticing tinned meat, mentioned that a great difficulty was experienced in effecting the necessary complete exhaustion of air from the tins, and also remarked that the process followed caused the albumen of the meat to become hardened and the gelatine to be dissolved, the solution of the gelatine also causing the fibres of the meat to fall apart, giving rise to a delusive appearance of tenderness. After explaining the formation and use of caramel, Mr. Williams stated that he would postpone the important subject of cheese to the third lecture.

Parliamentary and Law Proceedings.

The Recent Poisoning Case at Partick.

An action for £1000, which had been raised in the Glasgow Sheriff Court in connection with the recent poisoning case at Partick, has just been settled.

The pursuer, William M'Kay, was the father of the young man who lost his life, while the defender was Mr. Rait, chemist, Partick. M'Kay stated that his son was an apprentice fitter, earning about £3 per week. On June 4 last, having contracted a bad cold, he called upon Dr. Young, who prescribed certain medicine, consisting of, *inter alia*, tincture of actea racemosa, and for which the doctor wrote out a prescription. The ingredients of that prescription were quite harmless, and the order was taken by pursuer's daughter to defender's premises in Partick. A mixture representing to be what was asked for was made up by a salesman in defender's shop and handed to the girl. The mixture, however, instead of being according to order, is alleged to have contained a quantity of tincture of aconite, a virulent poison, and pursuer's son, having partaken of the medicine in the belief that it was what had been prescribed by his medical adviser, died on June 6.

The defender explained that he was from home at the time, and that his shop was in charge of a manager of long experience as a chemist and druggist. One of the ingredients in the prescription presented to the salesman was tincture of actea racemosa, a liquid extracted from an American root seldom prescribed by medical men. Defender further stated that the tincture had not been prepared by himself, but was obtained from a wholesale druggist in the same state that he dispensed it, and it was not ascertained till after the medicine had been supplied to the girl that it contained a strong preparation of aconite. He further mentioned that when he became satisfied that the death of George M'Kay had been caused by poison, he expressed great regret at the loss pursuer had sustained, and offered, before the raising of the action, to pay the sum of £150 in full of all claims.

When the case was called before Sheriff Lees, on Wednesday, the 5th inst., for adjustment the parties presented a joint-minute, setting forth that the defender, having paid the pursuer the sum of £200 and expenses, the latter had accepted that sum in full of all claims.

His Lordship, in terms of this arrangement, issued an interlocutor dismissing the action without expenses.—*Glasgow Herald.*

Death of a Surgeon from Overdoses of Chloral Hydrate.

On December 10, Mr. Barstow, Coroner, held an inquest at Lindley, near Huddersfield, touching the death of William Hunter, M.D., aged 37 years, who died early on Saturday morning in the presence of his housekeeper, Isabel Roper.

The evidence showed that for six weeks Dr. Hunter, who come from Glasgow, had been drinking, and on Tuesday last week he took to his bed, and began taking chloral hydrate, which he always took when he had been drinking. It did not induce sleep, and about eleven o'clock on Friday night he took a strong dose of chlorodyne, and in about an hour and a half after the housekeeper (who had been in constant attendance on him since Tuesday) heard him him groan, tried to raise him, and saw him die almost immediately.

Mr. Erson, surgeon, who was called, showed that death had arisen from taking overdoses of chloral hydrate and chlorodyne to induce sleep.

The Jury found a verdict in accordance with the medical testimony.

BOOK RECEIVED.

Poisons: their Effects and Detection. By Alexander Winter Blyth, M.R.C.S., F.C.S. London: C. Griffin and Co. 1884. From the Publishers.

Reviews.

Les Produits de la Nature Japonaise et Chinoise. By A. J. C. Geerts. (Part II.)*

This work, written by a laborious and learned author, whose recent death is matter for sincere regret, forms part of a series, the present volume being devoted to a description of substances which are derived from the mineral kingdom. The whole was intended as a contribution to the pharmacology of Japan and China, showing how the various natural products enumerated are employed in the Eastern Hemisphere, in the arts, commerce, domestic economy and medicine.

As a book of reference respecting the special class of subjects on which it treats these pages will have a peculiar interest, since the author has elaborately gleaned his information from every possible source, and has invariably quoted the authorities on which statements are founded. While, then, the practical pharmacist will find little which he can turn to a directly useful purpose, the general reader and the pharmacologist will be rewarded by a perusal of these pages, for they will learn many curious historical details, and will see with what intelligence many manufacturing processes have been carried on in China and Japan. We are all disposed to grant a large share of manipulative skill to these nations: their methods of preparation are ingenious and often most effective. So long as the results of their industry belong to trade, we, with all our refinements, and improved apparatus might frequently be content to copy their example. But as regards the application of these products either to pharmacy or medicine, it would be strained humility not to acknowledge the superiority of the west. Of this no better proof could be afforded than the work just now under consideration. It contains little which might be termed of a popular nature, and its contents deal generally in carefully ascertained facts; and the genius of the two nations depicted seems strangely bounded by the mechanical. The same people who can make blue china to admiration have in their list of materia medica more than sixty varieties of earths, to most of which fantastic properties are assigned; many of them are nasty, and the rest of exceedingly doubtful value.

The author has permitted himself one stroke of humour when he remarks:—"The Chinese writer has had the happy idea of ending his enumeration of the earths by soap, as if he wished to wash out and efface so many dirty matters. We," the writer continues, "do the same, and have no need to state that all that has been written on 'Earth according to native books' rests on the sole responsibility of Asiatic authors."

It appears that some discretion must be used in accepting Chinese nomenclature, for when chemical terms are employed they are used with a degree of laxity not consistent with our more rigid rules. The salts of potash and soda are even frequently confused. Saltpetre is extensively prepared both in China and Japan, and is an article of considerable commercial importance. This salt has been known to the Chinese from time immemorial, and with it they manufactured explosive mixtures, petards and fireworks long before it was known to the Arabs and the western nations. But M. Geerts considers that it is a mistake to suppose that gunpowder was known in China previous to a knowledge of its use having been learnt from Europeans. Their ancient pyrotechnic mixtures were never used for firearms, which were completely unknown in the far east before the arrival of the "barbarians" from the west.

The mode of the preparation of saltpetre is minutely described, as is also that of the various salts of potassium, sodium, iron, cobalt, lead and other metals which are utilized either in the arts or for trade purposes. A wonderful amount of miscellaneous information has been grouped together by the industrious author with regard

* Yokohama: Levy and Salabelle. 1883. Pp. i.—viii., 297—662.

to native manufactures, proving that had modern science directed their ingenuity, China and Japan would hold no mean place in the history of technology.

Not the least curious portion of the book is where it treats of the medical application of familiar substances. Thus wood ash, which is scarcely employed in European pharmacy save for the preparation of a strong liquor potassæ, appears in China to be a favourite remedy for various complaints. It is esteemed also for its supposed power of resuscitating from apparent death by drowning or long exposure to the cold.

The mode of application borders on the grotesque, but the author states that one can easily be convinced of the efficacy of the treatment by practising on an insect rescued from the water. Placing it in a bed of moderately warmed ashes it will soon come to life. It will occur to most that gentle warmth would attain the same happy end without the aid of the much-praised remedy.

The term kaolin will naturally be sought for in an essay on Chinese materia medica. The subject is treated at some length, comparative analyses being given of substances known under that name in China, Japan and France. The term, which has been given in Europe to a pure clay not containing more than from 43 per cent. to 58 per cent. of silica, is derived from the mountain, Kau-ling, situated to the east of the porcelain factories in the province of Kiangsi. But this true kaolin is firm and hard and not plastic. Whence, says the author, we are in error in giving the name to the plastic material of porcelain, instead, as in the east, of assigning it to the hard, fusible, non-plastic substances which enter into its composition (p. 372). The former is called kaolinite. The disquisition on porcelain manufacture is foreign to our purpose. Pumice stone, which is recommended for a host of maladies, is still believed by the Chinese to be a product of the sea-foam and not of volcanic origin. Precious stones, to some of which marvellous virtues are attributed, have a chapter to themselves. One story will suffice. A man learnt the use of jade and duly reduced the precious stone to powder and took his daily dose. At first he was in excellent health but soon was attacked by a mortal disease. Summoning his wife and children he thus spoke: "He who would be cured by jade must be chaste and pure and drink no wine. He must live secluded in the mountains or the forest and flee society. But I have drunk much wine and led a vicious life, and if I am about to die, it is not the medicine's fault, but in consequence of my own sins. Yet listen, wife; leave my body exposed some days before interment, and something wonderful will be beheld." The wife obeyed her husband's wish, and was astonished to perceive that even four days after death, though it was in the heat of summer, neither the corpse changed colour nor did the mouth smell.

It would be unfair to the author and his book to imagine that such episodes formed a leading portion of the treatise. On the contrary the work is filled with minute descriptions of manufacturing processes adopted by the Chinese and Japanese. Rude, outline sketches, copied from native artists, illustrate the volume.

Had the author lived to complete the series no small addition would have been made to our knowledge of technical industry in the two countries so carefully described. As it is, the work is sufficiently advanced to prove the unwearied diligence of the writer whilst engaged on a research which obviously enlisted his entire personal sympathy.

NOTES ON THE DETECTION OF THE ACIDS, INORGANIC AND ORGANIC, USUALLY MET WITH IN ANALYSIS. By J. W. JAMES, Ph.D.*

The publication of this book is totally uncalled for. Had the author been better versed in the contents of existing chemical manuals, the statement in the preface that "the acids have received but little attention as far as their recognition when mixed is concerned" would not have been made, and had he been acquainted with the general principles of science-teaching the book never published. It is indeed a sorry affair. In fifteen pages of the largest type the principal reactions of the inorganic and organic acids of common occurrence are stated, with a view to their detection when occurring together. So condensed is this tabulation that we doubt whether a student would be able, by its aid alone, to detect the constituents of the simplest mixture or, indeed, even to keep a clear head while reading the description of some of the methods. This alone is a sufficient condemnation, and we have neither the time nor inclination to point out other instances which demonstrate the failure of the book to carry out the object stated in the preface, the "simplifying and rendering more reliable the investigation of a mixture of acids."

The progress of the chemical student of average intelligence, who has studied the reactions of known acids in a systematic way, will rather be hampered than otherwise by the use of such a "chart" as this. Even those who believe that students should be trained to analyse like machines, will, at least, stipulate that the methods which they are taught shall be efficient.

* London: J. and A. Churchill. Demy 8vo. Pp. 1–20.

RELIGIO MEDICI. By Sir THOMAS BROWNE, Physician. Being a Fac simile of the First Edition, published in 1642. With an Introduction by W. A. GREENHILL, M.D. Oxon.*

The increasing acceptance that has attended in recent years the production of new editions of the English classics is a welcome sign of the spread of a purer literary taste in the country. Most of these editions have been simply reprints in modern form; but are marvels of correctness and cheapness. Mr. Elliot Stock has, however, been working in another direction and has become celebrated for his issue of *fac simile* reproductions of several famous old works which adorn our English literature. Of these the '*Religio Medici*' of Sir Thomas Browne is the latest, and the humble bibliophile who does not possess an original edition may now indulge in the learned garrulity and Latino-English of this kindly, wise and humorous writer, with the accompaniments of "all the defects of type, false punctuation and quaint spelling" of two hundred and forty years ago. The edition chosen for reproduction is the first, which is said to have been printed without the consent of the author, and was the pretext for the issue of a second edition which he revised and corrected. A list of these corrections is given in the introduction.

THE EXTRA PHARMACOPŒIA OF UNOFFICIAL DRUGS AND CHEMICAL AND PHARMACEUTICAL PREPARATIONS. By WILLIAM MARTINDALE, F.C.S., and W. WYNN WESTCOTT, M.B. Lond. Second Edition.†

We have so recently expressed our opinion as to the value of this little book that we need do little more on this occasion than announce the issue of a second edition and congratulate the authors on the fact that it has been called for after so short an interval. We notice, however, that several additional drugs and chemical preparations have been inserted and some slight errors that had escaped observation in the first edition have been corrected. A Therapeutic Index has also been added, which will make the book even more useful than it was before to the medical practitioner.

* London: Elliot Stock. 1883. Crown 8vo. Pp. i–xxxii., 1–190, and engraved frontispiece. Subscribers, 4s.; Non-Subscribers, 6s.

† London: H. K. Lewis. 1884. Medium 24mo. Pp. i–iv.; 1–330. 7s.

Correspondence.

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

Tincture of Nux-vomica.

Sir,—I have read with much interest the correspondence relating to this tincture, and believe Mr. Hick is correct in saying that few retail chemists make it according to the B.P. formula; a great number do not make it at all, for there is an evil creeping insidiously into the retail trade, viz., delegating to wholesale traders (some of whom have little or no knowledge of the Pharmacopœia) the duty of making its preparations and distributing them through the trade, the profession, and even outside the trade, at a minimum of a profit, thus bringing dishonour upon a number of our B.P. preparations, such as its pills and potions. This I know encroaches upon a subject which is at present depressing our trade here, there, and everywhere. I will not, therefore, enlarge, but remark that I have just made (as I have for the last twelve years) my usual pint of tincture of nux-vomica as well as ignatia amara, certainly not with the same facility as Mr. Hick says he can weigh 120 grains of extract and dissolve in s.v.r., for I do not mind trouble, if by so doing I can make a better and more reliable preparation.

My *modus operandi* is as follows:—I weigh 2 ounces and 2 drachms of the seeds and place them in a mortar over night, just moistened with warm distilled water. I am not blessed with a laboratory and its conveniences, therefore, the next morning I transfer them on to a water-bath, adding, as required, more water; in about an hour I can cut the seeds into very small pieces with ease. After rapidly drying they can be easily powdered. Of course the 2 drachms extra is to ensure the right quantity, as there may be loss in powdering.

Sandford.

An Examination of some Samples of Pitch and Asphalt.

Sir,—Mr. E. Davies, F.I.C., F.C.S., in his paper read before the Conference and published in the *Pharmaceutical Journal* of November 17, remarks that the determination of the amount of matter soluble in petroleum spirit, sp. gr. ·700, does not admit of very great precision.

In my varied experience in analysis of asphalt, especially that of Val de Travers, I have always used carbon bisulphide (purified) for the determination of the pitch or bitumen, using the same process as Mr. Davies, only without the application of heat.

The CS_2 dissolves the bitumen when pure completely, leaving the limestone (in the case of the Val de Travers) in a perfectly white condition. Should the carbon bisulphide not dissolve all the organic matter, but leave a dark residue, it shows that the asphalt contains organic matter other than bitumen, such matter being useless for the purposes to which asphalt is applied. It is estimated by igniting the residue after extraction with CS_2, re-carbonating with ammonium carbonate the caustic bases formed, and weighing.

I find that when CS_2 leaves a perfectly white residue the bitumen can be estimated by igniting a weighed portion of the asphalt in a platinum crucible, recarbonating the bases as above with ammonium carbonate, again igniting at a low red heat and weighing, deducting, of course, from the result the moisture contained in the sample. My analysis by the CS_2 method I always check when possible by an ignition experiment, and the results always agree within a decimal point.

The following test, proposed by MM. Durand-Claye and Hervé Mangon, of the Ecole des Ponts et Chaussées, for distinguishing between gas-tar or artificial pitch, and bitumen or natural pitch, may be useful. Into a tube containing 1 gram of material, about 5 c.c. of rectified benzine are poured, and the mixture shaken repeatedly until the benzine becomes almost black; 5 or 6 drops of the liquor are filtered into another glass tube and diluted with about 5 c.c. of rectified benzine, and an equal volume of 85 per cent. alcohol is added. The contents of the tube are then agitated and allowed to settle. The liquid soon separates into two distinct layers; the upper is benzine strongly coloured by the dissolved matter, the lower layer is formed of alcohol. This alcohol is coloured golden yellow by gas-tar, and is hardly coloured at all by bitumen, or at any rate only shows a scarcely perceptible straw-coloured tint. The yellow colouring is plainly visible when a mixture of the two substances is treated, even when gas-tar only enters for one-tenth part.

Hornsey. H. P. Cooper, F.C.S.

"*Quercus.*"—Most likely the "dog" Latin has been misread.

"*Associate.*"—The formula of the B.P. yields a very satisfactory and soluble collodion, if the instructions are carefully followed.

A. J. Swadling.—The B.P. contemplates suppositories of about 15 grains each. The ingredients in the prescription sent are 60 grains. Each will require about 5 grains of tragacanth and 5 grains of cacao butter.

"*Kino.*"—(1) No. (2) The changes alluded to do not occur with iodine and ether in proper condition.

C. Pridham.—There is no discoloration when the ingredients used are B.P.

G. J. Gostling.—The ext. cinchonæ liq. of different makers differ very much in their behaviour when dispensed in mixtures. The mixture in question would be of a brown colour, slightly opaque, with a flocculent precipitate.

Pharmacist, U.S.A.—The ext. cinchonæ rub. would be the fluid extract. The ingredients should be rubbed together without the aid of heat.

T. A. W.—Glycerine of tragacanth in a gelatinous condition.

C. Potter.—The supply of small quantities of pure spirit for any purpose by an unlicensed person is illegal.

"*Apprentice.*"—(1) *Eriophorum vaginatum.* (2) *Geum rivale.* (3) *Knautia arvensis.* (4) *Pyrola minor.* (5) *Stellaria Holostea.* (6) *Lychnis Githago.*

"*Tinct. Rhei Co.*"—(1) The name is rather of the nature of a trade mark than indicative of a particular perfume. (2) See a number of recipes in vol. x., pp. 1009, 1031, 1051.

W. W. Morris.—The New Zealand Pharmacy Act, sect. 19, provides that any person who "holds a certificate or diploma of competency as a pharmaceutical chemist or chemist and druggist from the Pharmaceutical Society of Great Britain" shall be entitled to registration without further examination.

E. Dodds.—The 16th section of the Pharmacy Act, 1868, provides that nothing contained in the previous sections shall extend to or interfere with the business of any legally qualified apothecary.

Annikcam.—If you are in a position to prove that any of the preparations sold in the manner described contain a scheduled poison, you are recommended to communicate with the Registrar.

"*Dispenser.*"—(1) All such matters are subjects of private arrangement, and are influenced by too many conditions to allow of a definite answer being given. (2) Not necessarily, unless you wish to commence business on your own account, in which case you will have to pass the legal examinations.

Fraxinus.—According to the U.S.P., "petroleum ether" is the portion of distillate from American petroleum which has a specific gravity from 0·670 to 0·675, and boils at 50° to 60° C.

F. C. Allen.—The 'Extra Pharmacopœia' gives the following formula for "Vapor Iodi Ætherealis," which will possibly answer your purpose:—Iodine, 3 grains; ether, 2 drachms; carbolic acid, 2 drachms; creasote, 1 drachm; rectified spirit, 3 drachms. Ten minims to be dropped on the respirator before inhalation.

A. E. I.—(1) Cullingworth's 'Manual of Nursing' (J. and A. Churchill), 3*s.* 6*d.*, or Donville's 'Manual for Hospital Nurses' (J. and A. Churchill), 2*s.* 6*d.* (2) The question is one that hardly allows of a general answer being given, but we presume that illustrated catalogues are subject to the ordinary law of copyright.

Materia Medica is referred to the rule respecting anonymous communications.

Communications, Letters, etc., have been received from Messrs. Kinninmont, Harvey, Abraham, Freeman, Sanders, Howard.

ANALYSIS OF SOME SAMPLES OF NATURAL AND RENEWED SUCCIRUBRA BARK FROM THE SAME QUILLS.

BY JOHN HODGKIN, F.I.C., F.C.S.

A parcel in a recent consignment of Ceylon succirubra consisted of quills of natural and renewed bark in juxtaposition; these quills were about a foot long, the upper half being renewed bark (No. 3), whilst the lower portion was natural (No. 2). As in the same consignment there were parcels of bark ntirely natural (No. 1), and also bark entirely enewed (No. 4), an opportunity offered itself for testing whether the renewed and natural barks in direct contact with one another afforded intermediate results to those obtained from the unmixed barks.

The quantity experimented upon in each case was identical, and the percentage of moisture contained in the various barks was noted, in order that the analyses might be brought to one level for greater ease in comparison. The results, therefore, have all been calculated to Moens' standard hydration, viz., 13·5 per cent. The natural bark was carefully separated from the renewed bark by means of a pair of scissors. This was easily done, since the quills were thin and the bark somewhat flexible, owing to the high percentage of moisture contained therein.

No.	Description of bark.	Percentage of moisture in the bark.	Quinine sulphate.	Cinchonidine sulphate.	Quinine.	Cinchonidine.	Cinchonine.	Quinidine.	Amorphous alkaloid.	Total alkaloid.
1	Natural Quills.	13·33	1·352	0·948	1·014	0·711	0·661	Trace	1·222	3·608
2	Natural portion from Natural/Renewed Quills .	14·61	0·622	0·941	0·467	0·706	0·849	,,	0·888	2·910
3	Renewed portion from the same Quills .	15·96	1·474	2·076	1·050	1·557	0·817	0·051	0·810	4·285
4	Renewed Quills	13·84	2·311	2·379	1·744	1·784	0·717	Trace	0·871	6·116

It is worthy of note that the hydration differed considerably in the natural and renewed portion in the same quill. The renewed portions contained more water, probably owing to the soft spongy renewal, which had evidently been accomplished by shaving and not stripping.

The results are rather surprising, but it must be carefully borne in mind that trees grown apparently under precisely similar conditions, from the same seed, and, in addition, presenting the same physical appearance, will, on analysis, turn out widely different as regards their chemical composition.

If it should be the case that the natural bark (No. 2) has suffered in the renewal, it will probably be found to be owing to some temporary injury to the tree caused by the shaving process, as in McIvor's experiments no such deterioration was found. As regards No. 3, of course, the reason for such a small increase in alkaloid is due to the fact that this bark consisted of those portions of the quill where the shaving ended, and, consequently, only a very thin layer of original bark had been removed.

Where a thicker layer, as in No. 4, had been removed, the increase in alkaloids was well marked. No. 3 was the only one that gave an appreciable quantity of quinidine, the others only giving a faint trace.

FURTHER NOTES ON VEGETABLE TALLOW FROM SINGAPORE.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

I have perused Mr. W. T. Thiselton Dyer's comments (*Pharm. Journ.*, Dec. 15, p. 462) on my previous paper on this subject (*Pharm. Journ.*, Nov. 26, p. 401) with much interest, and have to thank him for drawing my attention to the existence of a fat obtained from a Sapotaceous plant at Bandjermassing, and to the admirable treatise on Minjak Tangkwang by Dr. W. H. de Vriese.

I cannot, however, agree with Mr. Dyer that the Sapotaceous plant he mentions as coming from Bandjermassing is the source either of the fat or seeds sent to me by Mr. Jamie from Singapore, and mentioned on p. 371. These seeds and fat came from Pontianak and Sarawak, not from Bandjermassing.

Mr. Dyer has expressed the hope that his doubts attending the origin of this interesting substance will be cleared up by myself and Professor Van Eeden. I have much pleasure, therefore, in giving such information as I possess, and will take up, *seriatim*, the various points raised by Mr. Dyer (p. 462).

I. With regard to the Sapotaceous plant sent to the Kew Herbarium by Madame de Vries de Vries, Dr. W. H. de Vriese expressly states, in the tract alluded to by Mr. Dyer, that several different fats pass under the name of "Minjak Tankawang," and enumerates some of them, as shown in the following quotation, from p. 9:—

"The fat, Minjak Tangkawang, is also known at Singapore under the name of Vegetable Tallow. But under this name different kinds of fats occur in Borneo, Java and Japan. Thus there is—

"1st. The vegetable tallow of the fruit of an *Isonandra* (Gutta Percha tree) prepared in the eastern part of Borneo.

"2nd. The fat of *Cylicodaphne sebifera* (*Litsæa sebifera*), a kind of Lauraceous plant. This is obtained from one of the largest and most lofty trees of the westerly part of Java, and is brought over to the middle and east of Java. Near the Court-house at Salatiga a large tree stands, the seeds of which furnish 500–600 candles annually, sufficient for the lighting of the house. This is the *Minjak Tangkallah.*

"3rd. The fat of *Stillingia sebifera*, the tallow or wax tree of Japan.

"4th. The fat of the berries of *Rhus succedanea* of Japan.

"5th. The fat of different *Sapotaceæ*, from species of *Cacosmanthus* in Java.

"All these and many more are classed under the name of vegetable tallow, affording another instance of the enormous confusion in names and articles in commerce."

To the above list he adds six species of *Hopea* which he calls tallow trees, and which I shall allude to hereafter.

The Sapotaceous plant mentioned by Mr. Dyer is, therefore, judging from the above remarks by Dr. W. H. de Vriese, only one out of several used for the purpose. Whether it be identical with the No. 1 (*Isonandra*) of Dr. de Vriese's list or no, I have no evidence to show; but the plant in the Kew Herbarium received from Madame de Vries de Vries, and alluded to by Mr. Dyer, also comes from the eastern side of the island, Bandjermassing being in the south-east of Borneo. This plant, I learn from Professor Van Eeden, is now determined by M. Pierre to belong to a new genus of *Sapotaceæ*, thus confirming Professor Oliver's opinion. Dr. Pierre has named it *Diploknema sebifera*, and the description and figures will, Professor Van Eeden believes, shortly be published in the *Archives Néerlandaises des Sciences Exactes et Naturelles*, issued by the Haarlem Society of Sciences, a copy of which Professor Van Eeden has kindly promised to forward to me as soon as published.

It is evident, therefore, that Mr. Dyer's Sapotaceous plant is only one of the numerous sources of Minjak Tankawang, but there is no proof that it yields the particular kind described by me.

II. The next point raised by Mr. Dyer is the following:—He remarks (p. 462) "It is *à priori* unlikely, however, that any species of *Dipterocarpeæ* would yield a vegetable tallow from the seeds, because the members of the family are characterized by the presence of oleo-resins in the tissues and not of fatty bodies." This is given as a reason why the vegetable tallow I have mentioned cannot be derived from a Dipterocarpous plant.

In confirmation of my opinion that the seeds sent me by Mr. Jamie *are* those of a Dipterocarpous plant, and that fixed oil *is* obtained from Dipterocarpous seeds, I may say,—

a. That previous to publishing any account of the fat, I had shown the seeds sent with it to Professor Oliver, who at once referred them to the *Dipterocarpeæ* and now agrees with me that they probably belong to the genus *Shorea*, as limited by Bentham. This genus is said by Bentham to be scarcely distinct from *Hopea*, the former having as a chief distinguishing character three or more of the lobes of the calyx enlarged unequally when in fruit, and the latter only two enlarged.

b. That in the No 1 Museum, at Kew, there are specimens of the fats of the seeds of two Dipterocarpous plants, viz., the fat of *Vateria indica*, well known to yield resin in the bark, and the vegetable tallow from Singapore. In another part of the Museum, among unnamed products, there are some of the larger Dipterocarpous seeds, identical with those sent me by Mr. Jamie (probably *Hopea macrophylla*, de Vriese). There is also a specimen of the fruit of *Lophira alata* (*Dipterocarpeæ*) labelled, "Seeds from which an oil called Meni is obtained."

c. In Dr. W. H. de Vriese's tract, six species of tallow trees which are said by him to yield the vegetable tallow, Minjak Tankawang, are described. These are *Hopea macrophylla*, *H. splendida*, *H. Balangeran*, *H. aspera*, *H. lanceolata* and *H. Seminis*.

In the copy of this tract in the magnificent botanical library at Kew, some of these species have been identified doubtfully, in what I am informed is Mr. Dyer's handwriting, two of them as a species of *Shorea* and one as a species of *Vateria*. The only explanation that seems possible is, either that Mr. Dyer had not read the text, which is in Dutch, and had referred only to the Latin description of the species, or that he doubted the statements of Dr. W. H. de Vriese and of other authorities whom Dr. de Vriese quotes, that the vegetable tallow was obtained from any Dipterocarpous plants.

d. Mr. F. W. Burbidge, the author of a most interesting book on Borneo, has kindly furnished me with the following information concerning the preparation of oil or fat from Dipterocarpous seeds:—

"The only place I saw the manufacture of oil from Dipterocarpous seeds was in a little village situated on the Lawas River, between Labuan Island and Brunei. The seeds are placed in a leather bag or folded mat, which is enclosed in a tough palm sheath folded into a V-shape, so as to form a spout for the oil to drain into the receptacle placed to receive it. This sheath is placed obliquely in the press, so that an 'oil shed' is formed, towards the side on which the receiver or cooking pot is placed. The oil press or *Teudasun* consists of a stout plank placed on two upright supports, fixed also into another stout plank at the base. In an opening in the horizontal planks are two vertical boards placed obliquely, between which the bag of seeds is placed, the pressure being applied by wedges forcibly driven in behind the vertical boards.

"The Dipterocarpous seeds (at least three species are used) are collected and thrown into heaps, and are then allowed to 'massuck' as the Malays say, or 'blet,' as we should say in English, before they are pressed. The pure oil is used in cooking and the refuse is used in the making of candles or rather rude torches. The process here described is used by the Kadyans, a clean and healthy Mahommedan tribe of Borneans, who live on the Lawas and Merapok Rivers, and to whom animal fat is an abomination."

Mr. Burbidge gives a sketch of the fruits, which are evidently Dipterocarpous, and apparently have more than three enlarged calyx lobes; they correspond well as regards size with the smaller Dipterocarpous seeds I have received from Mr. Jamie.

e. Professor Bernardin, of Melle-lez-Gand, in reply to my inquiry if he could give any information as to the botanical source of Minjak Tangkawang, says, "I think the tallow comes from *Hopea macrophylla*, *vide* Wiesner, *Rohstoffe*, p. 197." He sends me a portion of a seed said to yield it, which corresponds exactly with the larger variety sent me by Mr. Jamie.

I hope the above statements from competent authorities may be sufficient to show that I am justified in saying that the particular kind of Singapore vegetable tallow sent me by Mr. Jamie is derived from Dipterocarpous seeds, which may be referred to the genus *Hopea* by most writers on the subject, although by some botanists they may be considered to belong to other genera of *Dipterocarpeæ*, and that it is *not à priori* unlikely that any species of *Dipterocarpeæ* would yield a vegetable tallow from the seeds.

I may add here, that I can see nothing improbable in the occurrence of fixed oil in the seed of a plant which yields a resin or oleo-resin in the bark, etc. The *Dipterocarpeæ* is not the only family in which this occurs. *Canarium commune* (*Burseraceæ*) yields a semi-solid oil from the seed and an oleo-resin from the bark. *Garcinia pictoria* (*Guttiferæ*) also yields a fat (solid in this country) from the seed and a gum-resin from the bark. The chemistry of plant life is so little known at present that we are scarcely in a position to say under what circumstances or by what means resins, fat and caoutchouc are formed in plants, or that all of them might not be formed in the same plant, either by vegetable ferments or by strictly chemical processes.

III. The last point raised by Mr. Dyer is the identity of the vegetable tallow presented to the Museum by Mr. Jamie with two or three specimens in the Kew Museum.

I have seen the specimens in the Kew Museum, and, through the kindness of the Curator, Mr. J. R. Jackson, have been permitted to examine them.

I find that one of the specimens in the form of a cylinder is identical with Mr. Jamie's Dipterocarpous tallow, although labelled "*Bassia* sp."? Another specimen labelled, as Mr. Dyer remarks, "*Bassia* sp.", is of quite a different character. It has a rancid odour, is in crumbling irregular pieces, and resembles in appearance and consistence the fats of *Bassia* generally, and it is quite possible that it may be derived from the Bornean Sapotaceous plant recently named by Dr. Pierre. The third specimen labelled "Concrete oil, from a species of *Bassia*; *Sakarran*; Sir James Brooke," is totally different from the other two. It is enclosed in a bamboo joint, and consists of an almost pulverulent micaceous mass, with a strong and fragrant odour, between that of sassafras and nutmeg. The crystalline scales of which it consists closely resemble in appearance those of myristic acid. The fat appears to have soaked through the bamboo and has formed an efflorescence of micaceous crystals outside it. I should judge from the above characters that the fat is obtained from the seeds of some Lauraceous plant, possibly from the *Cylicodaphne sebifera* mentioned by Dr. W. H. de Vriese.

To recapitulate: The vegetable tallow and seeds presented to the Museum of the Pharmaceutical Society by Mr. R. Jamie are certainly of Dipterocarpous origin, and are, in all probability, the produce of trees which have been placed by Dr. W. H. de Vriese in the genus *Hopea*, but which may possibly belong to allied genera, according to the views held by different botanists, but they are undoubtedly *not* of Sapotaceous origin.

The Sapotaceous plant sent to Kew by Madame de Vries de Vries, named by Dr. Pierre, is most probably the source of one of the kinds of vegetable tallow of Borneo and possibly of the second specimen in the Kew Museum, but not of that presented by Mr. Jamie to the Museum of the Pharmaceutical Society. Lastly, the aromatic tallow, No. 3 of the Kew Museum, from Borneo, is most likely the produce of *Cylicodaphne sebifera*, although, in consequence of the absence of an authentic specimen for comparison, it is difficult to satisfactorily determine its identity. This last-named product seems, however, worthy of attention as an aromatic fat and of chemical examination with respect to the fatty acids and volatile oil it contains.

TINCTURE DEPOSITS.*

BY R. A. CRIPPS.

[Contribution from the Research Fund of the School of Pharmacy Students' Association.]

Every pharmacist must have noticed the fact that most of his tinctures, after having been filtered, deposit sooner or later a more or less bulky sediment. The importance of knowing the nature of these deposits at once suggests itself to everyone. Is it that they contain some of the active principles of the drugs, or are they only gummy or albuminous matter, of no value in medicine? It is with the view of throwing some light upon this question that I have undertaken their investigation, feeling that my work, however imperfect, will be one step towards a deeper knowledge of the chemistry of some of the pharmacist's practical difficulties.

1. *Tinctura Calumbæ.*—The deposit in this tincture usually occurs in flaky pieces of a light olive-brown colour, mixed with a gummy-looking substance of the same nature. Under the microscope the sample under examination formed a very interesting object, as it consisted principally of finely-formed starch granules, similar to a mixture of arrowroot and wheat starches, showing very distinctly the hilum and concentric rings, and with the polariscope a fine black cross; with the starch was mixed a quantity of matter of no definite structure, and a few very fine tubular vessels of a bright yellow colour.

The starch was confirmed by adding iodine to the cooled decoction of the deposit, when the usual blue colour was developed.

After washing well with proof spirit (until the washings passed nearly colourless) the deposit was boiled with water, and afterwards with very dilute sulphuric acid; it gave a brownish-yellow solution, which on dilution with spirit, boiling and addition of dilute solution of iodine in iodide of potassium, gave no green spangles indicative of berberine, nor did it possess any markedly bitter taste, showing the absence of more than traces of colombin or colombic acid.

The deposit in tincture of calumba may therefore be said to contain none of the active principles of the drug, and, except for the inconvenience of filtering, is of no consequence.

Tinctura Cardamomi Composita.—This deposit occurs principally in minute crystals of a dirty white colour, with a small proportion of a flocculent substance. The crystalline form is well shown by a low power of the microscope, which reveals several different forms, a few octahedra, while others are hexagonal prisms with pyramidal apex and base, besides others more difficult to make out.

The deposit was first washed with proof spirit until the washings passed colourless or nearly so, then boiled with water and filtered. The filtrate was examined for metals, very carefully for potassium, and also for tartaric acid, but gave no evidence of the presence of either, proving that the deposit is not acid tartrate of potassium, as I think is the usual opinion.

The precipitate was then boiled with a strong solution of sodium carbonate for about three hours and filtered. The insoluble portion was examined for metals, *calcium* was alone found.

Looking at the constituents of the tincture I find that the deposit must consist of one or more of the following:—Tartrate or malate of calcium or oxalate of calcium.

The alkaline filtrate was therefore divided into four portions. To the first was added excess of solution of acetate of lead, the precipitate filtered off and dried upon a water-bath, ammonia added, again dried, then a few more drops of ammonia, and lastly digested with alcohol, which would dissolve any malate of ammonium if present; on evaporation of the alcoholic solution no residue was obtained, proving absence of malate of calcium.

To the second portion excess of acetic acid was

* Read at a meeting of the School of Pharmacy Students' Association, Nov. 29.

added, then solution of calcium chloride; no precipitate was formed, showing absence of oxalate of calcium.

To the third portion nitric acid was added to exact neutrality, a slight excess of nitrate of silver, and lastly ammonia in slight excess; on boiling for a short time a fine mirror of silver was obtained on the sides of the tube, giving strong suspicion of tartaric acid.

To the fourth portion were added excess of acetic acid, a little potassic hydrate, then more acetic acid (to ensure acidity), and lastly a small quantity of alcohol. On setting aside for a short time a white crystalline precipitate formed, which on the addition of strong sulphuric acid and gently warming gave off the odour of burnt sugar, indicating the presence of *tartaric acid.*

A small portion of the original aqueous solution was boiled with Fehling's solution, but gave scarcely any evidence of sugar, probably not more than due to adherent tincture. The deposit in tr. card. co. is therefore almost entirely tartrate of calcium.

Tinctura Chloroformi Composita, B.P.—As might be expected, this deposit is the same as that occurring in tinct. cardam. comp.

Tinctura Cinchonæ Composita, B.P.—This deposit was of a dark reddish brown colour, and in a state of very fine division, not at all aggregated into lumps or scales. 1·769 gram was treated as described further on under tinct. cinchonæ flav., and yielded ·0542 of a gram or 3·064 per cent. of total alkaloids. The acid solution of alkaloids was scarcely fluorescent, and gave only a faint green coloration with bromine and ammonic hydrate, indicating only traces of quinia or quinidia. A saturated solution of the sulphate, when shaken with half its volume of ether and excess of ammonia, afforded abundant evidence of the presence of cinchonia.

The colouring matter of cochineal was also present, as shown by the colour imparted to dilute HCl on boiling with the deposit, and by the addition of sulphate of zinc and ammonic hydrate in excess, when a fine violet tint was developed; ammonic hydrate alone giving a deep claret coloration.

The presence of cochineal entirely masked any reactions for cinchona-red which may have occurred.

Ferric chloride gave a faint reaction for cinchotannic acid.

The deposit was found to contain 3·064 per cent. of alkaloids, chiefly cinchonia, probably existing as cinchotannates; and a little colouring matter from the cochineal.

Tinctura Cinchonæ Flavæ, B.P.—Three samples of this deposit were examined, they varied much in appearance and nature.

1*st Sample.*—This was of a brown colour. Being in small quantity only it was simply tested for the presence of quinia and other alkaloids. It was well washed with proof spirit, to free it from adherent tincture, dried and mixed with milk of lime, thoroughly dried over a water-bath and extracted with chloroform. The chloroformic solution was shaken with dilute sulphuric acid (to dissolve out alkaloids as sulphates) and washed with water till free from bitterness. The acid solution of alkaloids thus obtained was shaken with chloroform and ammonia in slight excess, and the chloroformic solution separated and evaporated to dryness.

The residue which consisted of the pure alkaloids was now tested for quinia. 1st. By dissolving a little in dilute H_2SO_4, adding bromine water and then ammonic hydrate. A fine green coloration, due to thalleioquin appeared. 2nd. The remaining alkaloid was dissolved in a small quantity of hot dilute H_2SO_4, exactly neutralized with ammonic hydrate, still being kept hot, and set aside for a short time. An abundant supply of crystals appeared, showing the presence of quinia.

2*nd Sample.*—This sample was much lighter in colour than the other two, and far larger in proportion to the amount of tincture from which it separated. It was first examined quantitatively for alkaloids and for quinia. 7·237 grams were treated as above, the extraction with chloroform being performed in a "Dunstan and Short's apparatus for continual extraction," which I find by far the best for the purpose. After evaporation of the chloroformic solution the residue was dissolved in dilute H_2SO_4, heated upon a water-bath, exactly neutralized by AmHO and set aside to crystallize, filtered, well drained, and again dissolved in boiling water, set aside, the crystals collected, drained, dried at 100° C. and weighed. 0·156 of a gram was obtained, to which was added 0·0876 of a gram, being the amount of quinia sulphate retained by the mother liquors, equivalent to 2·94 per cent. of quinia, or 3·204 per cent. of crystalline sulphate of quinine. The mother liquors were now precipitated by ammonia and the alkaloids taken up by chloroform, which solution, on evaporation, yielded ·3182 of a gram of alkaloids, from which was deducted ·0697 of a gram (the quinia present) leaving ·2485 of a gram of alkaloids, not quinia, or 3·433 per cent.

The deposit, therefore, contains—

Total alkaloids	6·374 per cent.
Quinia	2·940 per cent.

Cinchotannic acid was proved by distilling the dry deposit, when an odour resembling carbolic acid was developed, and the distillate when tested with bromine water gave a white precipitate which rose to the surface of the liquid (tribromophenol); and by the slightly acid extract giving a faint greenish coloration with ferric chloride. Cinchona-red was proved as below.

3*rd Sample.*—This was of a very dark colour, having the appearance of cinchona-red. 1·35 gram was treated as before for alkaloids. The yield was only ·034 of a gram or 2·52 per cent. The solution was only faintly fluorescent. On attempting to crystallize out the quinia as sulphate, I succeeded in getting only a few very minute crystals, quite insufficient to weigh; and on testing for quinia by the thalleioquin test, I obtained only a faint reaction. A saturated solution of the sulphates, when mixed with half its volume of ether and excess of ammonic hydrate, afforded abundant evidence of the presence of cinchonidine.

Cinchotannic acid was proved as before.

Warmed with potassic hydrate or acetic acid it imparted a deep brown-red colour to the solution, due to cinchona-red.

From these three examples it will be seen that the deposit contains a very varying amount of alkaloids, and although the two latter were from tinctures prepared strictly according to the B.P. (the first I am not certain of), their nature both physically and chemically was very different.

Tinctura Ferri Acetatis.—This was washed with water; the first washings were found to contain free acetic acid. The deposit was then dried and weighed $= \cdot 1833$ of a gram, dissolved in diluted HCl, diluted, and the iron preciptated in the usual manner by AmHO. The precipitate, after washing and drying, weighed ·1279 of a gram, that is to say, the deposit represents 69·77 per cent. of oxide of iron, Fe_2O_3.

Ferric oxyacetate, $Fe_6O_7(C_2H_3O_2)_4$ represents 70·175 per cent. of ferric oxide.

Tinctura Gentianæ Composita.—This deposit was of a grey colour, and was mixed up with tow. It was first washed with proof spirit until the washings passed colourless or nearly so. Examined microscopically it was seen to consist mostly of very small starch granules, about the size of rice starch, but oval rather than angular. Some of the deposit was then gently boiled with water, cooled and solution of iodine added; a greenish-blue colour appeared, confirming the presence of starch. It was then washed with cold water, and the washings filtered and evaporated to dryness over a water-bath. The residue was nearly white and possessed no bitter taste, proving absence of gentiopicrin. Portions were then tested as follows:—1st. A small quantity was boiled with potash solution, a yellow colour was produced. 2nd. Another portion was tested with Fehling's solution, which it quickly reduced. 3rd. To a drop of solution of borax was added one drop of solution of phenol-phthalein, and then a few drops of the aqueous solution of residue. The pink colour was not discharged. The first two experiments show that the residue was sugar, and the last that the sugar of gentian is not a polyhydric alcohol, such as glucose.* In order to prove that this was the same sugar as exists ready formed in the root, I prepared a decoction of gentian, filtered, and tested as before with phenol-phthalein and borax; obtaining the same result. The remainder of the deposit was washed with strong, hot alcohol, and the alcoholic solution evaporated to dryness. The residue was too minute for examination, but had the appearance of an oily resin, which formed a yellow solution with caustic potash. It had no bitter taste. After washing with alcohol the residue consisted of albuminous matters and starch mixed with tow. Starch and gentian sugar, mixed with albuminous matter, are, therefore, the constituents of the deposit of tinct. gent. co., the first having no doubt slipped through the filter, as starches frequently will.

Tinctura Ipecacuanhæ Concentrata.—This is not an official tincture, but as it is somewhat largely used in some parts of the country, I have examined it qualitatively for emetine. After washing with weak spirit, it was dried, mixed with milk of lime and again dried, warmed with chloroform, the solution filtered and evaporated on a water-bath. Scarcely any residue was left, and on treating with calcium hypochlorite and acetic acid no yellow colour was produced, indicating absence of emetine.

Tinctura Lobeliæ Inflatæ Ætherea.—This deposit occurred as a somewhat flaky, white sediment; it does not occur in the tincture made with proof spirit.

It was first washed with spirit of ether, and shaken up with water, the aqueous liquid tested by Mayer's reagent for the presence of alkaloid, but found to contain none, and on boiling the deposit with water no odour of lobeline was developed, even on the addition of ammonic hydrate. After boiling, the deposit assumed a resinous appearance, and was of a greenish-white colour. Some of this resin (?) was treated with caustic potash, but was insoluble; it dissolved perfectly in ether, from which solution it was precipitated by alcohol as a nearly white resin (?). Benzol, chloroform, and bisulphide of carbon also dissolved it freely. It gave no characteristic reaction with any of the ordinary reagents for resins.

Tinctura Quiniæ.—The sample of tincture from which this deposit was obtained was not prepared according to the official directions, but the quinine was dissolved in the tincture of orange by the aid of a small quantity of acid. It was white and soluble in water; on examination it proved to be sulphate of calcium.

Mr. Hustwick has shown (*Pharm. Journ.*, [3], iii., p. 722), that this deposit is formed during the three days used in its preparation by the pharmacopœial method, and that another deposit is formed subsequently at low temperatures, consisting of tannate of quinine. I have not been able to obtain any of this latter deposit.

Tinctura Rhei.—The deposit, which was of a greyish-brown colour, was washed with proof-spirit as before, until the washings ran through only slightly coloured, then dried and extracted by benzol, first in the extraction apparatus, and then by boiling. A yellow solution was formed which on evaporation left a residue too small for further purification and was, therefore, weighed as slightly impure chrysophanic acid. 1·485 of a gram yielded ·018 of a gram of chrysophanic acid = 1·2 per cent. This residue was shown to consist of chrysophanic acid by yielding a fine rose-coloured solution with dilute ammonia, which solution gave a lilac to rose-coloured precipitate with acetate of lead.

The remaining portion of the deposit was boiled with water, and, as it still gave evidence of the presence of chrysophanic acid, was boiled with very dilute ammonia until exhausted; the ammoniacal solution filtered, washed, and shaken with chloroform after acidulating with acetic acid. The chloroformic solution was evaporated to dryness and the residue weighed ·0142 of a gram = ·96 per cent., which, with that already obtained, equalled 2·17 per cent. of chrysophanic acid in the deposit.

The residue after the above treatment was now washed with dilute hydrochloric acid, and the solution gave evidence of oxalate of calcium in considerable quantity. Another portion of the deposit, ·5634 of a gram, was therefore taken and the ash estimated by ignition, it corresponded to 29 per cent. of the deposit, and consisted chiefly of carbonate of calcium, due to the decomposition of the oxalate, also a small quantity of magnesium, but no potassium. The deposit in tinct. rhei therefore contains 2·17 per cent. of chrysophanic acid and about 37 per cent. of oxalate of calcium. I had not enough of the deposit to test it for cathartic acid, which is the purgative principle of the drug. The remainder, apparently, consisted of gummy matters.

Note.—It will be observed that no reference is made to the *amount* of deposit formed in the above tinctures, I had the opportunity of judging roughly in a few only, viz:—Tinct. cinchonæ, ¼ oz. from ʒ gallon; do., ʒj. from 1 gallon; tr. calumbæ, ℥iss. from 1 gallon. I should be glad to receive any deposits, especially those from the more potent tinctures, for further examination.

* See *Pharm. Journ.* [3]., vol. xiv., p. 41; Dunstan on Polyhydric Alcohols.

SKETCHES OF TYNESIDE TECHNOLOGY.*

BY B. S. PROCTOR.

(*Concluded from page* 467.)

It was greatly to the advantage of the Newcastle Chemical Society that its meetings were held in the rooms of the College of Physical Science, and that so many of its meetings had the benefit of interesting matters brought forward by Professors Marreco and Herschel. Among such occasions we may call to mind the exhibition in operation of Tyndall's arrangement for experimenting on the preservation of organic fluids in a moteless atmosphere, and at a later date, the apparatus for liquefaction of gases as planned by M. Cailletet and it is interesting to note now in passing the further steps which have been successfully taken in that direction by Wroblewski and Olszewski, as reported in the *Philosophical Magazine* for July last, and other periodicals, where we find described the means by which they reduced oxygen, nitrogen and carbonic oxide to the liquid state and alcohol and carbon disulphide to the solid condition. The reduction of temperature necessary for liquefying oxygen was obtained by the vaporization of liquefied ethylene *in vacuo*, the thermometer falling by this means to $-136°$ C. The liquid oxygen thus obtained was colourless, transparent, and mobile; nitrogen and carbonic oxide only liquefying at a lower temperature obtainable by a partial releasing of the pressure of 150 atmospheres to which they had been subjected at the temperature of $-136°$ C. Alcohol becomes viscid like oil at the temperature of $-129°$ C. and solid at $-130{\cdot}5°$ C.

One of the most prominent, and I think we must also say one of the most important, of chemical subjects in recent times has been that connected with the germ theory of disease and of organic decomposition—as yet a theory, but becoming more and more definitely accepted, and held to be the best explanation of the phenomena observed. This topic was first introduced to our meetings by Mr. Bell, in his address in 1868, in connection with the action of air in starting the crystallization of supersaturated solutions. Attention was again drawn to it by Mr. Glover, in 1870, urging the importance to be attached to the pollution of air by sewage gas and the pollution of water by drainage. Still more forcibly was the subject elucidated by Professor Marreco, in his presidential address in 1876, when some of Tyndall's experiments on a moteless atmosphere were repeated, and the results exhibited showing that not the air, but the motes, established the putrefaction, and by implication not the stench, but the germs, spread the disease. From that time to this the medical periodicals have been full of disease germs, and swarming with infusorial life. The battle of the bacilli has been continually before us, and is growing in strength. We are endeavouring to combat the germs of disease by cultivating the disease of germs; we are learning to destroy their virulence by having recourse to circumstances which prevent their healthy development, such as fresh air and antiseptics. The conditions of health of one organism are often the conditions of disease of another. The animal and vegetable kingdoms are complementary to one another, the one living upon the product of the other; and the kingdom of the microdemes, occupying a debatable ground between the other two, preys upon both. What is healthy to the higher organisms is deadly to the low; what is healthy to the low organisms is deadly to the higher.

There have been many workers in this field, the most prominent of whom is Pasteur, who within the last few years has developed the cultivation of *microbes* into a scientific operation. He has successfully brought under control the development of germs of varying degree or of constant degree of virulence, his first great achievement being in relation to chicken cholera and splenic fever. From his observations on the *microbes* which cause these diseases, a process of starving, of over-populating the medium in which they live, of giving them too little pabulum and too much fresh air, causes the degeneration which enables them to produce only a milder form of the disease, or no disease at all. He notes that a virulent father begets a virulent son to the thirtieth and fortieth generation, and that the modified father begets a modified son with the same regularity. He modifies the fathers of his races by giving them limited chicken broth and more fresh air than is good for them.

Probably when we suffer from zymotic disease abundance of fresh air not only raises our vital powers, but depresses those of the germs by which we are surrounded and inhabited. In a subsequent paper Pasteur speaks of the conditions which determine an epidemic, being the greater than usual abundance of germs. But the greater abundance of germs at any given time must depend upon a cause, the cause itself probably being a combination of circumstances favourable to the existence of germs and unfavourable to the health of man. Though we may readily admit that the more germs the more probability of any individual exposed to them being affected with disease, we must also add, the longer the individual is exposed to them the more likely is he to suffer. Take, in illustration, the advent of a zymotic disease in a family of children. When once present why do they not all follow in a body rather than taking it one by one, as we so frequently notice, spinning out the disease for several months? Probably the most susceptible take the disease first, and the less susceptible follow in order of their power of resistance, one being able to resist the inroads of the *microbes* for a month, another for three months, and it may be some have the vital vigour to digest the *microbes* without suffering in consequence. Though Pasteur modified his virus by the action of time and air, it is not to be supposed that oxygen is the only agent which can reduce their virulence. It is unquestionably the most important agent, and one that should never be neglected. The ventilation of sick-rooms and the ventilation of sewers are duties owed by every individual and every corporation to the health of the community, but a more radical change is probably required before the battle of the bacilli can be terminated in favour of man.

It is not safe to conclude that a nuisance hidden, an evil smell got rid of, has removed the danger. Pasteur found that an animal which had died of splenic fever, and had been buried for twelve years, had so infected the soil that the worms would bring the virus to the surface and communicate disease to cattle feeding there. The soil does not admit of so free an action of the oxygen as to take away the toxic power of the germs. There is reason to suppose that most soil which is impregnated with decomposing organic matter is also infested with microzoa or germs, more or less inimical to the higher forms of animal life. There have been many cases noted in which the prevalence of disease would appear to be dependent on the newly-opened surface of the earth. For example, the new streets are more visited by the doctor's carriage than those of the same character of ten years' earlier date. If the probability of such a connection between the soil and disease be kept in view, evidence will soon be found to determine whether or not they stand in relation of cause and effect; and if it should so prove, the chemist, the biologist, and the architect will have to unite their powers to protect us from our common enemy. Cold, dryness, and fresh air are conditions under which the developed microzoa have little chance of life; but these conditions do little injury to the germ in its condition of potential life, and, indeed, dryness and ventilation promote the diffusion of the germ-dust, while warmth, moisture, and a limited ventilation are all that are re-

* Address delivered on October 4 to the Newcastle Section of the Society of Chemical Industry on the occasion of the opening of the Session 1883–84.

quired to start an active condition of vitality; and if there be present organic matter, living or dead, these are the conditions which produce disease in the one case or putrefaction in the other, provided there be not present at the same time some antiseptic, some substance which is poisonous to the microzoa. To get rid of the risks involved by the presence of these germs, probably a long-continued action of air, light, and dryness would suffice. Probably a short time would suffice to accomplish disinfection if the circumstances were so arranged that germs should germinate, but that the life so developed should not be vigorous enough to permit of reproduction. The circumstances under which it is possible to insure complete disinfection of organic materials by the agency of dry heat are not always permissible. We may put many articles of clothing, etc., under the necessary treatment, but we cannot subject a traveller or a patient to more than a figurative roasting or stewing, consequently the conditions of quarantine are so prolonged as to give time for germs, if present, to develop active life, or to work out the complete cycle of their consequent disease. It would be an interesting work, both in relation to the mitigating of individual attacks of zymotic diseases and reducing their liability to spread, to classify all the substances which can be found with the power of modifying the virulence of germs, with the view of finding such as might impregnate the human system without danger, and so reduce the duration and diminish the severity of the attack. Probably the action of quinine in malarial fever is of this nature, and, as in many other cases, the fact is known before the reason is understood; but if the reason of its efficacy be once understood, or even suspected, the active search among chemicals should begin by experimenting upon the infusoria, our enemies, who are below the protection of the Vivisection Act; and guided by the evidence so obtained, the experimentalist might go to the other extreme and try the effect of his chemicals upon ourselves, who are above that protection.

With regard to the supplying of pure air and pure water, pure as regards freedom from germs, one point has struck me very forcibly, as it no doubt must have struck many others—that is, the great facility with which air is filtered and rendered pure by filtration through a mere loose plug of cotton wool, and how the most careful filtration fails to do as much for water. Mr. Dallinger some time ago informed me that he thought it was practically impossible to free water from germs by filtration; and Frankland's experiment, quoted to us by Professor Marreco, in his presidential address, in 1876, showed that water might be filtered through a mile or two of soil and still carry with it the germs of disease.

There are two or three points in the physics of filtration which tend to this result. First, the greater the difference in density between the suspended matter and the fluid, the greater the facility for the separation, and the greater the mobility of the fluid, other things being equal, the greater the facility for separation. Both these act in favour of atmospheric filtration. In addition to these, there is the difference between the case of atmospheric germs and infusoria in an active condition: the former are carried by currents of air without any guiding power of their own, while the latter move in water not only in the direction of its currents but with a guiding power of their own. The channels in filtering media are generally so large that finely divided solids could pass through them, and would pass through them if suspended in viscid liquids. Why do the same powders not pass through when suspended in mobile liquids? A solid particle moved by a current of liquid less dense than itself acquires the tortuous motion of the current in a reduced degree, the curves being more gradual and the angles less sharp. The liquid impinges against the cotton filament of the filtering paper and turns aside, but the solid impinges there and is deposited upon it. In filtering water through paper, probably only one molecule in a million touches the paper: the molecule in contact with the filament forms a buffer to pass the others on without actual contact. As they have no greater density and no greater velocity, they have not power enough to move a molecule which is attached, but a particle of more dense matter has a momentum carrying it on in a continuous direction with a force greater than enough to remove the intervening molecules of water. Thus very few particles of solid matter suspended in a mobile liquid of little density pass through a medium the pores of which are large enough to allow of the particles passing freely through if suspended in a viscid liquid. Probably we rarely meet with filtering media the pores of which are so fine as not to afford space enough for the passage of finely-divided solids. Finely powdered chalk suspended in ether, a liquid lighter and more mobile than water, is perfectly separated by filtration through paper; chalk suspended in chloroform, a liquid heavier and more mobile than water, is likewise completely separated; though chalk suspended in water partially passes through the same paper, and if 1 or 2 per cent. of gum be added a considerably increased portion of the chalk passes through the paper. If the explanation of these differences be as I have suggested, we can readily understand how bacteria of exceeding minuteness, of a specific gravity almost identical with water, and having vital motion of their own, escape entanglement in the coarse meshes of paper filters or the open pores of the charcoal blocks.

It is well to remember, not only in connection with the treatment of disease, but in connection with wholesome air and water, that a little change may make the nidus of a germ favourable or unfavourable to vigorous germination, and what is favourable to one species of germ may be the reverse to another species; also that the race which is under adverse circumstances may be eaten out by the most favoured nation of microzoa. Well for us if that nation be more favourable to humanity. Filtration of water through charcoal may fail to mechanically arrest bacteria, but it may still deprive them of their sustenance and in a measure of their virulence. The observations of Pasteur and Frankland would lead us to suppose that sewage irrigation, if ever it is to be adopted successfully and safely, must depend for its safety upon the free action of air causing such degeneration of the microbes as to deprive them of their power to propagate disease. If the burying of a diseased carcase be simply planting a mine of disease, prolific for years afterwards, where is the safety of spreading the sewage of a diseased neighbourhood upon the land? We could only hope to escape evil consequences from the natural disinfecting power of the air, which may be supposed to act upon the soil to the depth which is necessary for keeping the herbage clear of dangerous germs.

With so much evidence of a conflicting character as has been published regarding the disposal of sewage, the ventilation of drains, etc., it is satisfactory to find that the Registrar-General reports an improved sanitary condition of the country during the ten years from 1871 to 1881 when compared with the period of the ten years preceding, the death-rate from general causes having been reduced by 5 or 10 per cent., but the death-rate from zymotic diseases having fallen in a much greater ratio, the deaths from enteric fever being reduced to two-thirds, the deaths from typhus and continued fever being reduced to less than half, and the fatality of other infectious diseases being reduced in an important though less striking degree. Such facts encourage us to continue the work of sanitation upon the same lines, or upon other lines which will still more effectually represent the logical deduction from the data established. Can we educate the microzoa into the principles of vegetarianism? Can we teach them to be herbivorous, and no longer to prey upon their neighbours in the animal kingdom? To do so, we must banish putrefaction from the animal kingdom, cremation must take the place of burial, and not of burial only but of sewage also. Before we can do this we must educate not the bacteria but society. The individual must learn to do no injury to his neighbour either in life or death; nor should his feelings, his sentiments regarding departed friends, stand in the way of his doing his duty towards those who remain. Good would result not only from the substitution of cremation for the burial of the dead, but from requiring every species and every fragment of putrescible animal matter to be treated in a similar way—to be put under the protection of antiseptics till the quantity had so accumulated as to be worth submitting to destructive distillation.

The advance of chemical technology is not indicated only in such changes as the Leblanc soda being pushed aside by that made by means of ammonia, or puddled iron disappearing in presence of Bessemer steel, though the latter is more typical than the former of the genius of the times. Chemical manufacture has now ceased to have the limited meaning that was formerly attached to it—it is no longer "The Alkali Trade" with a few etceteras. Chemical law now reigns in many works which were formerly ruled by thumb. Organic chemistry now holds a position as important as that of the less delicate operations upon simpler compounds. The collateral sciences are becoming more and more closely allied to chemistry, giving and receiving impetus from one another. The progress of electroplating has developed the uses of nickel, and will probably do the same for other metals. The demand for electrical storage is developing the chemistry of lead, and can scarcely fail to have a like effect in other directions.

The Siemens regenerative furnace has as yet done only a small portion of the work it is fitted to perform, and it is only one phase of the use of gas as a source of heat. The first fruits of electric lighting are a crop of improvements in gas-lighting, and if its last fruits should be the extinguishing of gas as an illuminant, that will be accompanied by an encouragement of its use as a heating agent and a motive power. The gas engine compared to the steam engine is a shortening of the process by which chemical action is converted into mechanical force, and it will no doubt be followed by further steps in a similar direction. It will probably urge on the improvement of the steam engine, or displace it from certain portions of the ground it now occupies, perhaps also leading the way to other modes of developing mechanical force from chemical energy. The conversion of one kind of force into others is an art of recent times, and of great promise. We are almost ceasing to use arrangements of metals and acids for the production of electric currents, and are learning to use electric currents for smelting or melting metals, and patenting arrangements by which the electric current converts air into nitric compounds. I have not hesitated to assume the existence of vital force, an agency to which I attach considerab e importance, but which some chemists of an advanced type say is resolvable into chemical affinity, an electric current and the process of dialysis. To say that the products which were formerly only produced by vital action are now obtained by a series of syntheses from inorganic or simple bodies is not sufficient ground for dismissing from our calculations a force, vital force, which we do not understand, and into which we cannot convert other forces. Nothing is more tempting than to gaze into the deeper depths of Nature's mysteries, and past experience all teaches that we shall reap benefits from the search, whether or not we find that which we seek. There is probably no more wisdom now in denying the possibility of a microdeme coming into existence without a parent than there was fifty years ago in denying the possibility of starch being formed otherwise than in a plant, or urea without a kidney. It is not necessary in acknowledging the existence of a Creator to suppose that he has ceased to exert creative power.

IMPROVED METHOD OF EXHAUSTING DRUGS.*

BY ALFRED B. TAYLOR.

For some years past I have employed a process for making some of the fluid extracts, tinctures, etc., of the Pharmacopœia, which has proved very satisfactory. The plan has probably occurred to others, but I have never seen it published, nor have I ever heard it suggested by any one, and I have thought a notice of it might be acceptable to the readers of the Journal.

I have found it especially serviceable in making those preparations which are made from drugs that are difficult to exhaust with small quantities of menstruum.

The process consists in using a portion of the finished preparation (from a previous operation) to macerate and partially exhaust the drug before using the new portion of menstruum, and as there is no limit to the quantity of finished preparation that can be used where necessary, it is prossible to exhaust completely the drug operated on.

For example, let it be required to make two pints of tincture of arnica flowers.

Take of—

Arnica flowers, in No. 20 powder . .	6 oz. av.
Tincture of arnica flowers	2 pints
Diluted alcohol, a sufficient quantity to make	4 pints.

Moisten the powder with a pint of the tincture of arnica flowers, and macerate for twenty-four hours; then pack it firmly in a cylindrical percolator, and gradually pour upon it, first the remainder of the tincture of arnica flowers, and afterwards diluted alcohol, until four pints of tincture are obtained.

I have used this process with great advantage in making the fluid extract and the tinctures of cinchona.

CHAMPAGNE MAKING IN FRANCE.†

In the champagne district the greatest attention, says Consul Frisbie, is paid to the picking of the grapes, the fruit being supported in the left hand so as to prevent the riper grapes from falling, and care being taken not to bruise the fruit in throwing it into the baskets. These baskets, when full, are emptied into larger ones, and minutely examined, in order that all the bruised, rotten and unripe grapes may be removed. If the grapes are very ripe, wisps of straw are placed in the bottoms of the baskets to prevent jolting and bruising. The picking usually commences with daylight, and the vintagers assert that the grapes gathered at sunrise always produce the best wine, and that by plucking the grapes when the early morning sun is upon them they are believed to yield much more juice; later in the day, in spite of all precaution, it is impossible to prevent some of the detached grapes from partially fermenting, and this frequently has the effect of imparting a slight excess of colour to the must. The gatherings of one day are pressed the following morning, the operation being effected by means of presses of different kinds; the most ancient being the *cliquet*, which is largely used at the present day. It is worked by a roller and grinders—large pieces of wood which are placed in layers on the pressed grapes. The grapes are spread over the floor of the press in a compact mass, only the first pressure producing a high class wine. Before beginning to press, the grapes are weighed, and 400 kilograms are allowed for every 40 gallons of wine, and this having been obtained, no more is pressed from it for first-class wine. The remainder then consists only of a heap of crushed fruit. The edges of this heap are next cut off in various

* From the *American Journal of Pharmacy*, November, 1883.

† From the *Brewers' Guardian*, November 6, 1883.

ways according to the shape of the press, the edges having been subjected to less pressure than the middle. The grapes thus obtained are then subjected to a second pressure, which produces a juice called first *taille*, and this operation is repeated to get a second *taille*, and a third time for the last juice, called *redeche*, a production which, in the champagne country, is only used for the consumption of the labourers, as is also the case with the produce of the second *taille*. When the wine is flowing from the press, the juice is tested with a wine tester or glycometer, to ascertain its sweetness and the amount of sugar it contains. Then, when the wine is drawn off from the press, it is put into tubs or casks, and is left until the impurities, thrown off, have collected on the surface in the shape of a scum, called *cotte*. As soon as this scum rises to the surface, the casks are filled and vapoured by burning sulphur. This operation, setting free sulphurous acid, tends to whiten the wine and prevent the taste of oak from flavouring it. The casks are then placed in the cellar on supports, usually about 8 inches above the ground, care being taken not to fill them quite full, as, when fermentation begins, they would overflow. A margin of several quarts is therefore left, and the bung is closed with vine leaves and a small tile. After a month has elapsed, and the fermentation subsided, the wine is racked off into other casks by means of copper basins and vessels. With the approach of December comes the frost, which makes the wine quite clear; it is at this period that the mixing is performed, an operation which immediately precedes the blending. The mixing consists of bringing together thirty or forty casks of the same growth. The blending, on the other hand, is the mingling of all these wines, with a view to the formation of a large quantity of wine for commercial purposes. It is at the blending time that the tannin is used, in liquid or powder, to anticipate various defects in the wine, such as grease and deposits. These deposits are known in the wine district by the technical names of *marques*, *barnes*, *culs de poule*, and *lentilles*. It is at this time also that alcohol, in greater or less proportions, is added. The wine merchants find the degree of alcohol by distilling a given quantity of wine, of which they take a third, and mix the result of the distillation with some distilled water, weighing with an alcoholometer, and taking into consideration the degree of temperature. Champagne wines generally have from 11 to 12 per cent. of alcohol; but in some very good years, such as 1865 and 1874, as much as 14 per cent. If the year should be a poor one, and the degree of alcohol insufficient, it is remedied by adding a sufficient quantity of spirits of 82°, made from the best Cognac brandies. The day after these operations have been completed, the fining is commenced, and this is done with isinglass, prepared beforehand with a slight admixture of tartaric acid. Every cask of white wine receives a slight proportion of this mixture, and is stirred with a stick before and after mixture, this being done with the object of thoroughly mixing the wine and isinglass. The casks are then hermetically sealed, a small hole being drilled in the top of the cask, and closed with three straws of rye or wheat, with the heads on; this admits sufficient air to remove all danger in case of fermentation. The wine remains in this state for about a fortnight or three weeks. When the wine is ready for bottling, the operation is effected by means of taps with six, eight or ten spouts. The bottles when filled pass into the hands of the corker—the corking being done with a mallet, and the cork secured. The bottles are then stored in the wine vaults, or left in the cellars, where they are stacked with rods and laths. In the month of July, when the bottling is over, the workmen find employment in removing defective hoops, or replacing them by new ones, and this operation, with the vintage, continues till the time of early frost. At this time many vineyard proprietors bring what they have bottled up again to the upper cellar, as the cold has the effect of helping the deposit to dry. Others simply change the position of the bottles, removing the leaky and broken ones, and making new piles. It is at this time also that attention is paid to the *masque*, the name given to the deposit on the side of the bottle, and which must be removed. This is done by means of a machine, which consists of a box, into which are placed two bottles having the deposit in them; by means of a handle a rotary motion is imparted to the bottles, which are further subjected to continued blows from two little hammers. These continued shocks produce a shaking, which is sufficient to detach the adhesive deposit. The removal, by hand, requires more attention. The workman is supplied with an iron implement, and has to be careful to hit the bottles just hard enough to detach the crust. When the bottles are entirely cleared of deposit, they are placed neck downwards, either on tables or on racks, and after being kept for some time in this position, the wine is shaken to make all the deposit fall on the cork. This is an important operation, and great care is taken in the selection of workmen to perform it. It is effected by very slightly lifting the bottles, and gently shaking them in that position. To bring it to a successful issue, requires a month or six weeks, or even more, the bottle being moved every day. When the deposit has altogether settled on the corks, the good bottles are placed in stacks, with their necks downwards, at a sharp angle, to await the time when they are again uncorked. The rest are replaced and worked a second time on the rack. The uncorking is also a difficult and delicate operation. It is necessary to remove the cork and wiring with the least possible loss of time, the bottle being all the time kept neck downwards. To do this, the workman watches the bubble of air which is in the bottle, and so removes the cork that only the deposit is ejected by the rush of gas. When the froth appears he uses part of it to wash the neck of the bottle, and then inserts a small cork prepared for the purpose, which prevents too great a loss of gas. The bottle then passes into the hands of a man who takes out enough wine to admit the necessary amount of syrup. The wine is now very dry, and would not be drinkable; this dryness is, however, corrected by the addition of what is called the "export syrup," which differs from what is put in at the time of bottling. It is composed of 150 kilograms of candied sugar to every 100 litres of wine, and 3 quarts of alcohol added to increase the strength. As the sugar dissolves the wine become thick, and must be filtered to make the liquid perfectly clear. The bottles when opened and emptied to a certain depth, are taken to the "mixer." The mixing consists in putting into each a certain equal quantity of syrup, the precise proportion differing for each country; the bottle is then placed on a revolving table, and as it revolves, all the bottles in turn come to the corker. The second and final corking requires more care than the first. The corks used are made from Spanish cork, soft or strong, hard and full, or red corks, according to the country to which the wine is intended to be sent. They are soaked for a few days in cold water before being used. For the final corking the machine used is often a mallet machine, but others are employed. The cork is put into a tube, pressed, and made to come level with the lower end of the tube, and with a clean sponge the few drops of water which have resulted from the compression of the cork are wiped off, and the bottle is then filled and corked, the cork being driven in to a greater or less extent according to the destination of the wine. The tying up is then proceeded with, oiled string being used. After the string is put on the wire is attached; the kind most in use being galvanized wire. It is at this time that the bottle is shaken once or twice, to mix the syrup thoroughly with the wine. Then the bottles are arranged in piles, always on end, and are left for a month or two. In conclusion, Consul Frisbie states that to make a good bottle of champagne at least two years of constant work and care are necessary.

THE CHEMICAL AND PHARMACOLOGICAL BEHAVIOUR OF FOLIA UVÆ URSI AND ARBUTIN IN THE ANIMAL BODY.*

BY DR. L. LEWIN.

Teacher of Materia Medica and Public Health in the University of Berlin.

I have given expression in my experiments with the leaves of the uva ursi, to the desire which has characterized pharmacology of late years of substituting the active principle of vegetable drugs for the drugs themselves, when seeking to secure the therapeutic effects of the latter. I have been induced also in so doing by a desire to determine the precise principle to which the action of this drug, which has for over a hundred years been employed in medicine, is due, and the changes which it undergoes in the system. Bright recommended the drug as a diuretic in the disease to which his name has been given, and now specific properties are claimed for it in catarrh of the bladder. Wherein lies this therapeutic property? The leaves yield tannin, gallic acid, urson, and the glucoside arbutin. The therapeutic properties of urson are not to be considered, inasmuch as this substance is not soluble either in water, dilute acid, or alkalies. Arbutin is soluble in water, has a bitter taste, and is decomposed by boiling with acids into sugar, methylhydrochinon, and hydrochinon. It does not ferment with yeast. It possesses, as I discovered, the property of rotating the plane of the polarized ray to the left. I also discovered that neither animal nor vegetable charcoal separates arbutin from either a warm or cold solution. A decoction of the leaves of uva ursi rotates, according to its strength in arbutin, the plane of the polarized ray to the left. The hydrochinon is optically inactive. I prepared the latter from the leaves as follows:—

Infusion of the leaves was precipitated with basic acetate of lead, the filtrate freed from excess of lead by means of sulphuretted hydrogen, and the resulting concentrated filtrate boiled for some time with dilute sulphuric acid. From the resulting dark-brown solution ether separates hydrochinon, which, on evaporation of the ether, is deposited in beautiful crystals.

There are two possible methods in which the leaves of uva ursi may act, namely, through the arbutin or the tannic acid which they contain. I have established by experiments the action and disposition of arbutin in the animal organism. It is manifest from these experiments that when arbutin is introduced into the system, either hypodermically or by the month, it is split up, a process which is demonstrable outside of the body, by boiling. There appears in the urine a substance which, on a brief exposure to air, changes to an olive-green or brownish colour. This substance is hydrochinon, as may be demonstrated to a certainty. These changes are also observed in the urine of man after the exhibition of uva ursi leaves. At first the urine is of a bluish-green colour, but after standing from twelve to twenty-four hours, it becomes of a somewhat darker green; then olive-green, and later brownish-green. It also happens that that which, when voided, is of a greenish-brown, afterwards becomes of such a dark green as to lose its transparency. With the onset of the dark discoloration the acid reaction of the urine diminishes, and it finally becomes alkaline.

The chemical process of this is as follows: The arbutin is converted into hydrochinon, and the latter is in turn converted into sulphate of hydrochinon. On standing exposed to the atmosphere the hydrochinon sulphate may, through the gradually growing alkalinity of the urine, be split up and the free hydrochinon further oxidized into products not definitely known. When the urine has already become alkaline in the bladder the process above described takes place in the bladder, and the urine is voided of an olive-green colour. But the whole quantity of arbutin taken into the system is not decomposed into hydrochinon and sugar. I have shown that a portion of this is voided unchanged in the urine.

Arbutin is not poisonous. It does not, through splitting up, set free in the body a sufficient quantity of hydrochinon to have a poisonous action.

As touching the action of uva ursi leaves and their different medicinal preparations, I have demonstrated by experiments, in the human being and lower animals, that the chemical changes are identical. In these experiments are also usually observed a progressive dark discoloration of the voided urine, proportioned to the amount of hydrochinon which is traceable. This is, however, not always the case, as has been taught in practice. It is to a secondary degree dependent upon the size of the dose administered. It is to a greater degree influenced by the condition of the urine. When uva ursi leaves are administered in vesical catarrh, attended by an ammoniacal condition of the urine, the latter is discoloured to a greater or lesser degree. The rotation of the polarized ray to the left shows also the presence of unchanged arbutin in such urine.

With these results as a basis, it is not difficult to establish the fact that the substance to which uva ursi leaves owe their reputation for specific action in vesical catarrh is hydrochinon. An auxiliary, although as compared with hydrochinon an insignificantly small action, is due to tannin, which is contained in the decoction of uva ursi leaves, and is voided in a very small amount in the urine.

Hydrochinon possesses antizymotic and antiseptic properties in even a one per cent. solution. I found that urine which had been voided after the administration of uva ursi leaves remained fresh, even after standing in the open air for two weeks, while that subsequently voided rapidly decomposed.

Hydrochinon possesses, particularly when it has become dark in solution, an irritating property. This irritation is, however, directly beneficial in catarrhal affections of the mucous membranes, which become turgid thereby, and have set up in them reparative action.

It is, therefore, to the antiseptic and irritating property of hydrochinon that the therapeutic action of uva ursi leaves is due.

It follows from this that much larger doses of uva ursi should be given than have heretofore been customary, inasmuch as even if the decomposition of one gram of arbutin into hydrochinon and sugar were complete, which is never by any means the case, the amount of hydrochinon which would thus be generated would be too small to secure the most beneficial local action on the bladder. In addition to this is the fact that the amount of arbutin contained in uva ursi leaves is very small. It is recommended, therefore, that when uva ursi leaves are administered, a decoction of from 30 to 80 grams in 180 grams of menstruum should be given. The objection which the large amount of tannin might interpose to the administration of such a decoction can be overcome by agitating it with charcoal:—

℞ Decoct. fol. uvæ ursi, 30—80: 180 grams.
Agita c. carbone vegetabil., q. s. ad remov. acid. tannic.
Filtra. S.

For this purpose I should regard the substitution of arbutin for the decoction as an improvement, should arbutin in the future take the place of the leaves themselves in medicine. Arbutin may be ordered in the form of powder or in solution; for instance:

℞ Arbutini . . . . 1·0 gram.
Sacchari . . . . 0·5 gram.
M. Ft. pulv.

Or,

℞ Arbutini . . . . 5—10·0 gram.
Aquæ dest. . . . . 100·0 gram.
M.

It may also be given hypodermically.

Clinical experiments have in the meantime demonstrated the fact that arbutin is a valuable therapeutic agent.

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* From the *Therapeutic Gazette*, Sept. 15, 1883.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 22, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

CHINOLINE DERIVATIVES AS ANTIPYRETICS.

THE attempts to find efficient substitutes for the febrifuge alkaloids of cinchona bark, which for a long time were made principally in the vegetable kingdom, have during the last two or three years been taking a somewhat less empirical form, and although chemists have hitherto failed actually to build up the invaluable alkaloids in their laboratories, they have, while continuing the work in that direction initiated many years ago by Professor A. W. HOFMANN, quite recently succeeded in producing several definite chemical bodies which have been proved by experiment to possess more or less of their therapeutic properties. The synthetical formation of chinoline, itself a decomposition product of quinine, by Herr SKRAUP about three years since, gave a considerable stimulus to hope in this direction, and that base, together with some of its compounds with acids, acquired at least a temporary reputation as quinine substitutes. But chemists did not consider the goal to have been yet reached, and an investigation carried on by Professor FISCHER, of Munich, in conjunction with Herr RIEMERSCHMIED, and another by Messrs. HOFFMANN and KÖNIGS, have led to the preparation of a large number of new derivatives from chinoline, descriptions of which have been communicated to the Berlin Chemical Society. Some of these compounds have already attracted considerable attention from the medical profession on account of the antipyretic action upon the organism that has been attributed to them, and at least one of them is now used to some extent as a medicine. It seems to us, therefore, that it would be convenient to publish in these columns, for the benefit of those of our readers who are prevented from following step by step the records of chemical investigation as they appear in the technical journals, a very brief *résumé* of the chemical history of a few of these chinoline derivatives, concerning which they are at any time liable to be asked for information. This course might also prove to be the more desirable, since already some of these compounds, in order to avoid the intolerable inconvenience attached to their lengthy and uneuphonious systematic names, have had other designations applied to them, which are arbitrary and disclose nothing as to their composition. A number of chinoline derivatives have also been prepared which are at present only of interest from a chemical point of view; but it is proposed to refer to this latter class only so far as is necessary to make clear the relation of the compounds that are of possible therapeutical importance.

The compounds described by Herr FISCHER are all of them derivatives from what he calls α-oxychinoline, and those described by Herr RIEMERSCHMIED are derivatives of β-oxychinoline, which two bodies appear to be identical with those that Herr SKRAUP has designated ortho- and meta-oxychinoline. These two oxychinolines are obtained by fusing with an alkali the corresponding sulphonates of chinoline, both of which are produced by the action of Nordhausen sulphuric acid upon chinoline, the α-sulphonate predominating when four parts of acid are used and the temperature does not exceed 200° C., and the β-sulphonate when the temperature exceeds 270° C. or the proportion of sulphuric anhydride is increased. Upon treatment of these isomeric oxychinolines with tin and hydrochloric acid there are formed double salts of tin and corresponding tetrahydro products, which have been termed α- and β-oxyhydrochinoline. These secondary bases can be converted into well-characterized tertiary bases by the introduction of a methyl, ethyl, benzyl or other alcohol group, and in some instances the product is a compound of therapeutic promise.

The first to be mentioned is α-oxyhydromethylchinoline, which is formed by the reaction of iodide, bromide or chloride of methyl upon α-oxyhydrochinoline. It is a strong base, readily soluble in caustic alkalies, with difficulty in water, and freely in benzol, warm alcohol and wood spirit. From ether it crystallizes in colourless, usually tabular crystals of the rhombic system, and from alcohol it is, as a rule, obtained in prismatic crystals. This methyl compound is distinguished by the following reactions. A diluted sulphuric acid solution gives with sodium nitrite an intense beautiful red-yellow colour; sodium carbonate throws down from the yellow solution a yellow-brown flocculent precipitate. A single drop of ferric chloride produces in a cold alcoholic solution a deep brown colour, the liquid then becoming turbid and separating dark brown flocks; an excess of ferric chloride colours the liquid a dark blackish brown. Ferrous sulphate produces in an alcoholic solution a transient dark red colour, and forms in a concentrated solution a dirty-looking precipitate. Potassium ferrocyanide produces in a very dilute acid solution an almost colourless voluminous precipitate, which dissolves in boiling water and crystallizes out on cooling in small bluish-green crystals. The melting point is 114° C., and analysis gave results corresponding closely with the formula $C_{10}H_{13}NO$. In the original paper of Herr FISCHER, the name "kairin" is applied to the hydrochlorate of α-oxyhydromethyl chinoline, for the sake of brevity; but, as will be seen by reference to a paragraph on p. 432, this is not the compound now sent out under that name by the patentees, which is presumably one of the ethyl compounds to be referred to subsequently. This salt of the methyl base is freely soluble in water, and upon evaporation of the solution over sulphuric acid is obtained in well-formed colourless shining crystals of the monoclinic system, the larger individual crystals readily becoming faintly violet coloured. The salt loses at 110° C. 8·27 per cent., or equal to a molecule of water of crystallization; and is represented by the formula $C_{10}H_{13}NO,HCl+H_2O$. The sulphate occurs in freely soluble flat shining prisms, and the picrate in handsome greenish-yellow shining tables, soluble with difficulty in water.

α-Oxydyhydroethylchinoline is prepared in a similar manner to the methyl compound. This base is easily soluble in benzol, alcohol, wood spirit and ether, very difficultly soluble in water and with some difficulty in light petroleum spirit. In other respects the behaviour of the ethyl base is analogous to that of the methyl base. In order to obtain it pure advantage can be taken of the hydrochlorate, which on account of its difficult solubility in hydrochloric acid is easily prepared pure. This hydrochlorate is called in Herr Fischer's paper, "kairin A." It crystallizes in magnificent brilliant colourless prisms and is easily soluble in water. When crystallized from hydrochloric acid the salt is represented by the formula $C_9H_{10}NO(C_2H_5)HCl$.

Another series of compounds described by Herr Fischer, one at least of which appears to possess important therapeutic properties, consists of derivatives of α-ethoxychinoline, a body obtained by treating α-oxychinoline in alcoholic solution with caustic potash and then with ethyl bromide. From this compound, by treatment with reducing agents, α-ethoxyhydrochinoline is obtained, and from this hydro base α-ethoxyhydromethylchinoline is prepared, by heating it with methyl iodide, as a pale yellow oil which does not appear to solidify and boils between 269° and 270° C. The salts of this base are crystalline, very soluble, and mostly deliquescent, and it is the acid sulphate, occurring in tufts of colourless prisms, that is referred to subsequently.

Turning now to the other series of compounds obtained in an analogous manner from β-oxychinoline, Herr Riemerschmied describes among them β-oxyhydroethylchinoline, the hydrochlorate of which is soluble with difficulty in water, and can be obtained in handsome white plates or tables. It has a pungent taste, subsequently becoming bitter, and according to Professor Filehne it resembles "kairin" in its physiological action. The salt is represented by the formula $C_9H_{10}NC_2H_5OHCl+H_2O$, the molecule of water being driven off at 110° C.

The investigation of Messrs. Hoffmann and Königs lay in a different direction, having been devoted to the production and examination of non-oxidized derivatives of chinoline. By the treatment of chinoline with reducing agents, as, for instance, hydrochloric acid and tin, two secondary bases may be obtained, one containing four and the other two atoms of hydrogen more than the original base. The former, tetrahydrochinoline ($C_9H_{11}N$), is of especial interest, on account of its probable near relation to the cinchona alkaloids. It possesses strongly basic properties and is liquid at ordinary temperatures, but when pure solidifies in the cold of winter to form colourless needles. It boils at 244° to 246° C., and distils without decomposition. Several of its salts and nitro-compounds are described by the authors, but need not be further referred to here. The experiments of one of the authors having led him to the opinion that cinchonine probably contains a nucleus in which a methyl group is united to the nitrogen of hydrochinoline, an attempt was made to produce such a compound, and methyltetrahydrochinoline ($C_9H_{10}NCH_3$) is one of two products obtained by the action of methyl iodide upon tetrahydrochinoline. After separation and purification by conversion into sulphate and decomposing, it appears as an oil, boiling at 242° to 244° C. Its salts are most of them deliquescent and are difficult to obtain crystalline. The acid sulphate forms white prismatic crystals, which readily deliquesce when exposed to the air. The corresponding acid sulphate of ethyltetrahydrochinoline, as prepared by Messrs. Hoffmann and Königs, behaves similarly. It is to these two acid sulphates, and especially to the first-mentioned, that the term "kairolin" has been applied.

The physiological experiments with these compounds were undertaken by Professor Filehne, of Erlangen. It was found that α-oxychinoline and methoxychinoline and their salts possessed poisonous properties, and attention was therefore directed to the hydro-derivatives. The hydrochlorates of α-oxyhydrochinoline and methoxyhydrochinoline showed indications of an action in the direction of quinine, but this was accompanied by other disagreeable effects, such as the local decomposition of albumen. As this local action was attributed to the atom of hydrogen loosely united to the nitrogen, it was sought to produce a more stable molecule by replacing it with a methyl or ethyl group and the hydrochlorate of the resulting oxyhydromethylchinoline ("kairin") was found to possess an extraordinary antipyretic property without the local inconveniences caused by the hydro bases. The β-oxyhydroethylchinoline and the α-ethoxyhydromethylchinoline were also experimented with, and found to exercise the quinine action, but differing in the degree of its persistence; in this respect the acid sulphate of α-ethoxyhydromethylchinoline exceeded all other substances examined, the effects continuing during fifteen or sixteen hours. As to the non-oxidized series, the hydrochlorate of tetrahydrochinoline is in its general action more energetic than chinoline, but cannot be used on account of its strong local action. The acid sulphates of methyl- and ethyltetrahydrochinoline ("kairolin") possess the property of reducing the fever temperature, like "kairin," and in the few cases in which they were used their action did not appear to be attended by unpleasant symptoms, such as singing in the ears, headache, etc.; but they have the disadvantage, as compared with "kairin," of being deliquescent and having a more acrid disagreeable taste.

It appears that we were somewhat hasty in assuming, in common with at least one medical contemporary, that drugs and medicinal preparations will be represented in the Health Exhibition to be held at South Kensington next year. In reply to a request for more definite information we have been informed by the Secretary—almost ironically it might be thought if it were not for his known courtesy—that "it is not intended to exhibit drugs or medicinal preparations, inasmuch as being a Health Exhibition these are outside its scope." Nevertheless, Class 30 is to be devoted to "Personal Hygiene and Care of the Sick." This official decision to the effect that there is no connection between drugs and medicinal preparations and the health of the public throws a new light upon the future of pharmacy and might be thought by some to render almost superfluous the projected issue of the two addresses of the late President of the British Pharmaceutical Conference on the future supply of drugs to the public.

* * *

We understand that in one of the outlying suburbs of London proceedings have been taken against several chemists and druggists under the Weights and Measures Act. We are not yet acquainted with the exact facts upon which the proceedings were based, but it appears that partly, at least, the offence consisted in being in possession of weights and measures that were not properly stamped. We have on several occasions pointed out that neglect to comply with the requirements of the law in this respect might be productive of annoyance and inconvenience.

* * *

A report has been published, wh'ch requires confirmation, that a tree yielding balsam of copaiba has been discovered in the Ghat forests of Coorg. The report seems to be based upon the observation that a tree having some resemblance to Mr. Cross's description of the genuine tree was found to yield a thick oily "claret-red" liquor, possessing the characteristic odour of balsam of copaiba, but in less degree. According to the *Indian Forester*, the leaves of the tree—no flowers have yet been obtained—resemble somewhat those of *Pterocarpus marsupium*, the source of East Indian kino, but are very irregular in size and shape. It is stated that samples of this liquid have been forwarded to this country, so that more information concerning it may be forthcoming.

* * *

A correspondent to the Ceylon *Tropical Agriculturist*, says: "It is, perhaps, not generally known that the young leaves of the lime have a pleasant, sweet, mucilaginous taste, if eaten raw or boiled as a vegetable, or used as a salad." He adds that he and his family have used them for years.

* * *

M. Jules Libert, a pharmacien of Liége, in a communication to the current number of the Brussels *Journal de Pharmacologie*, states that he has been recently supplied, by a wholesale druggist, with iodoform that was adulterated with picric acid.

* * *

The *Ceylon Observer* thinks it probable that before long a quinine manufactory will be established in the isle of Ceylon, in the neighbourhood of Nuwara Eliya, where the occurrence of available water-power and an abundant supply of bark are considered to be favourable to the success of the enterprise. It appears to us, however, that the problem of cultivating the cinchona tree to the greatest advantage will be quite sufficient for the present to task the best energies of the island.

* * *

In a communication to *Nature*, Professor Cohn, of Breslau, calls attention to the fact that exactly two centuries have elapsed since Antony van Leeuwenhoek, writing from Delft in 1683, informed the Royal Society that with the aid of his microscope he had discovered "in the white substance adhering to his teeth very little animals moving in a very lively fashion." These were the first bacteria ever seen by the human eye; but so accurate were the drawings of them made by the Dutch observer that Professor Cohn says that they are easily recognized, and he mentions the species.

* * *

A curious incident in the history of an institution aspiring to be considered "national" is said to have happened at the "National College of Pharmacy, Washington, D.C.," from which forty-six students, headed by the president of the College Association, have withdrawn, as an expression of their displeasure at the admission of a coloured man into the school. In view of the strong objection of these gentlemen to "colour" the *Weekly Drug News* suggests that in the manufacture of bleaching powder, or the preparation of peroxide of hydrogen, they would be likely to find a field more congenial to their tastes than in pharmacy in the States.

* * *

According to the *Canadian Pharmaceutical Journal*, the Princess Louise, shortly before leaving Quebec, applied as an eye-lotion a preparation intended for another purpose, with a result sufficiently serious to prevent her from going to the Citizens' Ball.

* * *

A testimonial, consisting of an illuminated address and a purse of money, has been presented to Mr. Boverton Redwood, F.C.S., F.I.C., by members of the petroleum trade in London and the Provinces, in recognition of his services in connection with the inquiry, before a Select Committee of the House of Lords, into the late Petroleum Bill.

* * *

The usual Christmas lectures at the Royal Institution, adapted to a juvenile auditory, will be delivered this year by Professor Dewar, the subject being "Alchemy, in relation to Modern Science." The series will consist of six lectures, and the first will be delivered on Thursday, the 27th inst. The Friday evening discourses are to commence on January 18, with a lecture on "Rainbows," by Professor Tyndall; and among the other subjects announced as probable are, "The Darwinian Theory of Instinct," by Mr. G. J. Romanes; "The Chemical Work of Wohler," by Professor Thorp; "Theory of Magnetism," by Professor Hughes; and "The Two Manners of Motion of Water," by Professor O. Reynolds.

Transactions of the Pharmaceutical Society.

GENERAL MEETING—BENEVOLENT FUND.

ELECTION OF ANNUITANTS.

A General Meeting of the Members, Associates in Business, and Associates of the Pharmaceutical Society and of the Subscribers and Donors to the Benevolent Fund, was held at the house of the Society, 17, Bloomsbury Square, on Monday, December, 17, at 12 o'clock, for the election of Six Annuitants.

Mr. Michael Carteighe, President, in the chair.

The notice convening the meeting was read.

Scrutineers were appointed, who examined the voting papers and brought up the following report:—

Scrutineers' Report.

We, the undersigned Scrutineers, appointed at the nineteenth election of Annuitants on the Benevolent Fund of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us and report the following result:—

Barber, Joseph	5364
Wavell, John	4189
Barker, Caroline	2928
Powell, Mary Jane	2861
Taylor, Henry	2298
Tucker, Charles	2182
Cooke, John	2162
Fowler, Sarah Anne	944

3930* voting papers were received, of which number 71 were informal (46 unsigned) and were disallowed.

Geo. S. Taylor, *Chairman.*

Charles J. Mead. W. T. Frost.
Walter Hills. Robt. Rowe.
T. Howard Hall. J. O. Braithwaite.
Chas. E. Turner. Wm. H. Kerr.
Edward Henry Storey. Edwd. B. Stamp.
Jas. T. Tupholme. Sidney Constance.
Chas. B. Allen. R. S. Dampney.
Wm. I. Gulliver. R. Fisher Young.
E. N. Butt.

December 17, 1883.

The President declared the following six duly elected Annuitants:—

Barber, Joseph.
Barker, Caroline.
Powell, Mary Jane.
Taylor, Henry.
Tucker, Charles.
Wavell, John.

A vote of thanks was given to the Scrutineers for their long and arduous duties.

* 5856 voting papers issued.

EXAMINATIONS IN LONDON.

December, 1883.

Present on each day—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Brady, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Southall, Tanner, Taylor and Thresh.

Dr. Greenhow was present on the 12th and 19th, on behalf of the Privy Council.

MAJOR EXAMINATION.

12*th.*—*Six* candidates were examined. *Two* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Bing, Charles..........Canterbury.
Burford, Samuel Francis..........Leicester.
Dymond, Thomas Southall..........Bristol.
Low, David..........Hexham.

13*th.*—*Seven* candidates were examined. *Three* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Collins, Herbert Sleight..........Bradford.
Cornwell, Thomas Chinsura..........Penzance.
Dolbear, John..........Torquay.
Jones, Charles..........Ashton-under-Lyne.

19*th.*—*Six* candidates were examined. *Two* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Mitten, Flora..........Hurstpierpoint.
Mowatt, John Rodman..........London.
Sergent, William Thomas..........Croydon.
Taylor, Ernest Sanderson..........Grantham.

MINOR EXAMINATION.

12*th.*—*Twenty-one* candidates were examined. *Sixteen* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Bradford, George Henry..........Bradford.
Brown, Edgar Marshall..........Derby.
Butterfield, Joseph William..........Blackburn.
Dorning, Herbert Rigby..........Chorley.
Dutton, William..........Sheffield.

13*th.*—*Twenty-three* candidates were examined. *Eighteen* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Brown, Horace..........Thrapston.
Burgess, William..........Runcorn.
Foster, William..........Dewsbury.
Heaver, Arthur William..........Norwich.
Taylor, Edward..........Tonbridge.

19*th.*—*Twenty-two* candidates were examined. *Sixteen* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Brown, Richard..........Rochester.
Jackson, Walter..........Catterick.
Millhouse, Edward..........Grantham.
Peck, Edward..........Ely.
Smith, Albert Edward..........Sudbury.
Williams, Frederick..........Bath.

20*th.*—*Twenty-seven* candidates were examined. *Thirteen* failed. The undermentioned *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Jackson, John Thomas..........Scotforth.
Playford, Robert Henry..........Horsham.
Pomeroy, Francis Thomas..........South Petherton.
Ray, Charles..........Eastbourne.
Richardson, John..........Mansfield.
Roberts, Rowland..........Holyhead.
Shacklock, James Henry..........South Cave.

Shannon, Robert James ....Birmingham.
Tallantyre, John M. ....Manchester.
Thornton, Leonard Booker......London.
Turner, Aubrey ....Derby.
Wilkinson, Robert ....Kirkham.
Wood, John ....Leighton Buzzard.
Wride, Francis Blake .... Shirley.

MODIFIED EXAMINATION.

12*th*.—*Two* candidates were examined. *One* failed. The undermentioned passed, and was declared qualified to be registered as a Chemist and Druggist:—

Price, Benjamin William ......Farnham.

PRELIMINARY EXAMINATION.

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

Certificates of the College of Preceptors.

Hughes, John Lloyd ....Wrexham.
Qualtrough, Thomas S. ....Douglas.

Certificate of the Society of Apothecaries of London.

Croxford, William Charles ......Brentford.

Certificates of the University of Cambridge.

Asbury, Thomas ....Buxton.
Chamberlain, Edward Tracy ...Hull.
Foot, Frederick John ....St. Mary Church.
Holden, George Henry ....Walsall.
Wall, Augustine William ......Highgate.

Certificates of the University of Oxford.

Balmford, John Archibald......Huddersfield.
Chard, John Aloysius ....Fairford.
Pater, Edward Rhodes............Newark.
Richards, Thomas Coombs......London.

Provincial Transactions.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The second meeting of the session was held at 23, Burlington Chambers, New Street, Birmingham, on the 13th instant, Mr. Joseph Lucas, President, in the chair.

A lecture was delivered by Mr. David Hooper, F.C.S., on "Justus von Liebig : His Life and Works." A sketch was first given of Liebig's life, from the time when as a druggist's apprentice he manifested propensities for experimenting, to his appointment as Professor of Chemistry at Giessen University. Liebig's works in organic, agricultural, and physiological chemistry were reviewed, his theories in the former science being illustrated by a series of diagrams. The lecturer then gave some interesting account of Liebig's views with regard to the chemistry of cooking, and referred to some of his discoveries in this department of applied science. The lecturer said that chemists and druggists are much indebted to Liebig for his ingenuity in working in drugs and testing medicinal chemicals. He investigated kinic acid, which is naturally associated with the alkaloids of cinchona bark ; he examined the properties of amorphous quinine, and originated the ether test for the purity of quiniæ sulphas in the Pharmacopœia, which was afterwards modified by Stoddart of Bristol. He discovered the volumetric method for estimating hydrocyanic acid by means of nitrate of silver. He produced aldehyd and also chloral long before Liebreich discovered its medicinal properties ; and among many substances chemists and druggists are continually handling in their shops and laboratories, Liebig's name is connected with investigations of malic, lactic, hippuric, benzoic, formic, tannic, gallic, and fulminic acids. After mentioning the chief traits in Liebig's character, a high tribute was paid to him for his indomitable perseverance in working out details, and the method and order he practised in all his researches.

The lecture was illustrated by several experiments, apparatus, and diagrams, and was listened to by a large and appreciative audience.

At its close, the President proposed a hearty vote of thanks to Mr. Hooper for his interesting lecture, which was seconded by Mr. Robinson and supported by Messrs. Austin and the Honorary Secretary, who reminded the large number of assistants and apprentices present that it was still the intention of the Association to form classes for the pharmaceutical examinations if a sufficient number gave in their names.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The first meeting of the session was held in the Medical Theatre of the Owens College, on Monday evening, December 10, at 7.30 p.m.; Mr. G. S. Woolley, Treasurer, in the chair.

The Chairman, addressing the meeting, which was well attended, first desired Dr. Leech (Professor of Materia Medica in the Victoria University) to convey the thanks of the Association to the Council of Owens College for allowing the first sessional meeting to be held where they were assembled. He then dwelt upon the necessity of apprentices and students commencing their studies early in their career during their apprenticeship. By so doing they would be not only making the best use of their time but laying a good foundation of the knowledge on which their success as pharmacists in after life so greatly depended. He also advised young men to endeavour to pass in due course the Major examination, drawing their attention to the fact that almost without exception the most famous and successful pharmacists of the present day were those who in the early days of the Society passed their Major examination. Finally, he congratulated the authorities at Owens College on the election of Mr. W. Elborne to the post of Assistant-Lecturer in Materia Medica and Pharmacy, and called on Dr. Leech to say a few words respecting the College course of instruction for pharmaceutical students, recently established there.

Dr. Leech welcomed the pharmaceutical associates to the College, and expressed the hope that the arrangements made by the Council for the education of students in pharmacy would be found to meet all their requirements. He pointed out the advantages which would ensue if those entering on their career as pharmacists went through a regular course of collegiate education in the subjects of their calling instead of delaying the acquirement of a proper knowledge of these subjects till a short time before the final examination and then cramming up in as short a time as possible just as much information would enable them to pass it. According to the regulations of the department students would be required to attend in the first place courses of instruction in chemistry and botany, unless indeed they had already obtained a sufficient knowledge of these subjects. The education in botany and chemistry would be chiefly practical, and carried on in the laboratories. It might seem to some that the time spent in the microscopic examination of vegetable tissues, in the dissection of flowers, or in chemical analysis was thrown away; but this was not so. Such practical knowledge of a science, it had been found, should always precede the technical instruction in those subjects requiring a knowledge of the science, and the education of pharmacists on the lines laid down by the Council of the College would give pharmacy a higher status and prove advantageous to the public and especially so to medical men. Dr. Leech pointed out that to meet the varied requirements of students as regards times of attendance classes were being organized both in the daytime and in the evening. He also drew attention to the fact that students in pharmacy would receive tickets giving them free admission into the Botanical Gardens for the purpose of studying the medicine-yielding plants, of which a collection is now being formed.

The Chairman then called upon Mr. Elborne to give an address on "The Examinations of the Pharmaceutical Society."

The Examinations of the Pharmaceutical Society.

BY WILLIAM ELBORNE,

Assistant Lecturer in Materia Medica and Pharmacy, and Curator of Materia Medica Museum, Owens College.

The lecturer commenced by saying that at no period in the history of pharmacy had educational progress been more rapid than it is at the present day. The influence to which this onward movement is due might be attributed to the activity of individual members of the pharmaceutical body who take an interest in their calling, and to the zeal of those unaggressive workers to be found in the laboratory. From the fact of laboratory work having accomplished so much in the advancement of pharmaceutical science, it had assumed such importance in schemes of instruction and examinations that pharmaceutical education without it was a nonentity. This having become generally acknowledged throughout the community, the Council of the Pharmaceutical Society had become desirous of enforcing a better system of education, in the form of a compulsory curriculum. He proposed to offer a few remarks respecting the various examinations of the Pharmaceutical Society, treating them in such a manner that they might prove of service to students generally. The term "pharmaceutical student" was defined as indicating one who, having passed his Preliminary examination, follows pharmacy as his calling and endeavours to progress in the knowledge of its subjects. As well known, the junior members divided themselves educationally into two groups, viz., Minor students and Major. The greater portions of the course of study for the Minor should be extended over the student's apprenticeship, that period forming a most important epoch in the student's history; a time which it entirely rested with himself to either make the best use of or to throw away. In many instances young men who entered the trade and became bound to learn the art and mystery of a chemist and druggist did so with but vague ideas of the brain-work which lay before them, and, as a rule, it was not until after the lapse of years that they began to realize the true nature of the examinations in store for them. Mr. Elborne said the first thing he would recommend an apprentice to do would be to purchase and study the current 'Calendar of the Pharmaceutical Society of Great Britain.' There only would he be able to obtain that information which immediately concerned his future welfare and progress and be enabled to plan out for himself a proper course of study. The intelligent apprentice would also soon discover that the governing body which one day would examine him offers many encouragements to persevering students, in the shape of scholarships, medals and prizes. All students, therefore, who were interested in their own welfare, would, in his opinion, do well to join the Society as early as possible in their career. The privileges accruing in so doing were many. In the first place the student would associate himself with the respected and learned community which governed and protected his interests and calling; he would receive the weekly journal containing the report of the Society's transactions—the recognized organ of the trade; and further, he would have at his service its editorial department, which to inquiring students was of inestimable value. Secondly, he would have the use of the Library and Museum, comprising the finest collection of pharmaceutical literature and materia medica specimens in the world; he would be also presented with a comprehensive catalogue of each. Thirdly, he would be invited to compete for the Bell scholarships, Herbarium and Council prizes. Those who had more recently left school or had kept bright their knowledge of Latin, French or German, he earnestly recommended to try for the Bell scholarships, which were open for competition to all the Society's students under twenty-two years of age; there was, consequently, a good margin of time for preparation. Not only did successful competitors receive each £30 cash, but a free education into the bargain, whilst a "Bell scholar" held in the eyes of pharmacists a respected position, and his tenure of the scholarship brought him into immediate contact with a staff of distinguished professors and persons ever ready to help him on further in his studies and upward progress. In reference to the Herbarium prize, the competitor, to start with, must, he thought, live in the country and have a natural love for plants and field botany, and also plenty of time at his disposal for collecting, mounting, etc. The collection of a good herbarium required an enormous amount of labour, and those who undertook such were certainly to be commended for their pains. Those who lived in the neighbourhood of any botanical gardens should, however, be sure and pay a visit—say monthly, in order that they might become practically acquainted with all the official medicinal plants indigenous to this country (about fifty), which were generally to be found there among the economic beds. With respect to the Minor or qualifying examination, he said that the subjects of this examination were numerous, including chemistry, pharmacy, botany, materia medica, prescription reading and dispensing. The intelligent student would soon find that he is unable to understand pharmacy properly without possessing a knowledge of chemistry, materia medica without the knowledge of botany, nor dispensing without understanding prescriptions. The preparation for the Minor must, therefore, be built, as it were, upon three large pharmaceutical bricks,—knowledge of chemistry, botany and the language of prescriptions,—a foundation which should be laid as early as possible during apprenticeship. The first theoretical subjects, therefore, to which students should devote their hours of study were chemistry and botany, either by attending any such evening classes as are available in their surroundings, or by home study. He would also impress upon them the necessity of keeping their eyes open during the daily routine behind the counter, observing the characteristic appearance of every drug and chemical which came under their notice and recognizing all the various spirits, tinctures, extracts, pills, and compound powders by cautious taste and smell. By doing this they would be largely cultivating their observing faculties, besides learning a great deal which they would be able to turn to good account in the examination room. Having gained the theoretical knowledge of chemistry, elementary physics and botany, they could then be entitled to open the British Pharmacopœia, the book which must be so elaborated as to form an epitome of all their studies. It was most essential that every student should possess a copy of his own at an early date, and immediately make up his mind to esteem it as a text-book and note-book as well, using the margin for the entry of full notes upon the various drugs and preparations. A good book on materia medica should be treated in a similar manner, by filling in the margins with the natural order of the drug, percentage of active ingredient, brief mode of collection, its adulterations, impurities and substitutions. By so doing they would be turning the numerous blank spaces and wide margins to good account, and the book itself would no longer appear a dreary waste, but become a most valuable text-book and self-constructed record. At the same time students were recommended not to forget their practical pharmacy and technical work in the shop, cultivating good habits and picking up all the practical information they could in dispensing and tabulating it. The author then brought this part of the paper to a close with some hints with respect to preparation for an appearance in the examination room. Turning to the subject of the Major examination, he said it should, of course, be taken into consideration immediately after having passed the Minor, when the student would be in the best position to further brighten up his scientific subjects and devote his whole time to work, which after having got through the drudgery would become a pleasure. Then a man who had passed the Major should not forget the Pereira and Council prizes. The Pereira Medal was considered the blue ribbon of pharmacy and was open to all those connected with the Society that had passed their Major during the same pharmaceutical year.

After Mr. Elborne's address, a discussion took place in which the Chairman, Dr. Leech and Mr. Robinson, of Pendleton, took part.

Mr. Elborne having replied, the Chairman proposed a hearty vote of thanks, which was seconded by Mr. Botham and carried unanimously.

The Chairman then called upon Mr. Elborne to make a few remarks respecting the collection of Indian cinchona barks, exhibited upon the table, which had been presented to the Association by the Pharmaceutical Society.

Mr. Elborne stated that the subject of cinchona barks was a very vast one, especially as regards the supply which came to England from the British Colonies and India. He said it was a subject to which he had devoted considerable attention, and for a brief history of its modern features, he thought he could not do better than refer those interested in the subject to one of his recent papers published in the *Pharmaceutical Journal*, entitled "A Summary of the Cinchona Barks of Commerce." He said that the barks upon the table were from the plantations of Darjeeling, and that at some future meeting he hoped to be able to give them a paper on the subject.

At this stage of the proceedings, the Chairman invited the meeting to accompany Mr. Elborne and proceed to make an inspection of the new buildings (as announced). Having assembled in the Materia Medica Museum, Mr. Elborne stated that the pharmaceutical buildings comprised the Museum they now had the pleasure of inspecting, a Pharmaceutical Laboratory and a Professor's Laboratory, specially set aside for pharmacological work. In reference to the Museum, he said that as regarded its dimensions and bench accommodation for students, it was, he thought, unequalled by any in the kingdom, inasmuch as no less than twenty men could be comfortably seated at the same time while studying the accessible specimens. The students' bench was also admirably lighted and furnished with a microscope. The leading feature of the Pharmaceutical Laboratory, he said, was the fine dispensing counter it contained, which was fitted up with every requisite, including gas and water, and would enable twenty men to be dispensing at the same time. There were also private benches in the Professor's Laboratory, intended to be used by gentlemen desirous of undertaking any original investigation or research.

The meeting then terminated.

HANLEY PHARMACEUTICAL STUDENTS' ASSOCIATION.

A meeting was held at the residence of Mr. Moore, 7, Market Square, Hanley, on Thursday, December 6, at 6 p.m., to consider the advisability of forming a Students' Association for the chemists' assistants and apprentices in the town. There were present—Messrs. J. W. Moore, E. Jones, and J. F. Eardley, principals, and five apprentices.

Mr. Jones having taken the chair, Mr. Moore opened the meeting by explaining the cause for and advantages to be gained by the assistants and apprentices forming themselves into an Association for study and general advancement.

It was then unanimously agreed to form an Association, and that the name of the Association should be "The Hanley Pharmaceutical Students' Association." It was also arranged that the night for meeting should be Tuesday, from 8.30 to 10, and that there should be only two classes formed this session, "Preliminary" and "Chemistry." Mr. Moore was requested to see a gentleman in reference to the formation of the Preliminary class, and Mr. Eardley assented to an unanimous request to conduct the Chemistry class for the first session.

It was agreed that the first meeting of the Association be held on Tuesday evening, the December 11, at 8.30. Mr. Moore kindly offered to provide a room for meeting *pro tem.*, which was accepted.

Votes of thanks were passed to the Chairman for presiding and to Mr. Moore for bringing the matter forward and his efforts to establish the Association.

The first meeting of the Association was held on Tuesday, December 11. The Chemistry class was commenced, eight students entering their names. Should the Association prove a success, it is intended next session to invite the co-operation of the assistants and apprentices of the neighbouring towns.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

The Scientific Basis of Cookery.

At the commencement of the last of the series of Cantor lectures, on the "Scientific Basis of Cookery," by Mr. Mattieu Williams, the lecturer again explained the relations existing between the processes of boiling and stewing. He then proceeded to the subject of maceration, by which process, he said, the juices and non-colloid constituents of the food could be extracted unaltered through the agency of exmosis, the viand being cut in small pieces and steeped in cold water, without application of heat. The colloid constituents, consisting of the non-crystallizable substances, were thus separated from the more nutritious parts, which, being soluble, were readily taken up by the system of an invalid, without undergoing the process of digestion in the stomach. In this way beef-tea could be prepared for an invalid whose stomach is not equal to the task of digesting gelatin; this food would not, however, satisfy the invalid when he became stronger, as he would require something more sustaining. Mr. Williams then introduced the subject of casein, as the most important part of the evening's discourse. He remarked that casein could be separated even from skim milk by means of rennet or an acid, and unlike albumen it is not affected by heat, boiled milk being equal in value to fresh in the manufacture of cheese. Casein occurs in two forms, in the soluble form in milk, in the insoluble form in cheese. Several materials are in use for the separation of the casein. Rennet acts by decomposing the milk, lactic acid, which is the real separating agent, being formed; hydrochloric acid is also largely used for this purpose. The lecturer said that the cost of cheese is very low compared with that of beef, as although nearly the same price per lb., yet 1 lb. of lean beef contained 72 per cent of water, whilst cheese only contained 30 per cent, so that 20 lbs. of cheese was nearly equivalent in food material to 60 lbs. of beef. He also noticed the great superiority of cheese over meat in point of portability, as cheese might be imported from foreign countries without any trouble and could indeed be used as ballast. Pure casein has no taste or smell, and if carefully prepared, by neutralizing with an alkali, can be obtained in a soluble form. Mr. Williams considers cheese should never be eaten by anyone in the indigestible form in which it is sold, and that it is always hard to digest if not properly cooked. To make cheese digestible, he said, it is necessary to re-convert it into the soluble form as when in milk; he had found it preferable to heat it with milk or water containing a little bicarbonate of potash so as to neutralize the acid that had caused its separation. Or it could be used, as in Italy for the flavouring of soups. The lecturer mentioned several recipes for preparing dishes from cheese, among which was one consisting of ¼ lb. of cheese, water, a little bicarbonate of potash, and three eggs, which he said was very good when cooked. He further drew attention to the fact that, upon analysis, the same results are given by Parmesan cheese and cheese made from skim milk, which latter, commonly known as "Cream Dick," is considered only fit for farm labourers. Mr. Williams then passed on to speak of "bosch" or "butterine," which, he said, although better than many butters, simply consisted of scientifically prepared dripping. He next pointed out the importance of vegetables considered as articles of food, remarking that the elements of vegetables and meat were the same, and that they contained equivalent constituents. He also mentioned the value of ensilage as applied to vegetable food, as by this means the tough woody parts were converted into dextrine. For instance, whole meal bread would be much more nutritious if the bran were rendered more digestible by ensilage; again, Jersey pears, although hard and woody when plucked from the tree in September, became sweet and juicy if kept till December. This fact also might give a meaning to the old adage, "Pease pudding hot, pease pudding cold, pease pudding in the pot nine days old." Mr. Williams, in conclusion, remarked that the time might come when "scientific cookery" would enable man to dispense with animal food, and that then food supplies would be more easily obtainable from all parts of the organic kingdom.

Obituary.

Notice has been received of the death of the following:—

On the 20th of October, Mr. William Pissey, Pharmaceutical Chemist, Rayleigh, Essex. Aged 65 years. Mr. Pissey had been a Member of the Pharmaceutical Society since 1853.

On the 24th of October, Mr. John Abel, Chemist and Druggist, Forfar. Aged 47 years.

On the 28th of October, Mr. John Tankard, Chemist and Druggist, Manchester Road, Bradford. Aged 39 years.

On the 30th of October, Mr. Henry Milner Hughes, Chemist and Druggist, Overton, Ruabon. Aged 27 years.

On the 2nd of November, Mr. Isaac Jack Reeve, Chemist and Druggist, High Street, Newhaven. Aged 60 years.

On the 4th of November, Mr. Henry Robert Kemp, Chemist and Druggist, Holloway Road, N. Aged 49 years.

On the 5th of November, Mr. Henry Maiden, Chemist and Druggist, Haymarket Street, Bury. Aged 66 years.

On the 8th of November, Mr. Cristopher Innes Macarthy, Chemist and Druggist, Romford. Aged 50 years.

On the 9th of November, Mr. Henry Dickerson, Fore Street, Devonport. Aged 78 years. Mr. Dickerson was a Pharmaceutical Chemist Member of the Society from 1842 to 1881.

On the 13th of November, Mr. William Bankes Hudson, Pharmaceutical Chemist, Haymarket, W. Aged 71 years. Mr. Hudson was one of the Founders of the Pharmaceutical Society, having joined it in 1841.

On the 17th of November, Mr. William Smith, Pharmaceutical Chemist, Sutton Coldfield. Aged 77 years. Mr. Smith had been a Member of the Pharmaceutical Society since 1842.

On the 18th of November, Mr. Joseph Revill Pennington, Chemist and Druggist, Calton Road, Worksop. Aged 44 years.

On the 26th of November, Mr. Isaac Garrett, Chemist and Druggist, Queen's Road, Brighton. Aged 53 years.

On the 27th of November, Mr. Charles Elkington, Chemist and Druggist, Rugby. Aged 64 years.

On the 8th of December, Mr. James Laws, Chemist and Druggist, Mare Street, Hackney. Aged 57 years.

On the 14th of December, Mr. William Kimberley, Chemist and Druggist, Balsall Street, Birmingham. Aged 77 years.

On the 14th of December, Mr. Alexander Grant, Chemist and Druggist, Cullen, N.B. Aged 26 years.

Reviews.

THE INTERMEDIATE TEXT-BOOK OF PHYSICAL SCIENCE.* By F. H. BOWMAN, D.Sc., F.R.A.S., F.L.S., etc.

The key-note of much of modern research in science and more especially in physical science is struck when it is said that the ordinary man of science is broadly a worker and not a thinker in the special branch to which he belongs. The truth of this and its lamentable results are acknowledged on all hands by men of science, and have attracted much attention and comment from the outside world. It is painfully prominent in the science of chemistry, where every day adds a new name to the already enormous mass of unutilized and unclassified facts the bearing of which one to another and to the general principles of the science is left undetermined; their very discoverers apparently shrinking from the mental task of generalization and caring little for the logical consistency of the science and its doctrines when viewed as a whole. Professor Huxley is one among the very few men who are able to take that wide and philosophic view of science as a whole, and who have endeavoured to give a precise and consistent account of the objects and bearings of physical science. This was done, and as far as it went was very admirably done, by Professor Huxley in his "Introduction" to the series of 'Science Primers.' There was, however, needed, and there still is needed, a book written in the same precise, yet simple way, but ranging over a much more extended field; in point of fact, Professor Huxley himself suggested the existence of such a book which could profitably be used where a general, more than a special, knowledge of physical science and its principal discoveries is required, a book which should open with a clear, consistent and intelligible exposition of the aims and instruments of scientific thought and then proceed to a general untechnical and systematic statement of the principles and leading facts of each and all of the physical sciences, accompanied by such reference to experiment as is necessary for their full understanding. This extremely difficult task has been attempted by Dr. Bowman in the book before us, he having, as we are informed in the preface, followed out the suggestion of Professor Huxley. It is evident that the author has a wide general knowledge of physical science, but what is wanted for the full consummation of such a task as this is not only quantity of knowledge but quality of mind. Whatever Dr. Bowman may be as a scientific worker he is certainly in no sense of the word a scientific thinker; his thought and utterance as portrayed in many parts of this book are destitute of those very qualities which are designated scientific. More profound intellectual confusion is not to be met with than that contained in the portion of the present work which deals with the meaning and methods of physical science, and indeed, wherever the author leaves the ground of empirical description of scientific facts. To have read both Whewell's 'History of the Inductive Sciences' and Jevons's 'Principles of Science,' which roughly represent ancient and modern scientific thought, without having previously fully and systematically considered the problems there treated, can only lead to the most utter and complete confusion. Indeed, this section of

* London: Cassell, Petter, Galpin and Co. Extra fcap. 8vo. Pps. i-xvi., 1-320.

the book is a strange mixture of the opposing statements of Whewell and Jevons without any attempt at reconciliation, and forms such a tangle and jungle of inaccuracies as is seldom to be met with. This is a severe expression, yet it is the only expression which adequately and fitly characterizes the introduction to Dr. Bowman's attempt "to enlarge the range of the intellect and open up a wide field of pleasure which might otherwise be closed." A few striking passages shall be quoted to justify the above criticism, although the majority of the introduction might be cited in its support. Here, for instance, are examples where inaccuracy, looseness and contradiction are fused in the definition of two of the most important words employed in physical science—law and induction. On page 2 we are told that "*the cause* which underlies the changes which are produced by the action of force upon matter is called a *physical cause*; and the constant relationship which obtains or subsists between a physical phenomenon and its cause is called a *physical law*." Here, be it observed, is defined the difference between a physical cause and a physical law, but on page 30 this difference becomes an identity. "Induction may be said to be the method of investigation which seeks to determine *the causes which lie underneath the phenomena and which we term laws*; just as deduction is the process by which the law inductively discovered is traced in new instances." And with true consistency this definition of induction is contradicted upon page 12 by the statement that we "deduce the laws which underlie the phenomena." This kind of confusion is the result of a pernicious and unscientific use of the word law in two senses. However this is not the place to rectify Dr. Bowman's errors, but only to point them out, and deplore their existence. Unfortunately, equal looseness of thought and expression is not restricted to this portion of the book; it also pervades that part which deals with more strictly technical subjects. It is displayed to perfection in the chapter upon "Statical Physics" (p. 33), where the author endeavours to explain the meaning of "Weight." "So far as any given quantity of matter is concerned its *absolute weight will remain the same whenever and wherever it is*, considered in regard to the same quantity of matter, either of its own or any other kind, and we measure this weight numerically by the intensity of the resultant of the earth's attraction upon the molecules of the body." In the next paragraph we meet this eminently clarifying rider:—"Measured, however, by this standard, the numerical *absolute weight* of a body *does not remain constant* in all parts of the universe or indeed of the earth's surface." Finally, to heighten the effect the section closes thus:—"Two pound weights which balance each other will do the same either in London or Glasgow or any part of the earth, or indeed of the universe, although their *absolute weights* as determined by the power which they possess to compress or extend a spring *will vary* in every position in which they may be placed." We pity the sentient being who gets his notion of "absolute weight" from these passages, and who probably concludes that one of the principal functions of physical science is to fog the mind of man. One more quotation in support of our dictum upon the merits or rather demerits of this book and we have done. On page 41, before any definition of a molecule or atom has been given, the following statement about cohesion occurs:—"It is distinguished from chemical attraction, which unites the atoms of different kinds of matter so as to form new substances, by the fact that it unites the molecules of the same kind of matter alone, and in the same way it differs from adhesion which unites the molecules of different kinds of matter." Under the head of "Chemistry," upon page 281, another statement about adhesion will be found which is in direct conflict with the present one. "Chemical union is most like cohesion or adhesion, but it differs from these in that while they occur most powerfully between matter of the same kind, chemical union is always the most powerful and energetic when the substances entering into combination exhibit the greatest differences in their kind."

When we saw the announcement of this book we thought and hoped that it would be precisely the book to suit the requirements of the pharmaceutical student, who under the present system is required to to have a sound general knowledge of physics, but we have been grievously disappointed, and our present advice to the pharmaceutical student is that the less that he has to do with the book the better will it be for him and his enlightenment. Just as the essence of scientific thought is found in its precision, so the essence of scientific expression is centred in its accuracy. The passages we have quoted suffice to show that it is in these very respects that the exposition contained in this book is wanting. The depressing task of reading the volume being over it was indeed a relief to quit this turbid atmosphere to enjoy the bracing air and exhilarating climate of the 'Introductory Science Primer,' and refresh oneself with Professor Huxley's precise knowledge, accurate language and lucid exposition.

PHARMAKOGNOSIE DES PFLANZENREICHES.* By F. A. FLÜCKIGER. Second Edition. Part III.

This is the concluding part of a work which promises to be to the German student in pharmacology what the 'Pharmacographia' is to the English student. As mentioned on a previous occasion (*Pharm., Journ.*, [3], xiii., 319), it includes most of the information contained in the *magnum opus* of the author and the late Daniel Hanbury, supplemented by fresh matter in relation to a few drugs that are relatively of more importance in Germany than in this country. For instance the present part commences with "Herba Jaceæ" (*Viola tricolor*), "Folia Malvæ," and "Folia Farfaræ." "Folia Theæ," which comes next, can hardly be said to be more in use on the Continent, but it forms a convenient heading under which to refer to other theine-containing plants.

The present part reveals the completion of the arrangement of the work. We must refer to the previous notice for a summary of the scheme so far as it was developed in the first two parts, and will only here briefly outline the remainder. It consists mainly of the third, fourth and fifth subsections of the section including the parts growing above the soil of the important sub-class of non-pulverulent organized substances. The third subsection is entitled "leaf-organs," and this is divided into (*a*) "bulbs"; (*b*) "leaves and (partly flowering) herbs," including (1) leaves with little taste or smell, (2) leaves with predominating astringent taste, (3) bitter leaves and herbs, (4) leaves and herbs of saline-bitter, acrid or pungent taste, (5) aromatic herbs and leaves; and (*c*) flowers, inflorescence and parts of flowers, including, (1) parts of flowers and (2) entire flowers and inflorescence. Subsection four is devoted to fruits, and is divided into (1) fruit rinds and fruit pulp; and (2) fruits, including (*a*) those having an oily or sweet taste, (*b*) those having a bitter taste, (*c*) those having a pungent taste, and (*d*) fruits in which an aromatic property preponderates. The last subsection consists of seeds and parts of seeds, including (1) seeds without bitter taste, oleaginous or mucilaginous, (2) bitter seeds, (3) seeds having a pungent or aromatic taste, and (5) seed appendages. This scheme of classification is really a somewhat further elaboration of that adopted by the author in the first edition of this work, but not followed in his joint work with Hanbury. We doubt whether the plan will find frequent imitation, but it certainly has the advantage of bringing many of the articles of the materia medica into a juxtaposition unusual in other manuals and so presenting them to the student under new aspects. But for those who prefer the botanical classification a table is provided which will enable them to see

* Berlin: R. Gaertner. Royal 8vo. Pp. i.-xvi.; 601-1049.

at a glance the pages upon which the substances derived from any particular order are referred to; while others who favour the less scientific alphabetical arrangement have a good index to which they can turn.

It is almost needless to state that the work is brought up to date, some of the most recent researches being referred to in the text.

BOOKS RECEIVED.

The Chemist's and Druggist's Diary. 1884. From the Publishers.

Baldness and Greyness: their Etiology, Pathology and Treatment. By Tom Robinson, M.D. Second edition. London: H. Kimpton. From the Publisher.

The Chemical Effect of the Spectrum. By Dr. J. M. Eder. Translated and Edited by Captain W. de W. Abney, R.E., F.R.S. London: Harrisons and Sons. 1883.

A Compendium of Modern Pharmacy and Druggists' Formulary. By W. Kilner. Fifth Edition, with Supplements. London: H. Kimpton. 1884. From the Publisher.

Saint Thomas's Hospital Reports. New Series. Vol. XII. London: J. and. A. Churchill. 1883.

Correspondence.

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

Sophistication of Oil of Turpentine.

Sir,—In an editorial note in the *Pharmaceutical Journal* of December 15, you call attention to the sophistication of oil of turpentine with "petroleum benzine" reported by Her Majesty's Consul at Charleston.

Allow me to state that the presence in oil of turpentine of the more volatile hydrocarbons distilled from petroleum is very readily, simply and certainly detected by the application of the flashing test prescribed by the Petroleum Act, 1879.

The possibility of thus advantageously employing the apparatus devised by Sir Frederick Abel was casually suggested to me, in conversation, by Surgeon-Major Lyon, Government Analyst at Bombay, and I now habitually determine the flashing points of samples of oil of turpentine submitted to me for examination.

On another occasion I may ask you to publish some particulars of the range of flashing point of American oil of turpentiee, as imported, and the effect upon the flashing point of admixtures of substances likely to be used for sophistication.

In the meantime, I may mention that the addition to oil of turpentine of only 1 per cent. of ordinary petroleum spirit lowers the flashing poiut about 10° Fahr.

Those who do not possess the legal apparatus may, with care, obtain fairly comparative results with a beaker, one-third filled, over a water-bath.

Boverton Redwood, F.I.C., F.C.S.

85, *Gracechurch Street, London.*

The Partick Poisoning Case.

Sir,—As your paragraph in Saturday's issue under the above heading may create an unfavourable impression against our client, Mr. R. C. Rait, we think it right to state and explain, that while the civil responsibility to the public rested with him by "aconite" instead of "actæa racemosa" being dispensed, yet neither he nor any of his assistants was in any way the cause of the mistake, nor can any blame whatever be imputed to them. The Procurator Fiscal, in the criminal proceedings against one of the assistants, after a thorough investigaiion and analysis of the different medicines, abandoned the charge, and in the civil action, Mr. Rait explained in his defence that the "aconite" given to Mackay, was received from a firm of wholesale druggists in Glasgow, instead of "actæa racemosa," the medicine actually ordered.

Further, that while our client paid to Mr. William Mackay, the sum of £200 and expenses, by an agreement come to out of court, the wholesale druggists repaid Mr. Rait all this outlay and a considerable sum in addition to meet other expenses.

McLelland Thomson and Towers-Clarke,

Glasgow. *Law Agents for Mr. Rait.*

Red Cap.—It has been reported that the administration of hydrochlorate of pilocarpine has been followed by darkening of the hair (see *Pharm. Journ.*, [3], xii., 438), but we cannot say that we are aware that any "preparation of pilocarpine is used for dyeing the hair black, by means of internal application."

Créon.—Very different preparations are sold under the name of "lime juice and glycerine" and several recipes have been already published in this Journal. The following is taken from Canning's 'Select Notes':—Lime juice, ½ pint; rose water, ¼ pint; sp. v. r., added gradually, 2 oz. Shake well, after twenty-four hours strain through muslin, and add ol. limonis, ½ drm., ol. lavand., 15 drops, dissolved in s. v. r., 4 drs. Lastly add glycerine, 2½ fluid ozs. and shake well.

Registered is recommended to address his question to the Registrar under the Veterinary Surgeons Act.

Student.—We should think not, unless he has passed an equivalent to the Preliminary examination.

C. Potter.—The law makes no exception and the answer given last week applied strictly to both parts of your question. As to our *opinion* in respect to the probable application of the law, see *Pharm. Journ.* for June 9 last, p. 1025.

J. P., jun.—"Troch. Cubebæ, T. H."—Cubebs in powder, 200 grs.; extract of liquorice, 1225 grs.; tragacanth in powder, 70 grains; refined sugar, 200 grains; black currant paste, q. s. Mix the dry ingredients, then add the black currant paste until the whole mass weighs 1 lb., divide into 350 lozenges of 20 grains each and dry them in a hot-air chamber at a moderate heat.

Associate.—Lactic acid has been recommended as useful in the treatment of diabetes, one to three drachms being given daily; it has also been used as a remedy for dyspepsia. As a solvent of the diphtheritic membrane solutions have been recommended varying from one of "acid" and five of water to one of "acid" and twenty of water, but no indication of the strength of the acid itself is given. The U.S.P. sp. gr. is 1·212, which is said to represent 75 per cent. of absolute lactic acid and 25 per cent. of water.

F. Wright.—Before we can deal with the matter referred to in your letter, in the manner you desire, we must be fully acquainted with the facts of the case.

J. H. Henry.—The subject of your letter is referred to on p. 493.

J. J. Macaulay.—The lesser galangal root (*Alpinia officinarum*).

T. F. Abraham.—We believe that the sunflower is cultivated in the south of Europe and in Russia for the sake of the oil that can be obtained from the seeds, but we are not aware that it is cultivated for that purpose in England. You will find some information on the subject in *Pharm. Journ.* [3], ii., 106, and vii., 117.

Botanist.—Bentley's Manual of Botany, published by J. and A. Churchill, price 15s., or the smaller work of the same author.

Pharmacopolist.—The 12th section of the Pharmacy Act, 1852, provides that "it shall not be lawful for any person, not being duly registered as a pharmaceutical chemist according to the provisions of this Act, to assume or use the title of pharmaceutical chemist or pharmaceutist in any part of Great Britain, or to assume, use, or exhibit any name, title or sign implying that he is registered under this Act."

"*Emigrant.*"—The colonial Act provides for the acceptance of evidence of the English qualification in lieu of an examination.

J. Wyatt.—Professor Flückiger was the first person to whom a Hanbury medal was awarded.

Communications, Letters, etc., have been received from Messrs. Samuel, Maben, Churchill, Apprentice, Novice, Natron, F. A.

"THE MONTH."

The relative activity of certain metals in the oxidation of oils, which was the subject of an interesting paper by M. Livache some months since (*Pharm. Journ.*, [3], xiii., 942), has been further investigated with results that promise to be of industrial importance (*Comptes Rendus*, xcvii., 1311). In imitating an industrial method of preparing drying oil, in which the oil is heated with minium or litharge, together with manganese generally used in the state of borate, M. Livache added to an oil which had been heated with lead obtained in a fine state of division by precipitation, as described in his previous paper, some finely pulverized sulphate of manganese, the result being the formation of an insoluble lead compound and a complete displacement of the lead by manganese. The oil produced was extremely siccative, drying when placed in a thin layer upon glass completely in five or six hours. Upon increasing the fluidity of such an oil by mixing it with equal parts of benzine and shaking it in a closed vessel, a rapid absorption of oxygen takes place, which is increased if the temperature be kept between 40° and 50° C., and if the air be renewed at intervals, so as to replace the oxygen absorbed, a point is reached at which after the separation of the solvent by distillation the oil upon cooling becomes a dry elastic homogeneous solid. This product is absolutely insoluble in water, alcohol or ether, but is nearly immediately saponified in the cold by potash.

The importance of the freedom of oils intended to be used as lubricants from uncombined fatty acid is well known, and M. Krechal proposes a test for this purity based upon the facts that acetate of rosaniline is not dissolved by neutral oils, but is dissolved by free fatty acids, and that rectified petroleum is a solvent of oils, but not of acetate of rosaniline, though it does not precipitate that compound from a solution in fatty acids (*Journ. Pharmacie*, [5], viii., 430). Ten c.c. of the oil are shaken in a test-tube with 1 c.c. of a strong alcoholic solution of acetate of rosaniline, and the test-tube is then placed in the water-bath for an hour to drive off the alcohol. Sufficient rectified petroleum is then added to increase the volume to 100 c.c., and of this 10 c.c. is taken, further diluted about ten times, and then titrated with petroleum containing sulphurous acid, prepared by digesting petroleum with about one-fourth of its volume of sulphuric acid and allowing it to become clear. The decolorizing effect of this upon acetate of rosaniline must be determined before each experiment.

Two kinds of yellow pigment are met with in India under the name of "piuri," or Indian yellow, one of mineral origin, imported from London, the other said to be of animal origin and manufactured at Monghyr, in Bengal. As some uncertainty existed respecting the correctness of this latter statement, inquiries have been made by the Indian Government, at the instance of Sir J. D. Hooker, by which it has been substantiated. The manufacture of animal "piuri" appears to be carried on in a suburb of Monghyr, on a very limited scale, by some members of the sect of gwalas (milkmen). The substance is the dried product of the evaporation of urine from cows that are fed exclusively upon mango leaves, which fodder is said to increase the bile pigment and impart to the urine a bright yellow colour. The cows are said to become very unhealthy under the treatment, and the owners are consequently compelled to give them occasionally grass and other kinds of fodder; but the change is always followed by a decrease in the yield of pigment, which is about two ounces daily. The animal piuri is of an exceedingly bright colour, and is therefore considered superior to the article of mineral origin.

A new compound of quinine with chloral is described by Dr. Mazzara (*L'Orosi*, vi., 430), which he believes will prove to be a type of a series of compounds of chloral with the alkaloids. It is prepared by adding to a solution of quinine in chloroform an equivalent quantity of chloral, and allowing the mixture to evaporate at the ordinary temperature. The gelatinous transparent yellowish residue is taken up with ether and the solution gently warmed, when an abundant separation of white warty crystals immediately commences, and in a short time the whole liquid is converted into a crystalline paste. Or the compound may be prepared directly by dissolving 32 parts of anhydrous quinine in chloroform, diluting this solution with anhydrous ether, adding 147·5 parts of chloral and gently warming. The crystals are washed with cold ether and dried over sulphuric acid, and are thus obtained snow-white, the crystals being tasteless at first with a slightly bitter aftertaste. The compound is represented by the formula $C_{20}H_{24}N_2O_2 \cdot CCl_3COH$. Chloral-quinine volatilizes unaltered in dry air at a temperature of 149° C. Its solutions in dilute acids are fluorescent and give the thalleioquin reaction. With sodium bicarbonate it gives a precipitate free from chlorine, and it is thought doubtful whether chloral-quinine can remain undecomposed in aqueous solution.

Some experiments made by Herr Lewkowitsch seem to show that it is possible to convert lævogyre-mandelic acid into the dextrogyre form, and *vice versâ*, passing through the intermediate optically inactive form. By heating the left-handed acid in a closed tube to 160° C. during thirty hours, a yellow crystalline mass was formed, smelling strongly of benzaldehyd, which was purified by treatment with water, and the clear solution was then optically inactive. After standing some days, crystals of paramandelic acid separated, from which dextromandelic acid was removed by combining it with cinchonine and decomposing the resulting salt. Still more interesting is the observation that when a certain species of *Schizomycetes* was cultivated in a solution containing inactive or paramandelic acid, it was found that after the growth was at an end and the liquid had had time to clear the liquid had become lævogyre, the fungus having apparently consumed all the dextro portion of the acid, and then ceased to develop.

In a letter to the *Chemical News* (December 2, p. 291), Mr. F. M. Lyte challenges the usually accepted explanation as to the combination of water of crystallization, the existence of hydrates and double salts and the combination of phosphorus pentachloride with iodine, bromine and iodine chloride, and other analogous combinations, which supposes that there exists either in the atoms themselves composing the molecule some residue of unsatisfied atomicity or that some of the atoms possess a variable atomicity. He asks whether there is any valid reason why it should not be supposed that the entire molecules, acting as entities or compound atoms, come to possess an atomicity of their own, attracting one another, or the molecules of water, as the case may be. At the first blush, it is not quite clear in what this atomicity of the molecule would differ from the sum of the residue of the unsatisfied atomicities spoken of; but Mr. Lyte does not think this a sufficient explanation of the energetic action which is manifested in some cases, resulting in a considerable development of heat, as when dry calcium or zinc chloride combines with water.

In 'Pharmacographia' it is mentioned that the slightly dextrogyre essential oil yielded by matico leaves (*Piper angustifolium*, R. et P.) deposit in winter long crystals of a camphor, having the odour and taste of the oil from which it is derived and melting at 103° C. A fine sample of this matico camphor was shown in the recent exhibition at Vienna by Messrs. Schimmel and Co., and some crystals transmitted to Professor Flückiger by this firm have been examined by Herr Kügler (*Berichte*, xvi., 2841). The melting point was found to lie between 89° and 103° C.; but after repeated recrystallization it became constant at 94° C., a yellow amorphous resinous matter, to which the variation was probably due, being left in the mother-liquor. The purified camphor was readily soluble in alcohol, ether, chloroform, benzol and petroleum spirit; it was not attacked by aqueous solutions of caustic alkalies, and when placed on the surface of water had a rotatory motion. With dry hydrochloric acid gas it took an intense violet colour, passing immediately into blue and then green. Upon analyses it gave results corresponding with the formula $C_{12}H_{20}O$, and Herr Kügler thinks it will probably prove to be the ethyl compound of ordinary camphor,—$C_{10}H_{15}(C_2H_5)O$.

Signor Barbaglia announces the isolation of a new basic substance from *Buxus sempervirens* (*Annali di Chimica*, lxxi., 5), to which he has given the name "buxinidine." It is precipitated from a concentrated alcoholic solution, together with parabuxine, by oxalic acid, and is separated from the parabuxine by means of ether, in which it is insoluble. It is described as forming a snow-white amorphous powder, insoluble in water or ether, slightly soluble in alcohol. The author appears to be unaware that a third basic principle has been isolated from this plant by Dr. Alessandri and named buxeine (*Pharm. Journ.*, [3], xiii., 23); this latter, however, would appear to differ from buxinidine in more than one respect, and is soluble in ether.

The want of agreement between different authors as to the composition of saponin has induced Dr. Schiaperelli to investigate the subject afresh (*Annali di Chimica*, lxvii., 65). *Saponaria officinalis* root was exhausted with boiling alcohol and the impure saponin that separated upon standing was repeatedly redissolved in hot alcohol and treated with animal charcoal. As it still retained inorganic matter, a cold saturated aqueous solution was treated with a similar solution of barium hydrate. The resulting precipitated barium-saponin was decomposed with a current of carbonic acid gas, the last trace of barium removed by means of a little dilute sulphuric acid, and the filtrate then evaporated to a syrupy consistence and precipitated with ether-alcohol. After repeating this operation several times and drying over sulphuric acid, a snow-white product was obtained quite free from inorganic constituents, and giving analytical results corresponding to the formula $C_{32}H_{54}O_{18}$, which is the same as that finally adopted by Herr Rochleder (*Pharm. Journ.*, [3], vii., 489). This saponin was amorphous and odourless, was an energetic sternutatory, had a disagreeable taste and a poisonous action, and was lævogyre; it dissolved very freely in water, less so in alcohol, and was almost insoluble in ether, benzine and chloroform. It had the peculiar property of preventing the separation of substances insoluble in water, retaining them apparently in a kind of colloidal condition. It is probably this property that allows of the use of a preparation of soap bark as a pseudo-emulsifying agent. When carefully heated with dilute acid in a water-bath this saponin splits up into a sugar possessed of very slight optical action and a micro-crystalline substance having the composition represented by the formula $C_{40}H_{66}O_{15}$, and differing, therefore, from the "sapogenin" of other authors. It is proposed that this decomposition product shall bear the name "saponetin."

Some months ago Professor Plugge separated from the Japanese plant *Andromeda japonica*, Thunb., a poisonous principle to which he gave the name "andromedotoxin." He has since made an examination of *Andromeda polifolia*, Linn., which grows wild in some parts in Germany and reports (*Archiv*, xxi., 813) that he has discovered the same principle in that plant. Although very little is known respecting any poisonous principles in plants of this genus, Guibourt mentions in his 'Natural History of Drugs' that the narcotico-acrid properties of *Andromeda polifolia* render it very injurious to sheep. Another crystalline body was separated from *A. polifolia*, which Professor Plugge says is probably identical with the "asebotin" isolated by Professor Eykman from the Japanese plant and which was considered to differ from arbutin only by the elements of water (*Pharm. Journ.*, [3], xiii., 798).

"Jambu assu" is said to be the local name of a plant indigenous to Brazil and employed in that country as a stimulant in low fevers as well as an antiperiodic; it is reputed also to exercise a specific influence over the uterus. A sample of the drug, consisting of a mixture of stems and roots, has been submitted to a chemical examination by Dr. Lyons (*Therap. Gaz.*, iv., 450), who reports that he has separated from it a crystalline neutral body, an alkaloid which in solution has a somewhat bitter and characteristic taste, a peculiar acid, an essential oil and a soft resin. It is doubtful whether any action that the drug may possess is attributable to either of the first three substances; but the volatile oil and the resin, which are removed in combination by extracting the alcoholic extract with hot petroleum benzine, both possess the peculiar pungency of the drug. Dr. Lyons appears to think that the resin is really the active constituent of the oleoresin and he describes it as being rather sparingly soluble in petroleum benzine, soluble in ether, alcohol and chloroform, almost insoluble in water and sparingly soluble in alkaline solutions. The plant from which the drug is derived has been referred to *Eugenia Jambos*, Linn., but this is thought to be probably a mistake.

The use of β-naphthol as a substitute for tar preparations in diseases of the skin has been stated by various observers to have been followed by toxic symptoms and irritation of the skin. In order to test the correctness of these statements, experiments have been made on rabbits and human beings by Dr. Shoemaker, and he reports (*Boston Med. and Surg. Journ.*, Nov. 8, p. 442) that subcutaneous injections, and even 2 and 4 grain pills every three hours, failed to produce any effect upon rabbits, except apparently to increase their appetite, whilst his assistants took increasing doses until they reached 5 grains twice daily, the principal results produced being a sensation of great warmth in the epigastric region after each dose, that passed away quickly, leaving a slight vertigo, buzzing in the ears and evidence of cerebral hyperæmia. Dr. Shoemaker points out that naphthol is apt to be contaminated by various bye-products, to which the pungent and disagreeable odour of the ordinary commercial naphthol is due; but if these be removed by passing a rapid current of steam through an aqueous solution it can be obtained in silvery crystalline scales and quite inodorous. In this condition, he says, it is a disinfectant and antiseptic of great value, superior in this respect to carbolic acid, and so far as his experience goes, never exercising any dangerous influence upon the human organism.

M. Guérin proposes to use crotonol, the vesicating principle of croton oil, in the preparation of blistering plasters, which he says are very active and are free from the inconvenience sometimes attending those having a basis of cantharidin (*Répertoire*, xi., 534). The crotonol can be obtained sufficiently pure for this purpose by shaking together in a flask equal parts of croton oil and 90 per cent. alcohol, and allowing the mixture to stand, when it separates into two layers. The alcoholic layer, which contains all the active principle, is then removed and heated in a water-bath until all the spirit is driven off, leaving an oily liquid a little more viscous than croton oil. A piece of linen of the size required is attached to diachylon plaster by simple pressure of the hand, and upon this sufficient crotonol is poured to completely saturate it.

Dr. H. L. Snow, in a note in the *British Medical Journal* (December 8, p. 1125), directs attention to the value of St. John's wort (*Hypericum*) in the prevention and cure of bedsores. The preparation used by him is described as a compound oil of hypericum, but he gives a recipe for what may be termed a simple oil, as follows:—Fill a bottle half full with the flowers of St. John's wort; olive oil is then to be added, and the bottle is to stand in the sunshine for a few days till the oil becomes of a deep red colour; it is then fit for use. The oil is brushed over the sore two or three times daily with a feather. It is unfortunate that Dr. Snow has omitted to say what species of *Hypericum* should be used, since the name "St. John's wort" and *Hypericum* are both used in a general sense. It would be desirable also to know whether he intends the recipe to be used as a substitute for the compound oil.

In the *Lancet* (Dec. 1, p. 946), Dr. A. H. Baines calls attention to the value of nitrite of sodium in cases of epilepsy not amenable to bromides, but reiterates the caution as to the necessity of giving the salt in doses of not more than 2 or 3 grains, and of obtaining it pure.

Hyposulphite of sodium is mentioned by a correspondent of the *British Medical Journal* (Dec. 22, p. 1268) as an excellent disinfectant for destroying the horrible odour of carcinoma uteri. The salt is used in solution of the strength of 1 lb. to 1 pint of water.

Dr. Kennedy, in the *Philadelphia Medical Reporter* (Nov. 24), recommends the following method of administering salicylate of sodium, as being more pleasant than the usual form. ℞. Sodæ bicarb. ℥ij; acid. salicylic. ℥iij; glycerinæ, aquæ āā ℥ij. A teaspoonful every four hours. The glycerine prevents the too rapid evolution of the carbonic acid, and helps to keep the salicylate in suspension (*Med. Times and Gazette*, Dec. 22, p. 722).

Dr. T. J. Hudson directs attention in the *Lancet* (December 22, p. 1081) to the comparative value of the bromides and iodides of potassium and sodium. He considers that the sodium bromide is less liable to produce depression, dyspepsia, or acidity, while the taste also is less objectionable. It constipates rather than the reverse, and has greater tonic action than the potassium salt, but is contra-indicated when there is much phosphate in the urine. In whooping cough the potassium bromide is, however, more effectual than the sodium salt. In renal disease, rectal cancer, or other cases in which opium is inadmissible or injurious, the sodium salt answers best, and in all cases in which the action of the haloid element is desirable the sodium salts are to be preferred.

Not long ago the use of the burdock in medicine as an alterative in skin diseases was pointed out in these columns, and now it is stated (*Garden*, Dec. 22, p. 545) that the root is being introduced in France as a vegetable, under the auspices of the Acclimatization Society. It is said to resemble salsafy in flavour, and as an antiscorbutic vegetable may possibly be of use as a diet on sea voyages. The root of *Canna edulis*, the tous-les-mois plant or capucho, the starch of which is well known to microscopists as one of the largest kinds, has been pronounced when cultivated in France to be worthy of taking rank with the vegetables commonly grown in gardens at the present time. The 500 franc prize for the introduction of an esculent which can be used as human food has been awarded to M. Paillieux for this root.

Dr. W. G. Balfour, of Bombay, has announced the discovery in the blood of the banela fish, commonly known as Bombay ducks, of a bacterial organism resembling those which Dr. Koch found in the intestines of cholera patients in Egypt. Dr. Balfour had lately pointed out that the consumption of certain kinds of fish at particular periods of the year seemed to play a part in the production of cholera (*Lancet*, Dec. 15, p. 1058).

In a communication to the *Lancet* (Dec. 8, p. 984), Mr. Lawrence puts forward the theory that typhoid fever is capable of being set up *de novo* by bovine evacuations. In support of it he cites a number of cases that came under his observation while practising medicine in South Africa, in which, although the sparse population of the country was favourable to the tracing of infection, no connection with a previously existing case of typhoid could be detected, whilst there was always evidence of the access of cattle manure to the drinking water. In no case was he able to ascribe the disease to horse manure or to sheep manure, the latter of which, at the large sheep farms of the Boers, is said to lie in enormous quantities close by their dwelling houses. It certainly is a curious fact, as pointed out by Mr. Lawrence, that many typhoid epidemics of which the history has been traced in this country have originated from dairies, although this has hitherto usually been attributed to the great susceptibility of milk to contract contamination.

A case of poisoning by the berries of *Bryonia dioica* is mentioned in the *British Medical Journal* (Dec. 1, p. 1067), in which the patient, a child four years of age, recovered after the use of an emetic of 20 grains of ipecacuanha and 10 grains of sulphate of zinc, with a warm poultice over the abdomen and a dose of senna tea. The subsequent feverishness was met with salines.

A case of poisoning by three drachms of aconite liniment is recorded in the same journal, in which the patient, aged about sixty, died in less than two hours. In this case a hot poultice over the epigastrium proved useful; but medical aid was probably called in too late, as no mention is made of apomorphia being used, or of the other remedies mentioned in Murrell's little work 'On what to do in Cases of Poisoning.'

Mr. A. Nesbitt in the *Gardeners' Chronicle* (p. 763, Dec. 15) queries the oft-repeated assertion that honey made from the flowers of *Rhododendron ponticum* is poisonous, and even that the plant itself is so. He says that he has observed lambs eating a small quantity of the leaves either of *R. ponticum* or hybrids of that plant and no bad result followed. He suggests that it is possible that as the flower of the oleander is more like a rose than the rhododendron, it is probable that the former was the plant from which the honey was obtained which poisoned Xenophon's soldiers, the oleander being well known to be poisonous.

The Rev. C. Woolley Dod, in p. 793 of the same journal, contributes an interesting note which throws some light upon this point. He remarks that there were apparently two kinds of poisonous honey met with in Pontus, one found near Heraclea and the other near Trebizond, the former being attributed by Pliny to a plant called "ægolethon" or goat's bane, the other to a plant which both he and Dioscorides called "rhododendron;" but they also used the name "nerium" for it. The latter Sibthorp has identified as *Nerium oleander*. Mr. Dod can find no direct evidence that *Rhododendron ponticum* is poisonous; but *Azalea pontica*, which occurs in profusion near Trebizond, about ten miles from the coast, he believes to possess poisonous properties similar to those attributed to *Kalmia latifolia*. It is a noteworthy fact, if correct, that no species of *Rhododendron* is known to be poisonous, while members of the other Ericaceous genera, *Azalea*, *Kalmia* and *Andromeda*, possess poisonous properties. M. Peysonnell, in a treatise published in Paris, in 1787, mentions among the annual exports from Taman, on the east side of the Sea of Azov, 500 quintals (about 25 tons) of honey collected in Abaza, a region on the north-east coast of the Black Sea, extending up the west slope of the Caucasus. This honey was called mad honey (miel-fol), and its use was for mixing with intoxicating drinks to increase their effects. It is remarkable that Pliny uses the same word "mad honey" for the poisonous honey of Pontus.

It has generally been supposed that the pretty little microscopic alga, *Volvox globator*, is a hollow sphere. Mr. Levick, however, has demonstrated that this is not the case (*Journ. Roy. Micr. Soc.*, December, p. 889), but that the alga consists of a skin containing matter apparently of a gelatinous consistence, which retains its spherical shape when the outer skin is stripped off, the skin collapsing when empty. The gelatinous contents are, however, so exceedingly transparent that they can only be seen in a coloured fluid. If a gathering of volvox be strained and placed in water containing carmine or coloured matter, the carmine can be seen adhering to any one of the spheres which has part of the surface removed. Sections have also been cut when the plant is frozen, which, when thawed, retain a sufficient density to support particles of carmine, dirt, or other solid matter.

Herr J. M. Hetlinger has investigated the electrical phenomena attending the germination of seeds of *Vicia*, *Faba*, *Zea Mays* and *Biota orientalis* (*Journ. Roy. Micr. Soc.*, Dec., p. 867), and finds that in these plants, in all stages of development, from the time of the protrusion of the radicle through the testa to the earliest appearance of the first foliage leaves, the galvanometer indicated a current from the cotyledons to the radicle, caused by the electro-negative condition of the latter and the electro-positive condition of the former. Every point of the root of the secondary roots, and of the first foliage leaves, and especially of the tigellum, was electro-negative in relation to the cotyledons, but with decreasing intensity the nearer to them. This line of investigation seems to be one which might possibly be turned to account in gaining a further insight into the direction followed by the sap in different plants and of some of the chemical and vital processes of plant life.

The *Journal of Botany* for December records the discovery of *Lobelia urens* in Cornwall, between Lostwithiel and St. Veep, but speaks of the station near Axminster as being the only Devon one. There is, however, very good authority for stating that it grows also in North Devon, where it was found by Dr. Wainwright. It is fortunate that the plant has a perennial root or it would speedily be destroyed in the few places where it is indigenous, from the rapacity of collectors, who have been seen to take it away in one case by the basketful and in another by hundreds of specimens. Provided that the root is not pulled up, however, the "locality" will not be easily destroyed. An illustration of all of the new *Naias* (*N. marina*) is given in the same number of the *Journal of Botany*. Dr. Hance also describes a new podophyllum, *P. versipelle*, found near Canton, so that, with the Formosan one recently described, there are now four species of the genus—*P. peltatum*, *P. Emodi*, *P. pleianthum* and *P. versipelle*. *P. versipelle*, like *P. pleianthum*, has purplish flowers, but in the former the leaves are opposite and the flowers on the axil. The new species is said to vary remarkably in the outline of the leaf, from a square parallelogram, triangle or pentagon to a circle, and would, therefore, form an interesting addition to our Botanical Gardens as a morphological curiosity. The finding of two species in the extreme east of Asia illustrates the relationship which exists between the Chinese flora and that of the United States; but it is a curious fact that the Asiatic species have only a single row of stamens. As in *P. Emodi*, the new plant has a prolongation above the lower leaf, which Dr. Hance regards as a continuation of the aerial stem, the petiole of the upper leaf arising only just above the insertion of the flower or flowers.

Within the present month, too, another new British plant, *Carex trinervis*, has been detected by Mr. Arthur Bennett in the Herbarium of Mr. H. G. Glasspoole, where it has lain *perdu* for fifteen years. The specimen was collected near Yarmouth. The numerous recent discoveries in this side of England point to the conclusion that a comparison of the flora of our eastern counties with that of the opposite coast of Holland might lead to the detection of other species that might be expected to occur.

THE SOLUBILITY OF CALCIC HYDRATE IN WATER AT DIFFERENT TEMPERATURES.*

BY THOMAS MABEN.

In the course of an able paper on "Lime Water: its Preparation, Preservation and Estimation," read some time ago by Mr. Abraham, of Liverpool, and subsequently published,† the author stated that he had found a difficulty in maintaining his lime water at the proper strength. On investigating the cause of this he was led to the conclusion that the difference was due to increase of temperature, and he indicated that the solubility of calcic hydrate fell from 0·56 grain CaO per fluid ounce at 60° F. to something like 0·5 grain at 70° F.

Having had occasion in July last to give a few notes (which were afterwards published in an extended form‡), on the same subject before a local association, I undertook at that time an investigation as to the effect of temperature on solubility, and though my experiments were confirmatory of Mr. Abraham's to a certain extent, the results did not show such a marked difference as his had done. I have recently repeated these experiments with more care than before, and now bring the results before you in the hope that they may prove of some interest.

I have been much surprised, in looking into various authorities, to find that great differences of opinion prevail regarding the solubility of calcic hydrate. A few of these may be noted. At 15° C. calcic hydrate is held in solution to the extent of 1 part CaO in 781 parts water, according to Squire; 780 (Miller and Bineau); 778 (Dalton); 776 (Paris Codex); 764 (Hager): 750 (United States Pharmacopœia); 730 (Wittstein); 500 (Ure), and 450 (Davy). At 100° C. 1 part is dissolved in 1560 water, according to Miller; 1500 (Bineau); 1350 (Wittstein); 1305 (Hager); 1300 (United States Pharmacopœia), and 1270 (Dalton).

According to the German Pharmacopœia *aqua calcaria* should contain calcic hydrate equal to from 0·43 to 0·49 gr. CaO per fluid ounce, the United States Pharmacopœia gives the amount in solution as about $\frac{1}{2}$ grain, while the British Pharmacopœia requires *liq. calcis* to contain ·56 gr., *i.e.*, to be as nearly as possible a saturated solution.

According to Storer, Dalton disputes the correctness of the statements of observers who say that water takes up $\frac{1}{400}$ or $\frac{1}{450}$ its weight of lime, the fact being, he says, that few have tried the experiment with due care.

In estimating the strength of solutions of calcic hydrate it is of the utmost importance that we should ascertain correctly the temperature at which the solutions pass through the filter. This is a matter of considerable difficulty. I have found that different methods give quite different results, and there is not the slightest doubt, in my opinion, that had the authorities quoted carefully followed an uniform system their results would have been much more in accord than they are. It is sufficiently obvious that out of the eight or nine different solubilities quoted not more than one can be absolutely correct, and while the question is not one of crucial importance it would be extremely interesting if by some means or another the real figure could be arrived at.

In the experiments which form the basis of this communication, I adopted the following method, it having been found to give the most constant results.

For the lowest temperature I placed a glass beaker containing calcic hydrate and distilled water in a freezing mixture till the thermometer fell to 0° C., and ice began to form. The liquid was then filtered, zero being maintained by placing the funnel also in a freezing mixture. The temperatures from 5° C. to 15° C. present no special difficulty, as they are easily obtained by adding hot or cold water to the beaker till the required point is reached and filtering in the usual way. Comparatively little variation takes place when the surrounding atmosphere indicates from 10° C. to 12° C. From 15° C. to 80° C. I made use of the water-bath. A flask containing lime and water was placed in the bath, and as soon as the contents reached the required temperature, the mixture was filtered through a funnel placed in the ordinary funnel space in the bath. The water surrounding the funnel, being always at the same temperature as that surrounding the flask, it was hardly possible for any variation to take place, but in order to ensure accuracy the thermometer was used in the funnel as well as in the flask. For the temperatures above 80° C. the solutions were heated over the naked flame and passed through a funnel kept in boiling water. It is exceedingly difficult, unless with special appliances, to filter at the boiling point, and I had to be content with what I have described. Strictly speaking, the maximum point reached would be from 98° to 99 C.

For the sake of convenience quantities by volume were taken, a small graduated flask being employed as a measure.

The amount of lime in solution was ascertained volumetrically, decinormal nitric acid being used. This acid is preferable to oxalic, as calcic nitrate being soluble in water, there is no danger of the exact point of neutrality being obscured by the presence of a precipitate.

Calcic oxide, perfectly free from all impurities, was made use of, after having been slaked with distilled water. Incidentally, I may remark that the heat generated in "slaking" the lime rose to the very high point of 205° C.

The results which were arrived at have been tabulated in three ways for the sake of convenience, and are appended. The figures are in each case calculated from the mean of three titrations, but where thought necessary corroborative results have been obtained by additional experiments.

It will be observed that the solubilities are expressed in terms of calcic oxide. I express them so, in accordance with custom, although it is apparent that the calcium exists in solution as hydrate and not as oxide.

I am unwilling to close this note without a few words as to its practical bearing upon the *liquor calcis* of the British Pharmacopœia. Repeated proceedings have been instituted against druggists for the sale of defective lime water, and cases have been reported where the strength was as low as 0·1, 0·2 and 0·3 gr. CaO per fluid ounce. Several hypotheses might be started to account for this state of things, and I shall briefly allude to one or two of these.

* Read at a Meeting of the North British Branch of the Pharmaceutical Society, December 19.

† *Pharm. Journal*, [3], xiii., p. 433.

‡ *Chemist and Druggist*, 1883, p. 390.

In the first place, it is obvious that the variations of temperature which naturally occur really exercise comparatively little influence on the strength of lime water, for it can rarely happen that the temperature of a shop will rise above 32° C. (90° F.), and yet at that point, water holds in solution about 0.5 gr. CaO per fluid ounce.

Neither can we account for these faulty waters on the hypothesis that undistilled water had been used in their preparation, unless, indeed, the water had been altogether exceptional in permanent hardness. I have found that a water containing about 10 grains of total solids per gallon gives lime water of full strength. At the same time this does not alter the fact that only distilled water should be employed in preparing *liquor calcis*.

Other two hypotheses remain, either of which would furnish a sufficient cause for even the weakest lime water. One is that the calcic hydrate, not having been properly stored, had almost entirely changed its constitution and become carbonate; the other, that the solution, after decantation or filtration, had been so badly kept that the lime originally present had all or nearly all been precipitated. It is a well-known fact, and one which is daily made use of by the agriculturist in the application of lime to the soil, that if burnt lime be exposed to the atmosphere even for a very short time, it passes over into the milder form of carbonate. The same reaction, of course, takes place on the shop shelves, and if slaked lime is not kept in an air-tight vessel, it necessarily follows that it will deteriorate, owing to the absorption of CO_2. If, forgetting this, any pharmacist has been careless in storing the slaked lime, it need not be wondered at if his lime water is weak.

I have found that lime water can be made of full strength with calcic hydrate, mixed with 15 per cent. of carbonate; with equal parts of hydrate and carbonate I obtained 0·5 gr. CaO per fluid ounce; with 25 per cent. hydrate and 75 carbonate, 0·4 grain; and with 10 per cent. hydrate and 90 carbonate, the amount dissolved was only 0·1 grain.

It is stated in almost every text-book that calcic carbonate is insoluble in water, and if this is so, these results are to say the least very singular. I have been able, however, to find several authorities who differ from the popular belief. Among others, Thorpe* states that a litre of water dissolves 0·1 gram $CaCO_3$, that is in the proportion of 10,000 to 1. My own experiments go to prove that 40,000 to 1 is nearer the mark, but whatever the solubility is it is quite appreciable, and the alkalinity can readily be estimated.

The U.S. Pharmacopœia states that "the alkaline reaction of the liquid entirely disappears after it has been saturated with carbonic acid gas, and the excess of the latter has been expelled by boiling (abs. of alkalies or their carbonates)." This, however, is not so; the liquid after boiling is still alkaline, though of course not to any large extent, and the test as it stands is therefore worthless.

The other hypothesis is similar in principle to that just explained. If after filtration, the lime water is kept in vessels of too large a capacity, or in unstoppered bottles, calcic carbonate is rapidly deposited. Even when most carefully preserved, this takes place to a certain extent, the coating of carbonate inside the shop bottles being a familiar sight to all of us. This is of itself quite sufficient to account for occasional inferior specimens, and it will be remembered was the defence urged at a recent trial; but if there is reason to suspect that the lime water is habitually weak, the explanation would probably be found in the fact that the stock of lime was for the most part in the form of carbonate.

It is difficult to understand why the presence of carbonate should prevent the solution of the hydrate when the latter is present in sufficient quantity to saturate the water, but I have repeatedly proved that it does so, whatever be the explanation of the fact.

* 'Inorganic Chemistry,' vol. i., p. 107.

SOLUBILITY OF CALCIC HYDRATE AT DIFFERENT TEMPERATURES.

Temperature. Degrees C.	Expressed in grains CaO per fluid ounce.	Expressed as 1 part CaO in parts water.	Expressed as parts CaO in 100 parts water.
0	·576	759	·131
5	·572	764	·130
10	·568	770	·129
15	·561	779	·128
20	·553	791	·126
25	·526	831	·120
30	·507	862	·116
35	·481	909	·109
40	·469	932	·107
45	·444	985	·101
50	·429	1019	·098
55	·396	1104	·09
60	·385	1136	·088
65	·362	1208	·082
70	·354	1235	·08
75	·333	1313	·076
80	·321	1362	·073
85	·315	1388	·072
90	·277	1579	·063
95	·265	1650	·06
99	·265	1650	·06

HIPPURATE OF SODA.*

BY PETER BOA.

At our last meeting there was exhibited a specimen of hippurate of soda. This salt is perhaps deserving of more than the incidental notice which it then received, on account of the recent suggestion of Dr. Garrod to employ the alkaline hippurates in diseases arising from excess of uric acid in the system. In the course of his experiments he made the observation that hippuric acid, when allowed to remain in contact with uric acid, caused the disappearance of the latter.

It may be noted that there are three forms in which nitrogenized waste is eliminated from the system by the kidneys, viz.:—as urea, uric acid and hippuric acid. Of these uric acid is the least soluble. It is practically insoluble in water, and the salts which it forms are but slightly soluble. On account of this characteristic it is, although forming only a very small part of the excreted waste, frequently the cause of disease, owing to its liability to form concretions in the kidneys, giving rise to gravel and calculus, and in the form of urate of sodium it may deposit in certain tissues, and give rise to gouty and rheumatic symptoms.

* Read at a Meeting of the North British Branch of the Pharmaceutical Society, December 19.

In herbivorous animals the renal excretions rarely contain uric acid, but hippuric acid is always present. Uric acid is probably formed at one stage, but the presence of hippuric acid in considerable quantity effects its decomposition. Hippuric acid forms salts which are extremely soluble.

To approximate, therefore, the excretions from the kidneys of man to those of the herbivora, is to make an important step towards the prevention or removal, as the case may be, of the cause of diseases which arise from the defective elimination of uric acid. This may be attained by the employment of such a salt as hippurate of soda.

Dr. Garrod says: "There is no doubt that if hippurate of soda be added to a blood serum which shows the presence of a urate, the latter is soon removed from it."

I make these preliminary remarks merely to show on what grounds the introduction of this remedy is based. In view of the salt coming into general use, I have made a number of experiments in regard to its behaviour towards other substances with which it might be administered in combination.

There are only two forms in which we shall likely be called upon to dispense it, namely, in powders and mixtures, and in regard to these only have I made experiments. Avoiding details, I shall summarize the results which seem worth recording.

(1) *Powders.*—The hippurate of soda itself, dispensed in powder form, keeps quite well in paper. Combinations of the salt with lithia carbonate and citrate and bicarbonate of potash and soda, put up in powders in the usual way and kept for a fortnight, were found on examination to be in as good condition as when prepared.

(2) *Mixtures.*—Like all alkaline salts the taste of hippurate of soda is disagreeably saline. I have tried a number of combinations with the object of rendering its administration as pleasant as possible, and the results may be briefly stated.

Chloroform water or spirit of chloroform seems to make it more disagreeable, rendering it almost nauseous.

Infusion of calumba disguises the saline taste, and where the bitter is not an objection, affords an eligible vehicle.

The most agreeable mixtures, however, are obtained by employing syrup and peppermint water or glycerine and cinnamon water.

The following examples may suffice:—

(1)	℞ Sodæ hippurat.	gr. 80
	Lithiæ carb.	gr. 24
	Glycerin	ℨiv.
	Aq. cinnam. . . . . ad	℥viij.
M.	Sig. One-eighth part for a dose.	

(2)	℞ Sodæ hippur.	ℨij
	Potass. citrat.	ℨiij
	Syrupi	℥vj
	Aq. menth. pip. . . . . . . ad	℥vj
M.	Sig. Tablespoonful for a dose.	

The addition of an alkaline carbonate or citrate as given in the foregoing is desirable, so as to imitate the condition of the renal excretion of the herbivora, which is alkaline, that of man being usually acid.

The salt is very soluble. Fifty grains dissolve in thirty minims of water, forming a syrupy liquid. The dose may be from 10 to 15 grains.

THE PREPARATION OF QUASSIIN.*

BY ADRIAN AND MOREAUX.

Quassiin, the active principle of *Quassia amara* or Surinam wood, has long been presented in a more or less impure extractive form. The authors have studied the different published methods of extraction and have arrived at the conclusion that some of these methods give but a defective product, while the others, though producing purer quassiin, remove but a small portion of the bitter principle contained in the wood.

After quoting the methods for extraction given by Soubeiran, Pelouze, Wurtz, Wiggers and Christensen, the authors state that by the following process, which is their own, a purer and more abundant product is obtained.

Very sound wood reduced to thin shavings is exhausted by the aid of boiling distilled water, either by displacement or by decoction, carbonate of potash being added to the extent of 5 grams per kilogram of quassia. The liquor is then concentrated by evaporation, first by the open fire, afterwards in a water-bath, to the consistence of a soft extract; a mean of 60 grams per kilogram of quassia being obtained. The extract is afterwards suspended in hot 90° alcohol, and after standing a few moments the supernatant alcohol is decanted; the process being repeated a second and third time, so as to thoroughly exhaust the extract. The alcoholic liquor is allowed to stand twenty-four hours, during which it deposits extractive matter and salts dissolved by the hot alcohol; the liquid should then be decanted, and sulphuric acid diluted with ten times its weight of 90° alcohol added until a precipitate is thrown down, from 2 to 2½ grams being necessary for each kilogram of quassia. The liquor is then filtered, milk of lime added in the proportion of 12 to 15 grams per kilogram of wood (or 4 to 5 grams of caustic lime), and after some hours' contact, it is passed through muslin and the deposit washed with alcohol and pressed, as it is very spongy and contains much alcoholic liquor.

The liquor being alkaline after the treatment with lime it is neutralized by a current of carbonic acid, and then again filtered. Thus prepared, the liquor has a light amber tint. It now remains only to distil the alcohol and to dry the residue from the distillation. Each kilogram of quassia yields by this process about 8 grams of a friable and easily pulverized product, which is the amorphous quassiin of Adrian.

If, instead of amorphous, it be desired to obtain crystallized quassiin, the distillation should be stayed while there yet remains a small quantity of alcohol in the product, which is then poured boiling upon a moistened filter to separate the resin. This filter should be so placed that the liquor may be received in a porcelain capsule. The remainder of the alcohol is then evaporated by heating to 80° C., and as the alcohol volatilizes, the quassiin crystallizes out and is deposited. As soon as the liquor contains no more alcohol, it is withdrawn from the fire; when in a few minutes and before the liquor has quite cooled it forms a crystalline mass. When quite cold, the mother liquor is decanted and the crystals are washed several times with distilled water. The quassiin thus obtained is not quite pure; it still contains some resin and uncrystallizable quassiin. To purify it, it is dried, and then dissolved by heating it in twice its weight of 95° alcohol. It is then placed to crystallize in a funnel with a very short neck closed by a cork stopper; in cooling, the quassiin crystallizes, and after ten or twelve hours, forms a mass. The stopper is then removed and the alcohol which has been used in crystallizing is displaced by 90° or absolute alcohol, in order to wash the quassiin. As the crystallizing liquor draining away is replaced by fresh alcohol, the coloured quassiin is seen to become white; a second crystallization suffices

* From the *Rép. de Pharm.*, n. s., vol. xi., pp. 246—50, (Juin, 1883).

to render it very pure; the result is from $1\frac{1}{4}$ to $1\frac{1}{2}$ gram per kilogram of quassia.

The mother liquor and the wash waters of the first crystallization retain a considerable quantity of quassiin, which it is difficult to entirely extract. A large proportion may be obtained by shaking these liquors several times with chloroform, which dissolves the quassiin and separates very easily from the aqueous liquor. The chloroform is distilled off, and in this way the non-crystallizable quassiin is obtained, it being deposited from the alcoholic solution as a granular resinoid substance, which is very easily softened by heat. Its bitterness is nearly equal to that of the crystallized quassiin. Repeated treatments with chloroform have failed to remove from the aqueous solution the whole of this quassiin, which seems to be combined with mineral salts that it still contains.

The alcohol which has been used in the crystallization, as well as that used in the washing, contains also in solution a little quassiin both crystallizable and uncrystallizable, which may be obtained by the same process as above described.

Résumé.

	Crystallizable quassiin.	Uncrystallizable quassiin.	Mineral salts.	Resin and other organic matters.
Viscous brown amorphous quassiin in 100 parts contains	00 to 00	12 to 15	35 to 40	45 to 50
Yellow amorphous quassiin in powder contains in 100 parts . . .	18 to 20	18 to 20	25 to 30	30 to 35

In brown quassiin, potassium salts predominate.

In yellow quassiin, calcium salts.

Crystallized quassiin is white, light, very soluble in chloroform, soluble in about 90 parts of cold absolute alcohol, in 35 to 40 of 80° alcohol, scarcely soluble in ether, and soluble in about 300 parts of hot water, from which it recrystallizes on cooling.

Uncrystallizable quassiin is very soluble in absolute alcohol, more soluble in ether than crystallized quassiin, and less soluble in water.

BISMUTH SALICYLATE.*

BY L. WOLFF, M.D.

In a recent number of the *American Journal of Pharmacy* mention was made of this article as a new remedial substance, along with an interesting account of its use and some of its properties. The *New Remedies*, as well, had notes upon the subject in both the September and October numbers, giving therein, also, directions for its preparation, which, however, are not sufficient to obtain a pure salicylate, but only a mixture of the subnitrate and salicylate thereof.

Bismuth is well known to exist in combinations both as bismuthous and bismuthyl salts, the former on addition of water changing into the latter group. Weaker organic acids, however, will not enter into combination directly with so-called metallic bismuth, and we have to depend, therefore, for its preparation on double decomposition with other salicylates the bases of which have greater affinity for the acid radical of the bismuthous salt. The bismuthous salts being precipitated from their acid solutions by water, would in such decompositions give rise to the precipitation of considerable bismuthyl salts in addition to the salicylate so formed. Thus, as proposed in the September number of *New Remedies*, if an acid solution of bismuth nitrate be employed, a mixture of bismuthyl nitrate and salicylate with salicylic acid would inevitably result. If, as proposed in the same journal of October, an acid bismuthous chloride solution were used, a similar result with bismuthyl chloride would ensue. As bismuthyl carbonate cannot be decomposed by salicylic acid, a direct salicylate is thus impossible, though bismuth teroxide, if freshly prepared from bismuthyl nitrate, with solution of sodium or potassium hydrate, will combine with salicylic acid when boiled with a concentrated solution of the acid for some time.

The reaction is a direct one, and would be expressed as follows:—

$$Bi_2O_3 + 2\,C_7H_6O_3 = 2\,BiOC_7H_5O_3 + H_2O.$$

As in this process, however, there seems to be always more or less undecomposed bismuth teroxide present, it is safer to produce it by double decomposition, with proper measures preventing the formation of other bismuthyl salts than the one desired.

After experimentation to that end, I found that a glycerine solution of crystallized bismuthous nitrate bore dilution with 1 to 2 parts of water before precipitating the bismuthyl nitrate, and acting on this I made a concentrated solution of sodium salicylate, with which I decomposed the glycerine solution of crystallized bismuthous nitrate, obtaining thus a bismuthyl salicylate, sodium nitrate, free nitric acid, salicylic acid and water, which were removed with water, and the still adhering salicylic acid removed by washing with hot water and subsequently alcohol. The reaction occurring under these circumstances with the sodium salicylate, as given in the U.S. Pharmacopœia as $2\,NaC_7H_5O_3.H_2O$, would be expressed:—

$$Bi3NO_3.\,5\,H_2O + 2\,NaC_7H_5O_3.H_2O = BiOC_7H_5O_3 + 2\,NaNO_3 + C_7H_6O_3 + NO_3H + 5\,H_2O.$$

As the bismuthyl salicylate treated with a concentrated solution of sodium bicarbonate yielded bismuthyl carbonate and sodium salicylate, I inferred that bismuthyl nitrate would yield, also, on boiling with a concentrated solution of sodium salicylate, a bismuthyl salicylate, which I found to be the case, the reaction being as follows:—

$$2\,BiONO_3H_2O + 2\,NaC_7H_5O_3.H_2O = 2\,BiOC_7H_5O_3 + 2\,NaNO_3 + 3\,H_2O.$$

The precipitate, being well washed with hot water, presented the same appearance as by either of the previous methods, and when dried and combusted on the platinum foil grew dark brown, and burnt off to the greater part with evolving phenol vapours.

The salicylate of bismuth presents a slightly pinkish appearance and is of a granular consistence, which is not readily overcome to an impalpable powder in the mortar. Under the microscope it is easily distinguishable from the subnitrate by being of a distinct granular character, the granules of even size, reminding of the conidia of fungoids, while the former consists of uneven broken crystals.

In water, glycerin, alcohol and ether it seems insoluble while its solution in acids is probably due to its decomposition, and formation of bismuthous salts. Tests for its purity are the absence of acid reaction of water boiled with it (salicylic acid), its rapid combustion on platinum foil, with liberation of phenic odours, free from nitrous acid vapours, and lastly its distinct granular appearance without crystalline fragments under the microscope (bismuthyl nitrate).

If it proves what has been claimed for it, it will certainly be a most important addition to our store of remedial agents, but its slow demand amidst the vast material for its application where it could be certainly used with impunity leaves the latter question somewhat in doubt.

* Read before the Philadelphia College of Pharmacy. Reprinted from the *American Journal of Pharmacy*, November, 1883.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 29, 1883.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

THE BRITISH PHARMACEUTICAL CONFERENCE AND THE ENTERTAINMENT OF VISITORS AT ITS MEETINGS.

IT may seem inappropriate at this festival season to say anything that has even the appearance of limiting the exercise of hospitality, but the decision arrived at by the Executive of the British Pharmaceutical Conference last week, as recorded on another page, is so completely in accord with the course which has been repeatedly advocated in these columns that we feel pleasure in taking the earliest opportunity in giving it such endorsement as lies in our power. In the official statement of the objects of the Conference, "the encouragement of scientific research" takes priority of "the promotion of friendly intercourse amongst pharmacists," but we are by no means sure that this order represents the relative importance of these two objects so far as they are attainable by that body. For although there can be no doubt that a number of important researches have been initiated under the auspices of the Conference, there is no absolute reason why these should have been dependent upon the existence of such a stimulating influence, and possibly if the Conference had never been formed a large proportion of the valuable information that has been made known in papers read at its meetings would have seen the light in some other way, either by being brought before one of the societies in London or the provinces, or by being published directly in one of the technical journals. But we know of no other means by which the promotion of friendly intercourse between pharmacists can be effected so thoroughly as it is by the annual meetings of the British Pharmaceutical Conference in various parts of the country. It is for this reason that we have felt that any conditions that might tend to render these gatherings in the least degree burdensome to those taking part in them or to mar the prospect of their continuance should be most carefully avoided.

We are therefore pleased to learn that at the meeting of the Executive before referred to it was resolved that in future the expense of the luncheons which are usually provided on the days of meeting, and which are so popular among the members as a real convenience and as furnishing pleasant opportunities for social intercourse, shall be borne by those who partake of them. It was also resolved in the event of an excursion being organized in connection with any future meeting of the Conference the expense of conveyance shall be defrayed by those taking part in it. Now, without assuming in the slightest degree that the size of a town is, potentially or volentially, a measure of the hospitality of those who live in it, there is required but a small effort of the imagination to conceive of occasions when the existence of these resolutions will relieve the local organizers of the Conference meetings of a cause of much anxiety in respect to finances. At the same time in cases where funds are available the resolutions will impose hardly any restriction upon a proper desire to spend them, although it may be hoped that in all cases it will be understood to be the wish of the visitors that the hospitality should rather take the form of enabling them to make the most of their stay in a locality at a minimum of expense to any one. Nor in conceding to these terms need the resident members think that they are laid open to any imputation as to their generosity. The practice will be essentially in accord with that followed in connection with the two largest meetings of pharmacists on the continents of Europe and America,—those of the Deutsche Apotheker-Verein and the American Pharmaceutical Association. In the case of the former of these societies, the organization of the meetings, so far as relates to accommodation and excursions, is, we believe, undertaken by a local committee, as we presume it is intended to continue to be the case with the Conference, and a book containing a set of coupons is issued to each gentleman visitor at a fixed price, there being also usually a set of coupons for lady visitors at a lower price. In the United States a similar practice obtains, except that the fundamental arrangements for the entertainment of visitors are made and carried out by an "Entertainment Committee" nominated by the Association itself, the local members being left to supplement these or not as they may please. It will be apposite to mention that some little opposition having been manifested at Washington to this practice the subject was referred for consideration to a committee, which has since reported decidedly in favour of its continuance.

We take the opportunity, whilst writing upon the subject to refer to another reform that we hope one day to see accomplished, and that is the more complete separation of the meeting of the British Pharmaceutical Conference from that of the British Association. Originating, as the Conference did, on the occasion of the meeting of the British Association at Newcastle in 1863, it was only natural that for a time the young society should avail itself of any advantage which the gathering together in one place of many scientific men interested in the progress of pharmacy presented for holding its meetings. But the Conference is now strong enough to run alone, and ought no longer to lay itself open to the possibility of the sneer that it is merely a "side show" to the

Association. We know that there are still certain advantages to be derived from holding the two meetings about the same time and in the same town, not the least being that this plan best suits the convenience of persons who are members of both societies; but these advantages are probably more than counterbalanced by accompanying disadvantages, and we do not think the objections to an alteration are insuperable. As in the coming year the Conference will, for the second time in its history, break away from its sister Association, we hope the experience will be so satisfactory that its repetition may in succeeding years become the rule and not the exception.

At the recent meeting of the American Pharmaceutical Association, on the suggestion of Mr. J. W. Colcord, of Lynn, Massachusetts, a resolution was passed, asking the United States Congress to appropriate the sum of twenty-five thousand dollars to promote the introduction and cultivation of foreign medicinal plants in different parts of the Union. A similar resolution has since been adopted by the Massachusetts Pharmaceutical Association, and vigorous efforts are being made to secure the political support necessary for the passage of a Bill to that effect. In the meantime, we understand that Mr. Colcord has obtained a considerable quantity of seeds of *Rheum palmatum*, some of which he has distributed to various other persons interested in the subject, and some he has retained for his own experiments. The enormous range of climatic conditions comprised within the United States territory would offer many facilities for carrying out attempts at acclimatization on an extensive scale, and the experiments, if made, will be watched with great interest from this side of the Atlantic.

* * *

We see from the latest numbers received of the *Ceylon Observer* and the *Times of Ceylon* that Dr. Trimen has communicated to the public press copies of a letter that he had forwarded to us for publication, consisting of a reply to Mr. J. E. Howard's criticisms on points in the "Ledgeriana" controversy, to which reference has been made in our columns more than once. Dr. Trimen appears to have thought that a certain time having elapsed since the dispatch of the letter from Ceylon he might assume that it had already appeared in this Journal; but, in fact, the manuscript having been received by us simultaneously with the news of the death of Mr. Howard, it was thought advisable to delay its publication in order to give Dr. Trimen an opportunity of revising certain passages by sending him a proof.

* * *

The new Rules under the Patents Act of last session, relating to applications for and registration of patents and proceedings thereon, together with a list of fees and rules for appeal to the law officers, have just been issued. The rules appear to apply only to patents, so that we presume the existing regulations as to the registration of trade marks will continue in force, according to the provision made in the new Act, which comes into operation on the 1st of January.

* * *

An International Forestry Exhibition will be held at Edinburgh next year under the patronage of Her Majesty the Queen. Systematic collections of forest produce, specially illustrating the sources of supply and the method of manufacture in different provinces, will be exhibited, and are to be accompanied by reports. Prizes will be awarded, in the shape of diplomas, medals and money, to exhibitors of such collections; also for concise practical essays on various subjects connected with forestry, a list of which can be obtained from the Secretary, Mr. G. Cadell, 3, George IV. Bridge, Edinburgh. Among the subjects for essays may be noted two which are connected with pharmaceutical products, viz., On the Growth and Management of Eucalyptus Plantations and their Economic Uses, and On the Comparative Advantages of the various Methods of Producing and Harvesting Cinchona Bark, with Specimens. Reports and collections must be forwarded to the Secretary on or before June 14, 1884.

* * *

In a recent editorial article in the *Medical Times and Gazette*, on "The Place of Botany in the Curriculum," the belief is expressed that botany, instead of being as heretofore the landmark of materia medica, will rise to be one of the widest and most all-embracing subjects of the medical course. But in order for this to be the case, plants must be studied as illustrations of a special aspect of life, and the physical and physiological laws underlying the phenomena of plant nutrition, of tension of tissues, and the mechanics of growth, must be learned and understood. A knowledge of the life history and conditions of development of the various bacilli and other minute organisms, a comparison of the parasitic diseases of plants and animals and the conditions conducive to their development, and a knowledge of the abnormal growths of plants, are other subjects which will doubtless in the future crowd out a great deal of the systematic and morphological botany which has hitherto had a primary place in botanical lectures in medical schools. A practical acquaintance with the use of the microscope, section cutter, and of dyes for vegetable tissues will probably form a *sine quâ non* for the medical student of the future.

* * *

According to a return by Mr. Consul-General Ross, the quantity of Persian opium exported from the port of Bushire during the year 1882, was 4512 chests, of which rather over a thousand chests came to London and nearly the whole of the remainder went to Hong Kong. Another 2000 chests were shipped for China from Bunder Abbass.

* * *

We notice in a recent issue of the *Lancet* an appeal from Mr. J. Fayle, of Prospect Hill, Walthamstow, to old Guy's Hospital men who attended William Allen's lectures on chemistry and experimental philosophy to give him any assistance they can, in the shape of memoranda or reminiscences, in writing "a popular, and as far as possible original sketch of a man of whom England may be proud, but who is now little appreciated." As William Allen was the first President of the Pharmaceutical Society of Great Britain we may be excused for expressing a hope that Mr. Fayle may successfully carry out his intention and produce a book worthy of the subject.

* * *

The *American Druggist* states that the Chemical Laboratory of the John Hopkins University, which has just been opened, measures one hundred feet by fifty feet, and has three stories and a basement. It is under the charge of Professor Remsen.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

EVENING MEETING.

The second meeting of the present session was held in the Society's Rooms, 119A, George Street, Edinburgh, on Wednesday, December 19, at half-past eight o'clock. Mr. John Nesbit, President of the Branch, in the chair.

The minutes of the previous meeting having been read and confirmed, the Secretary to the Branch announced the following donations:—

To the Museum:—

Specimen of colocynth fruit.

From Mr. JAMES MACKENZIE.

Specimen of ol. rusci verum.

From Mr. THOMAS GREENISH.

Specimens of baycuru, guaco, tayuyu, jaborandi, pao pereira, cascara sagrada, *Euphorbia pilulifera*, *Berberis aquifolia*, buckeye bark, gum angico, yerba santa, corn silk and damiana.

From Dr. SYMES.

Mr. MacEwan, in calling attention to these specimens, said that several of them, though now in common use, had previously been unrepresented in the Branch Museum. The specimen of Russian birch tar oil, sent by Mr. Greenish, differed considerably from the commercial variety, a specimen of which was also on the table, and which he believed was prepared in Germany. The most marked points of difference were in the odour, the Russian being pleasanter than the German, and in the amount of volatile constituents. The Russian variety lost about 20 per cent. under the boiling point of water, while the German lost three times as much; the former had thus more body than the latter, and was quite suitable for currying, whereas other varieties which he had met with were not. There were other interesting features about the oils which could not be referred to briefly. Several of the drugs which Dr. Symes had sent had not previously been shown at the meetings, and of these the Brazilian drugs were worthy of note. Dr. Symes took a lively interest in the materia medica of Brazil, and much of the information regarding the specimens shown was the result of his investigations. Gum angico, known in Brazil as *Resin de Angico*, was obtained from *Acacia Angico*. It appeared from Dr. Symes's investigation that one-half of this gum was soluble in water, the other half being soluble on the addition of an alkali; probably a low percentage of ash might account for this sparing solubility. In Brazil a mucilage of the gum was used for pectoral affections. The specimen of pao pereira was the inner bark of *Geissospermum Vellosii*, an Apocynaceous plant, which, like many others of that order, was reputed to possess powerful febrifuge properties. Tayuyu, the root of *Trianosperma ficifolia*, would interest students, owing to its large spiral vessels, which could be seen with the naked eye. Medicinally the root was used in scrofulous affections. The large russet-brown root shown was a specimen of baycuru, which resembled somewhat a root official in the last United States Pharmacopœia and obtained from *Statice Caroliniana* (marsh rosemary). Mr. Holmes believed that baycuru was also obtained from a species of *Statice*, probably *Statice Brasiliensis*. Its distinctive characteristic appeared to be the ray of light-coloured vascular tissue situated towards the circumference; this ray was compact in the smaller roots, but in the larger was disintegrated, owing probably to more rapid growth of the surrounding tissue. In Brazil it was highly esteemed as a remedy for glandular swellings and sore throat, its medicinal properties being due, no doubt, to the variety of tannin which it contained. The other specimens he would be glad to describe after the meeting.

The President of the Branch moved a hearty vote of thanks to the donors, and remarked that it was of great importance to have an acquaintance with the various new remedies which are brought under the notice of the medical profession, and the Branch owed a debt to those gentlemen who had sent the interesting collection. He then called upon Mr. Maben to read a paper on—

THE SOLUBILITY OF CALCIC HYDRATE IN WATER AT DIFFERENT TEMPERATURES.

The paper is printed on p. 505, and gave rise to the following discussion:—

Mr. Dott, in moving a vote of thanks to the author of the paper, said that an eminent scientist had remarked that one could not open a text-book without finding a subject for investigation. The paper which had been read was an illustration of the truth of this statement, and he felt that those present were indebted to Mr. Maben for the interesting manner in which he had brought the results of his investigation before them. The solubilities stated were somewhat lower than his experience had led him to expect, and he had thought that something like 1 in 721 at normal temperatures represented a saturated solution. He had little to say regarding the method which Mr. Maben had adopted, but he might point out that before measuring at any given temperature the solution should be kept for some time at that temperature in order to ensure accuracy.

Mr. Stephenson seconded the motion and remarked that there was one source of weak lime water which had not been referred to. Some were in the habit of putting a quantity of lime into a jar and filling the jar with water from time to time until scarcely anything but chalk was left, the lime water being, consequently, much too weak. A fresh quantity of lime should be used each time according to the official process, and if anyone tasted the water before placing the bottle on the shelf, a fair indication of its value would be got.

The President heartily concurred with the remarks which had fallen from the previous speakers. He recollected that Mr. Abraham had attributed deficiency of lime in part to the presence of sodium chloride in the limestone used, and asked Mr. Maben if he had found this to be the case.

Mr. Maben said that he had only used pure calcium oxide in his experiments; these had been done at different times with similar results, and the figures given he had endeavoured to corroborate fully. His experience of the use of limestone was corroborative of Mr. Abraham's observation, and he mentioned that Mr. Abraham's recommendation to wash the lime before using it was a capital method for removing this source of weakness.

The President then called upon Dr. Macadam to communicate a report on—

SALICYLATE OF SODA.

In the course of his remarks, Dr. Macadam stated that he had recently had occasion to examine some "salicylate" of soda powders from which fatal results had arisen, and he thought that it would interest the meeting to know how he had gone about the investigation which he had made. After describing the preparation of salicylic acid from oil of wintergreen, salicin and carbolic acid, he stated its uses as a thereapeutic agent and preservative. It was now well known that many articles of food, such as milk and beer, were kept sweet by salicylic acid, and the French, alive to the importance of all such articles, had permitted its use in preserving wine. The quantity admitted in this case was something like 0·15 gram per litre. This quantity, though small, was quite capable of detection, and he proceeded to illustrate the delicate ferric chloride test, using a solution containing one grain per gallon. The detection of salicylic acid in milk was then shown, the lecturer explaining that dialysis was the best means of obtaining from milk a clear solution of the preservative; this could be done by placing over a beakerful of water a piece of parchment paper, which should dip into the liquid and should be secured with an indiarubber band. The milk is placed in the paper and after a short time, the contents of the beaker will be found to give a beautiful violet colour with perchloride of iron. The method was also illustrated with a small dialyser. After explaining dialysis, he concluded with an account of the examination of the salicylate of soda powders already referred to, which he found to contain 52 per cent. of muriate of morphia.

Mr. Mackenzie said that there could be but one opinion regarding the interesting manner in which Dr. Macadam had brought his subject before the meeting. The case which had been referred to was certainly a very painful one, and it was to be regretted that the origin of the mistake had not been traced. It was important that all connected wlth pharmacy should be able to apply such tests as Dr. Macadam had shown, and he had much pleasure in moving a vote of thanks to the lecturer.

Mr. Dott, in seconding the motion, said that he was surprised that the medical man did not taste the powders containing morphia; they were quite bitter, and this fact might have led him to suspect that death was not due to salicylate of soda. Reference had been made to the estimation of morphia by means of intensity of colour reactions; this he did not think reliable, and a standard solution of biniodide of mercury might be used with preference.

After a few words from Dr. Macadam, in which he stated that the morphia was estimated gravimetrically, the President called upon Mr. Boa to read a paper on—

Hippurate of Soda.

The paper is printed on p. 506.

On the motion of Mr. Maben, a vote of thanks was awarded, and a short discussion took place, in the course of which Mr. Boa stated that it seemed to be generally understood that carbonate of lithia is insoluble in water, but he found that 5 grains could be dissolved in an ounce of distilled water with the aid of a little heat. In reply to a remark from Mr. Mackenzie he said that he had not tried the effect of extract of liquorice in covering the taste of the hippurate, but he thought that it would give good results.

EXAMINATIONS IN LONDON.

Erratum.—Page 494, col. ii., last line, *for* "Shacklock, James Henry," *read* "Shacklock, James Harvey."

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fifth general meeting of the thirty-fifth session was held at the Royal Institution, on Thursday evening, December 6.

In the unavoidable absence of the President, Mr. Edward Davies, the chair was taken at the request of the meeting by Mr. Michael Conroy.

The minutes of the previous meeting were read and confirmed, and the following donations were announced:—'The Proceedings of the Liverpool Architectural Society,' from the Society; 'Annual Report of the Liverpool Geological Association,' from the Association; and the *Pharmaceutical Journal*, from the Society.

Mr. H. O. Dutton exhibited a specimen of ensilage taken from one of Lord Tollemache's silos. The ensilage had been taken from the silo about fourteen days previously, and was quite as damp and as good as on the day it was cut out. Lord Tollemache, Mr. Dutton said, used 2lb. of salt to the hundredweight of freshly mown grass when placed in the silo, and supposing only 14lbs. of the ensilage was given daily to each animal, this would be equivalent to about a quarter of a pound of salt per day. He thought such a quantity would very likely cause diarrhœa, if animals were regularly fed on it. Mr. Dutton mentioned that he had seen some of the ensilage given to three cows, and would testify to the readiness with which it was eaten by them. The question was whether it was necessary to use so much salt.

In reply to Mr. Conroy, Mr. Dutton said that the grass was cut early in the morning, and was carted with the dew upon it.

The thanks of the meeting were accorded to Mr. Dutton for his interesting communication.

A paper was then read, entitled—

Note on the Estimation of Fixed Oils and Fats with Special Reference to Milk.

BY A. C. ABRAHAM, F.C.S,

The plan generally followed for the estimation of fixed oils in such things as linseed meal has generally been maceration and percolation, or the latter alone with ether, benzol, or some similar solvent. Anyone who has followed either course will, I think, readily admit the troublesomeness of it and the great care involved in preventing loss, especially when dealing with small quantities. To obviate these difficulties, I adopted a year or two ago for linseed meal the following plan, which I have since used for other substances and which I believe to be more accurate as it certainly is more easy than those generally followed. The principle is simply that of macerating the substance to be estimated in the suitable solvent, taking half or a known proportion of the *total liquid resulting*, finding the amount of fat in it and calculating therefrom the amount in the whole.

To take linseed meal (or more correctly, crushed linseed, *i.e.*, the linseed crushed but not deprived of its oil) as an example. My procedure is as follows:—A tube is taken of about 1 inch in diameter and 14 inches in length, contracted at the neck and stoppered; in it is placed 100 grains of linseed meal and upon this is poured 2000 fluid grains of spirit of wine less such an amount as will approximately represent the volume of the oil contained in a genuine and fair quality sample of the meal. The tube is now shaken to enable the spirit to expel all the air from the meal and when this has taken place the tube is graduated at the point at which the liquid stands. It is now ready for use. When it is desired to estimate a sample, 100 grains of the meal are inserted and ether added until it reaches the mark; it is then stoppered or corked and occasionally shaken during a sufficient time, when, if any loss has taken place by evaporation, or the volume has been apparently diminished by the loss of air from the meal, it is made up to the original point, again shaken and set aside. When it has completely subsided, 1000 fluid grains of the clear supernatant liquid are removed with a pipette, evaporated and weighed as usual. By doubling the product so obtained, the amount of oil, together with such other matters contained in the meal as are soluble in ether, is arrived at.

It will be readily admitted, I think, that if the amount of matter soluble in ether were known before the estimation was commenced this process would be unexceptionable. I believe, however, that the error admitted by the want of this knowledge will upon consideration appear so trifling, even for an article containing so much oil as does linseed meal, as to be perfectly unimportant. Suppose, for instance, that the meal contains 20·2 per cent. of oil, etc., which we may assume to increase the bulk of the resulting solution to the extent of 20 fluid grs., now if no allowance at all were made for this the bulk of the solution would be 2020 fluid grs. instead of 2000 which is required. If only 1000 of this were taken, that portion would be less than the remainder by 20 fluid grs., *i.e.*, to say supposing the 1000 fluid grs. taken were found to contain 10 grs. of oil, the remaining portion would contain 10·2 grs., and by doubling the former amount we should get a result of 20 instead of 20·2 an error of one-hundredth of the product or ·2 per cent., which if considered important can be neutralized by an allowance at the end of the operation. Or, if thought preferable, 2000 fluid grs. of the solvent may be always used and an allowance made in proportion to the result found.

In this process it is assumed that all the solvent is capable of dissolving all of the matter to be dissolved and that none of the latter will remain in a fixed condition in or upon the tissues of the article containing it. Whether this assumption be absolutely true or not, I think it will be admitted that if it is not, no process of percolation is likely to obviate it. In regard to milk the case is somewhat different, because to follow the process it is essential to evaporate the milk with either hydrated sulphate of calcium or powdered glass; the latter perhaps preferable on theoretical grounds, but the former what I have generally myself used.

The details of the process as applied to milk are as follows:—

A 1000 gr. specific gravity bottle is filled with the milk, the weight taken which gives the specific gravity. This is emptied upon 250 grs. of powdered glass or hydrated sulphate of calcium, and the flask either weighed or rinsed out with a few drops of distilled water, although practically neither is necessary as the amount of milk adhering to the flask when once found will be practically constant for all samples (unless sour). The milk taken is to be evaporated to dryness with the glass and thoroughly powdered, when it is to be introduced into a tube; 2000 fluid grs. of ether added from a pipette, so as to avoid loss by evaporation; the tube stoppered, shaken occasionally during some hours, after which 1000 fluid grs. may be removed, dried and weighed. This must not simply be doubled, as an allowance must be made for the fat dissolved by adding to the weight found $\frac{1}{9}$ (the specific gravity of butter fat being about ·900), deducting this from 1000 and calculating the whole amount present by a simple proportion, thus—

Fat found, say	9
Add $\frac{1}{9}$	1
	10

∴ 990 fluid gr. of ether took up 9 grs. of fat, how much would 2000 take up?

$$990 : 2000 :: 9$$
$$11 \mid 200$$
$$18{\cdot}18 \quad \text{Total fat present.}$$

The difference between the amount which would be arrived at by simply doubling the weight found and that obtained as above will never amount to more than about ·005 per cent.

For this process of estimation it would be clearly much better, if possible, to extract the fat from the milk whilst still in a liquid condition, and if this could be done by simply boiling the milk down in a graduated tube, then adding the ether, making it up so that the ethereal solution should measure a convenient quantity, and drawing off half of this with a pipette, it would be much better; but I have not had time to try whether this can be done, although I believe it might.

There is another process which I have to mention, one which has been even less tried than the one I have named, for, although it has suggested itself to my mind some time, I have not tried it until within the last ten days. It is applicable to all emulsions, such as milk, and, as far as I have gone yet, may be described as follows:—

A piece of Parker's paper fibre lint, 4 inches by 2, is made into a roll, a piece of thin wire is passed through the centre, wound once or twice round the roll, and fixed into the stopper of a suitable weighing bottle in such a manner that the roll may be sufficiently far from the sides to enable it to be lifted in or out without any fear of touching the sides. The roll is then taken out of the bottle and dried in a water-oven with the bottle until its weight is constant, 5 c.c. of milk are then dropped upon it from a pipette, when the stopper with the roll attached is re-inserted in the bottle and the whole weighed. The stopper is then removed and with its attachment placed in a drying oven with the bottle and kept there until it ceases to lose weight.

The excess of weight over the original weight gives the total solids. The stopper and roll are now removed and placed in another similar bottle—preferably ground to fit the same stopper as the first—sufficient ether added so that the roll may be covered (about 50 c.c. is a convenient quantity) and allowed to macerate some hours; it is then transferred to another similar bottle, and again to a third, after which the fat will be found to have been entirely extracted.* It is now removed and again weighed as before; the loss is fat.

If desired the fat may be weighed directly by evaporation of the ethereal liquids, or the tubes in which they are contained may be graduated, the volume made up to the graduation, the liquid stirred with a pipette and half or a known proportion drawn off from each. The latter method I think in some respects preferable, as it does not involve the removal of the liquid from one vessel to another, which, if done, introduces an element of uncertainty, owing to the adhesion of a certain amount of the fluid to the vessel from which it is poured, and also involves the washing of the vessels to obviate the last-mentioned difficulty. It will be noticed that I have made no reference hitherto to the estimation of the ash, and this is because I have thought it impossible to expect anything like a small or possibly even a constant ash from an article not specially made for analytical purposes. I am not without hopes, however, that by means of washing with acids, even Parker's paper fibre lint may be so freed from ash as to enable the whole four determinations of total solids, solids not fat, fat, and ash to be made with very great accuracy from the one small sample of milk. The sugar may also be estimated by immersion in water, but great care is required to prevent portions of the lint from falling off.

If, however, this cannot be done I do not think that it renders valueless the whole process, because at the worst the ash can be easily estimated as hitherto; and, moreover, I do not see why a special preparation, such as mononitrocellulose, dinitrocellulose, or some other body which would be sufficiently absorbent and yet leave no ash on incineration, might not be found or specially made for the purpose. I have only made one estimation of milk by this process and this with rather unsuitable and improvised apparatus, but I subjoin the results, which seem clearly to show that it is capable with experience of producing very accurate results, and in some respects more accurate than the processes generally followed.

The estimation No. 1 was made, as far as total solids are concerned, in the ordinary manner, but the solids not fat were estimated by difference, which is by no means an accepted method. The conclusions that I would draw from the figures are that the total solids can be estimated with much greater accuracy than by the ordinary method and in shorter time; and that it is impossible to dry the fat completely at a temperature of 212°. Dr. James Bell, the principal of the Somerset House Laboratory, says in his recent work upon 'The Analysis and Adulteration of Foods,' according to the *Analyst*, in the first place, that the determination of total solids is a comparatively easy operation, but later on that it is difficult to get a constant weight for the total solids, and that, therefore, the items, solids not fat and fat *are generally more satisfactory*, which as I understand it, means that the total solids are *very difficult indeed* to obtain by direct estimation.

* It is important that the lint should not be too near the bottom, because the fatty solution which can be seen falling from it should have room to collect below.

The total solids in column No. 1 were dried until the weight appeared to be constant (using the quantity and apparatus recommended by Dr. Bell) at 212°, and yet they stand very much higher than those in column 2, which were estimated until of constant weight on the paper fibre lint.

Dr. Bell recommends the drying of the fat in a water-oven, and, therefore, presumably at 212°; and it will be seen that the results arrived at (see columns 1 and 3, which were both obtained by direct weighing), after drying at this temperature, very closely agree, but that the weight lost by immersion of the lint in ether is more than ·10 less. In other words the fat lost was ·11 less than the same fat when dried at 212°. This I think at least shows that 212° is *not* sufficient to dry the fat. I think that if I were a milkman I should be disposed very much to question a method of analysis which does not enable the analyst to rely upon his estimation of total solids, but compels him to fall back upon his weighing of solids, not fat and fat, both of which weights are arrived at after manipulation, which may entail a loss.

With regard to the drying of the fat I have not tried whether a temperature of 220° would enable an accurate weighing to be made, and with regard to the total solids, I do not think it would be right to apply so high a temperature, because we do not know exactly what effect it may have upon the constituents of milk.

	No. 1.	By difference. No. 2.	By direct weighing. No. 3.
Total solids	11·97	11·38	—
Solids not fat (by difference only)	8·95	8·48	—
Fat	3·02	2·90	3·01

In conclusion, I should say that in the one experiment which I have made, the time occupied was certainly rather long; but I believe that this was due to the fact that the roll was rather tight and an ordinary drying oven was used, whereas a tabular oven which would allow a constant and rapid circulation of air around and through the roll would probably have produced results comparable in point of time with those attained by other means.

Mr. H. O. Dutton, in proposing a vote of thanks to Mr. Abraham, said he found the results of analysis of samples of genuine milk very variable, and gave the subjoined analysis of three samples from three cows, the samples being all taken at the same time, and the cows having been fed for some days previously on the same kind and quantity of food exactly.

In 100 c.c. of the sample.

Sample.	Sp. gr.	No of grams of total solids.	No. of grams of fat.	No. of grams. of solids not fat.
1	1·0325	10·80	2·04	8·76
2	1·0270	12·74	4·59	8·15
3	1·0340	13·60	3·80	9·80

Mr. Dutton also showed how the quality of pure milk varies at different seasons of the year, and submitted the following table showing the quantity of cheese produced from 100 gallons of pure milk, at four different times in the year, taken from the daily record kept in the diary of the same farm.

Yield of milk in gallons.	Quantity of cheese weighed after six days from 100 galls. milk.	Date of making.
311	105·83 lb.	May 23
279	98·20 lb.	July 11
180	121 lb.	Sept. 24
150	132·33 lb.	Nov. 11

Showing that, while in summer, the cows produce more than twice as much milk, that milk is not nearly so rich in cheese as during the winter months, when fed upon artificial fodder. These facts, he thought, tended to prove how very easily a perfectly innocent dealer might get an evil reputation.

Dr. Symes, in seconding the vote of thanks to Mr. Abraham, said he considered the paper of much value, and the new method of estimation a marked improvement.

Mr. Conroy, thought the method of drying an ingenious one, and having put the motion from the chair, it was carried by acclamation.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, December 20. Dr. W. H. Perkin, F.R.S., President, in the chair.

The following gentlemen were declared by the Scrutators (Messrs. Meldola and Williams) duly elected Fellows of the Society:—Messrs. W. P. Bloxam, A. Cobb, G. C. Chambers, A. E. Ekins, F. P. Haviland, F. Keeling, W. H. R. Kerry, J. J. Pilley, M. Percy, J. Phillips, A. W. Rogers, W. J. Saint, G. Smith, A. Smithells.

The following certificates were read for the first time:—J. H. Burland, R. A. Bush, T. R. Duggan, G. W. Gibson, F. W. Harris, C. W. Sutton, F. W. Tompson, E. W. Voelcker.

The President then called on Mr. C. O'Sullivan to read a paper, entitled—

Researches on the Gums of the Arabin Group. Part I. Arabic Acid: its Composition and the Products of its Decomposition.—The author, wishing to compare arabic acid with other bodies with which he was working, looked up the literature of the subject, but found the results obtained by previous observers so irreconcilable that he was forced to examine this substance for himself. The present paper contains the first results of this examination. The author has mainly followed the method employed by Neubauer. The gum is dissolved in the smallest possible quantity of water, and the solution decanted from any insoluble matter; twice or three times as much hydrochloric acid as is sufficient to convert the bases into chlorides is added, and the arabic acid then precipitated by an excess of alcohol. The curdy precipitate is washed with alcohol and pressed; it is then dissolved in boiling water, cooled, and alcohol gradually added with constant stirring. The liquid becomes milky, but no precipitate forms; a few drops of hydrochloric acid are added, when a curdy precipitate is produced. By the careful addition of hydrochloric acid the body can be precipitated in several successive portions. The author obtained four such precipitates; each portion was redissolved and reprecipitated several times, dehydrated with absolute alcohol, pressed, and dried over sulphuric acid. Thus treated the bodies are white, friable, soluble in water, and free from ash. By an optical examination, and the analysis of their barium salts, the author proved that he was dealing with a homogeneous body, the optical activities ranging from $[\alpha]j - 25·7$ to $-27·0$, and the percentage of barium oxide from 5·90 to 6·07. It occurred to the author that a careful study of the action of sulphuric acid might throw some light on the nature and composition of arabic acid, and that this body should yield a sugar or sugars and a series of acids of gradually diminishing molecular weight; in fact, that it would behave after the manner of starch (*Chem. Soc. Journ.*, 1876, ii., 125). Five hundred grams of arabic acid $[\alpha]j - 27°$, which must be free from ash, were dissolved to 1500 c.c., and 40 grams of sulphuric acid in 150 c.c. of water added. The mixture was boiled for three hours, cooled and exactly neutralized with a hot solution of barium hydrate. The barium sulphate filtered off, the filtrate evaporated to 1000 c.c., and alcohol specific gravity ·83 added as long as a precipitate fell. This waxy precipitate was repeatedly dissolved in water, reprecipitated by alcohol to free it from sugar and dried over sulphuric acid. This white friable body when dried at 100° gave 14·57 BaO. The arabic acid molecule had, therefore, broken up. It remained to be proved whether the substance was homogeneous or not. It was dissolved in water and fractionally decomposed by successive additions of sulphuric acid, into three portions, A, B and C. A contained 14·27 per cent. BaO. B, 14·35 per cent. C, 15·46 per cent. Portion C was further separated into three: the 1st contained 15·27 BaO; 2nd 15·36 per cent.; 3rd 15·54 per cent.: it was, therefore, fairly homogeneous. A and B were mixed, and on fractionation it became evident that there were two salts, one containing 13·3 to 13·4 per cent. BaO, the other 15·5 per cent. BaO. The author then studies the further action of sulphuric acid on this 15·5 per cent. barium salt. Twenty grams were dissolved in water, and 2·5 c.c. of sulphuric acid previously diluted with water added, the mixture was digested for three hours at 100°; by neutralization and treatment as above a salt was obtained containing 18·5 per cent. BaO. This salt was submitted to combustion, it gave numbers indicating the formula $C_{23}H_{38}O_{22}BaO$; it is therefore not a carbohydrate, but differs from the carbohydrate $C_{24}H_{40}O_{20}$ by the subtraction of CH_2 and addition of O_2. The alcoholic solution from which this salt had been separated was freed from alcohol, the residue concentrated to a syrup, purified and allowed to crystallize, when a sugar of the class $C_6H_{12}O_6$ separated out; its optical activity was $[\alpha]j$ 79°–81° and copper reducing power $K = 81-82$. The salt containing 15·5 per cent. BaO was next dried and analysed; it gave a formula $C_{29}H_{48}O_{27}BaO$. The 18·5 per cent. BaO salt was doubtless, therefore, derived as follows:—

$$C_{29}H_{48}O_{27}BaO + H_2O = C_{23}H_{38}O_{22}BaO + \underset{\alpha\ \text{arabinose}}{C_6H_{12}O_6}$$

The 13·3 barium salt corresponds to the formula—$C_{35}H_{58}O_{32}BaO$, so that we have the series —

$$C_{23}H_{38}O_{22}BaO + C_6H_{10}O_5 = C_{29}H_{48}O_{27}BaO$$
$$C_{29}H_{48}O_{27}BaO + C_6H_{10}O_5 = C_{35}H_{58}O_{32}BaO$$

The high molecule being broken down with elimination of $C_6H_{10}O_5$, which is hydrated to a sugar of the $C_6H_{12}O_6$ class, it appeared probable that the arabic acid molecule was broken down in the same way and that its composition would be arrived at by adding such a multiple of $C_6H_{10}O_5$ to one of these barium salts as would give a compound containing the same quantity of BaO as barium arabate. To obtain further evidence of this disintegrating process 200 grams of pure arabic acid $[\alpha]j$—27° were dissolved in 300 c.c. of water, to which 10 grams of sulphuric acid were added and the whole was digested at 100° for one hour. The product was separated as before by fractional precipitation and eventually two salts obtained containing 11·35 per cent. BaO and 13·38 per cent. BaO. The latter was the salt already noticed $C_{35}H_{58}O_{32}BaO$. The 11·35 per cent. salt was analysed and gave a composition—$C_{41}H_{68}O_{37}BaO$

$$C_{41}H_{68}O_{37}BaO + H_2O = C_{35}H_{58}O_{32}BaO + C_6H_{12}O_6.$$

The free acid of this salt was also prepared; its analysis confirmed the above formula. At this point the author set to work to isolate the sugars which ought to be separated at the various steps of the disintegration of the molecule of arabic acid. Starting with the alcoholic solution from which the salt $C_{29}H_{48}O_{27}BaO$ had separated he succeeded in obtaining three sugars of the $C_6H_{12}O_6$ class, which he names β-arabinose $\alpha j = 111·1°$ K 110; γ-arabinose, $\alpha j = 91°$ K $= 99·4$—100; and δ-arabinose $\alpha j =$ 79°—81° K 81—82, and in proving the presence of α-arabinose with a greater optical activity than β-arabinose. The author then gives the results of six analyses of arabic acid; the numbers lead to the empirical formula $C_6H_{10}O_5$. Now a barium salt containing CHO in this ratio and at the same time 6 per cent. BaO should be $C_{90}H_{150}O_{75}BaO$, but such a constitution does not lead to the highest acid $C_{41}H_{68}O_{37}$ obtained in the decomposition products, thus $C_{41}H_{68}O_{37} + 8\,C_6H_{10}O_5 = C_{89}H_{148}O_{77}$, but writing the equation thus

$$C_{41}H_{68}O_{37} + 8\,C_6H_{10}O_5 = C_{89}H_{142}O_{74} + 3\,H_2O$$

we obtain a formula for arabic acid $C_{89}H_{142}O_{74}$ which fits exactly with the combustion percentages and requires 6 per cent. BaO, the numbers obtained being 6·10, 5·90, 6·00, 6·16. The calcium salt was prepared and gave similar results. Arabic acid may therefore be represented by $C_{89}H_{142}O_{74}$. Finally the author made a successful attempt to isolate the acids intermediate between arabic acid and the $C_{41}H_{68}O_{37}$ acid. Sixty grams of pure arabic acid were dissolved in 200 c.c. of water containing 4 grams of sulphuric acid and digested for fifteen minutes at 100° C. Two barium salts were obtained, containing 6·45 per cent. BaO and 7·36 per cent., corresponding respectively to $C_{83}H_{132}O_{69}BaO$ and $C_{71}H_{112}O_{53}BaO$: β-arabinose αj 111·5° K 110 was also isolated and evidence obtained that α-arabinose αj 140° was present. Neither γ- nor δ-arabinose was detected. The author then gives a summary of this most important paper respecting the decompositions of arabic acid by sulphuric acid.

$$\text{I.}\quad \underset{\text{Arabic acid.}}{C_{89}H_{142}O_{74}} + H_2O = \underset{\alpha\text{-arabinosic acid.}}{C_{83}H_{132}O_{69}} + \underset{\alpha\text{-arabinose}}{C_6H_{12}O_6}$$

$$\text{II.}\quad C_{83}H_{132}O_{69} + H_2O = \underset{\beta\text{-arabinosic acid.}}{C_{77}H_{122}O_{64}} + \underset{\alpha+\beta\text{-arabinose.}}{C_6H_{12}O_6}$$

$$\text{III.}\quad C_{77}H_{122}O_{64} + H_2O = \underset{\gamma\text{-arabinosic acid.}}{C_{71}H_{112}O_{59}} + \underset{\beta\text{-arabinose.}}{C_6H_{12}O_6}$$

The next five steps have not been followed and so are united.

$$\text{III.—VIII.}\quad C_{77}H_{122}O_{64} + 9\,H_2O = \underset{\alpha\text{-arabinosic acid.}}{C_{41}H_{68}O_{37}} + \underset{\beta,\ \gamma,\ \delta,\ \text{and other arabinoses.}}{6\,C_6H_{12}O_6}$$

$$\text{IX.}\quad C_{41}H_{68}O_{37} + H_2O = \underset{\iota\text{-arabinosic acid.}}{C_{35}H_{58}O_{32}} + \underset{\delta\text{-arabinose (?).}}{C_6H_{12}O_6}$$

$$\text{X.}\quad C_{35}H_{58}O_{32} + H_2O = \underset{\kappa\text{-arabinosic acid.}}{C_{29}H_{48}O_{27}} + \underset{\delta\text{-arabinose (?).}}{C_6H_{12}O_6}$$

$$\text{XI.}\quad C_{29}H_{48}O_{27} + H_2O = \underset{\lambda\text{-arabinosic acid.}}{C_{23}H_{38}O_{22}} + \underset{\delta\text{-arabinose.}}{C_6H_{12}O_6}$$

This last arabinosic acid, $C_{23}H_{38}O_{22}$, is a very stable body, resisting the action of 3 per cent. to 4 per cent solution of sulphuric acid for many hours. It probably splits up in a more complicated way than its predecessors. Arabic acid, αj—27° to —28°, is the chief constituent of all the lævorotatory gums; other acids are present, which bear a simple relation to it. In a future paper the author promises an account of the dextrorotatory and optically inactive gums, the acids of which are built up in the same manner as arabic acid.

Dr. Armstrong said the paper was one of the utmost importance, and was the more interesting as it had been read by the investigator who first enlightened chemists as to the constitution of starch in 1876. He then contrasted the results of the present paper with those obtained in the case of starch, and pointed out the probability that starch has a very high molecular weight.

Dr. Ramsay then read a paper entitled—

The Decomposition of Ammonia by Heat. By W. Ramsay and S. Young.—The results obtained may be summed up as follows:—When ammonia gas is passed through a porcelain tube, or an iron tube, or a glass tube, filled with asbestos cardboard, the amount of decomposition at 500°–520° is nearly equal and very small. Ammonia, therefore, begins to decompose a little below 500°. In contact with a glass surface the temperature at which decomposition begins is much higher; the amount of decomposition depends on the rate of passage of the gas and on the nature of the surface. Thus ammonia is completely decomposed by passage through a plain iron tube heated to 780°. By passing ammonia through a glass tube containing iron wire at 760°, 76 per cent. of the ammonia was decomposed; with copper wire under similar conditions only 2 per cent. was decomposed.

Mr. Warington pointed out the importance of these results in connection with the now common practice of making soda lime combustions in iron tubes.

Professor Foster made some observations as to the bearing of these experiments on the quantity of ammonia obtained in the distillation of coal.

Dr. Ramsay then read a paper—

On the Halogen Compounds of Selenium. By F. P. Evans and W. Ramsay.—The authors first prepared the selenium monochloride, Se_2Cl_2, which splits up on distillation into selenium and selenium tetrachloride; the tetrachloride is insoluble, the monochloride soluble in carbon disulphide. The selenium dichloride could not be prepared. Selenium tetrachloride begins to decompose at 288°. The authors have also prepared selenium chlorotribromide and the bromotrichloride.

On the Preparation of Pure Chlorophyll. By D. A. Tschirch.—The author states that chlorophyll is very unstable, being decomposed by acids and alkalies. He has prepared it by reducing chlorophyllan (*Botan. Zeitung*, 1882, 533) with zinc dust. The chlorophyll so obtained gives a spectrum identical with that given by living leaves.

The Society then adjourned to January 17, 1884.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, on Wednesday, December 19, at 4 p.m.

Present—Mr. J. Williams, President, in the chair; Professor Attfield, Messrs. Atkins, Brady, Hills, Naylor, Southall and Taylor, Dr. Thresh, Mr. Ekin (Treasurer), and Messrs. Benger and Plowman (Honorary General Secretaries).

The minutes of the previous meeting were read and confirmed.

Letters of apology for non-attendance were read from Messrs. Bell, Groves, Radley, Reynolds, Schacht and Stephenson.

Professor Attfield, on behalf of the Sub-Committee appointed at the last meeting of the Executive Committee to undertake the distribution of copies of the two last presidential addresses to members of both Houses of Parliament, reported that arrangements had been completed and that the addresses were all enclosed in stamped envelopes and would be posted on the following day. He also reported that Messrs. Butler and Tanner had received orders from chemists and druggists in different parts of the United Kingdom for about ten thousand copies of the Southport address, and that these orders had been executed.

A letter was read from the printers stating that a few copies of the 1883 'Year Book' would be bound by the end of December, and that a sufficient number for general distribution to the members would be ready early in January.

Mr. Siebold was re-appointed Editor of the 'Year Book' for 1884.

The Honorary General Secretaries reported that since the last meeting of the Executive Committee the following gentlemen had signified their willingness to act as Honorary Colonial Secretaries for the undermentioned districts:—

For Bengal ....Mr. C. N. Kernot, Calcutta.
For South Australia ......Mr. J. Parker, Adelaide.
For West Indies............Mr. W. C. Ross, Port of Spain.

Acting on the authority which had been given to the President and themselves at the last meeting of the Committee they had written to these gentlemen informing them that their services would be accepted. These appointments were confirmed.

Mr. Plowman (Hon. Gen. Sec.) reported that he had paid a visit to Hastings and had had interviews with certain members of the Committee resident in that town. He had been very kindly received and felt sure that these gentlemen would exert themselves to the utmost to make the coming meeting a success, and would endeavour to fully carry out the wishes of the Executive Committee.

The subject of entertainment by Local Committees, which had been discussed on several previous occasions, was again brought forward and, after a long discussion, the following resolution was passed:—

"That in future the members attending the meetings of the Conference shall pay for the luncheons, etc., supplied to them during the business days of the meetings, and that if excursions be organized by the local members on the following days all railway or other fares shall be paid by the members attending those excursions."

Sixteen gentlemen were elected to membership.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

Presidential Address to the Chemical Section.

BY J. H. GLADSTONE, PH.D., F.R.S., V.P.C.S.

A sectional address usually consists either of a review of the work done in the particular science during the past year, or of an exposition of some branch of that science to which the speaker has given more especial attention. I propose to follow the latter of these practices, and shall ask the indulgence of my brother chemists while I endeavour to place before them some thoughts on the subject of Elements.

Though theoretical and practical chemistry are now intertwined, with manifest advantage to each, they appear to have been far apart in their origin. Practical chemistry arose from the arts of life, the knowledge empirically and laboriously acquired by the miner and metallurgist, the potter and the glass-worker, the cook and the perfumer. Theoretical chemistry derived its origin from cosmogony. In the childhood of the human race the question was eagerly put, "By what process were all things made?" and some of the answers given started the doctrine of elements. The earliest documentary evidence of the idea is probably contained in the Shoo King, the most esteemed of the Chinese classics for its antiquity. It is an historical work, and comprises a document of still more venerable age, called 'The Great Plan with its Nine Divisions,' which purports to have been given by Heaven to the Great Yu, to teach him his royal duty and "the proper virtues of the various relations." Of course there are wide differences of opinion as to its date, but we can scarcely be wrong in considering it as older than Solomon's writings. The First Division of the Great Plan relates to the Five Elements. "The first is named water; the second, fire; the third, wood; the fourth, metal; the fifth, earth. The nature of water is to soak and descend; of fire, to blaze and ascend; of wood, to be crooked and to be straight; of metal, to obey and to change; while the virtue of the earth is seen in seed-sowing and ingathering. That which soaks and descends becomes salt; that which blazes and ascends becomes bitter; that which is crooked and straight becomes sour; that which obeys and changes becomes acrid; and from seed-sowing and ingathering comes sweetness."*

A similar idea of five elements was also common among the Indian races, and is stated by Professor Rodwell to have been in existence before the fifteenth century, B.C., but, though the number is the same, the elements themselves are not identical with those of the ancient Chinese classic; thus, in the Institutes of Menu, the "subtle ether" is spoken of as being the first created, from which, by transmutation, springs air, whence, by the operation of a change, rises light or fire; from this comes water, and from water is deposited earth. These five are curiously correlated with the five senses, and it is very evident that they are not looked upon as five independent material existences but as derived from one

* Quoted from the translation by the Rev. Dr. Legge. In that most obscure classic, the *Yi-King*, fire and water, wind and thunder, the ocean and the mountains, appear to be recognized as the elements.

another. This philosophy was accepted alike by Hindoos and Buddhists. It was largely extended over Asia, and found its way into Europe. It is best known to us in the writings of the Greeks. Among these people, however, the elements were reduced to four—fire, air, earth, and water—though Aristotle endeavoured to restore the "blue ether" to its position as the most subtle and divine of them all. It is true that the fifth element, or "quinta essentia," was frequently spoken of by the early chemists, though the idea attaching to it was somewhat changed, and the four elements continued to retain their place in popular apprehension, and still retain it even among many of the scholars who take degrees at our universities. The claim of wood to be considered an element seems never to have been recognized in the West, unless, indeed, we are to seek this origin for the choice of the word ὕλη to signify that original chaotic material out of which, according to Plato and his school, all things were created.* The idea also of a primal element, from which the others, and everything else, were originated, was common in Greece, the difficulty being to decide which of the four had the greatest claim to this honour. Thales, as is well known, in the sixth century B.C. affirmed that water was the first principle of things; but Anaxamenes afterwards looked upon air, Heraclytus upon fire, and Theracleides on earth, as the primal element. This notion of elements, however, was essentially distinct from our own. It was always associated with the idea of the genesis of matter rather than with its ultimate analysis, and the idea of *simple* as contrasted with *compound* bodies probably never entered into the thoughts of the contending philosophers.

The modern idea appears to have had a totally different origin, and we must again travel back to China. There, also in the sixth century B.C., the great philosopher Lao-tse was meditating on the mysteries of the world and the soul, and his disciples founded the religion of Taou. They were materialists; nevertheless they believed in a "finer essence," or spirit, that rises from matter, and may become a star; thus they held that the souls of the five elements, water, metal, fire, wood, and earth, arose and became the five planets. These speculations naturally led to a search after the sublimated essences of things, and the means by which this immortality might be secured. It seems that at the time of Tsin-she-hwang, the builder of the Great Wall, about two centuries before Christ, many romantic stories were current of immortal men inhabiting islands in the Pacific Ocean. It was supposed that in these magical islands was found the "herb of immortality" growing, and that it gave them exemption from the lot of common mortals. The emperor determined to go in search of these islands, but some untoward event always prevented him.†

Some two or three centuries after this a Taouist, named Weipahyang, wrote a remarkable book called 'The Uniting Bond.' It contains a great deal about the changes of the heavenly bodies, and the mutual relation of Heaven and men; and then the author proceeds to explain some transformations of silver and water. About elixir he tells us, "What is white when first obtained becomes red after manipulation on being formed into the elixir" ("tan," meaning red or elixir). "That substance, an inch in diameter, consists of the black and the white, that is, water and metal combined. It is older than heaven and earth. It is most honourable and excellent. Around it, like a wall, are the sides of the cauldron. It is closed up and sealed on every side, and carefully watched. The thoughts must be undisturbed, and the temper calm, and the hour of its perfection anxiously waited for. The false chemist passes through various operations in vain. He who is enlightened expels his evil passions, is delighted morning and night, forgets fame and wealth, comprehends the true objects of life, and gains supernatural powers. He cannot then be scorched by fire, nor drowned in water, etc., etc. . . . The cauldron is round like the full moon, and the stove beneath is shaped like the half-moon. The lead ore is symbolized by the White Tiger; and it, like metal amongst the elements, belongs to the West. Mercury resembles the sun, and forms itself into sparkling globes; it is symbolized by the Blue Dragon belonging to the East, and it is assigned to the element wood. Gold is imperishable. Fire does not injure its lustre. Like the sun and moon, it is unaffected by time. Therefore the elixir is called 'the Golden Elixir.' Life can be lengthened by eating the herb called Hu ma; how much more by taking the elixir, which is the essence of gold, the most imperishable of all things! The influence of the elixir, when partaken of, will extend to the four limbs; the countenance will become joyful; white hair will be turned black; new teeth will grow in the place of old ones, and age at once become youth. . . . Lead ore and mercury are the bases of the process by which the elixir is prepared; they are the hinge upon which the principles of light and darkness revolve."

This description suggests the idea that the elixir of the Taouists was the red sulphide of mercury—vermilion—for the preparation of which the Chinese are still famous. That Weipahyang believed in his own philosophy is testified by a writer named Ko-hung, who, about a century afterwards, wrote the lives of celebrated Taouists. He tells how the philosopher, after preparing the elixir, took it, with his disciples, into a wood, and gave it first to his dog, then took it himself, and was followed by one of his pupils. They all three died, but, it appears, rose to life again, and to immortality. This brilliant example did not remain without imitators; indeed, two emperors of the Tang family are said to have died from partaking of the elixir. This circumstance diminished its popularity, and alchemy ceased to be practised in the Celestial Empire.

At the beginning of the seventh century the doctrine of Lao-tse was in great favour at the Chinese court; learning was encouraged, and there was much enterprise. At the same time the disciples of Mahomed carried their arms and his doctrines over a large portion of Asia, and even to the Flowery Land. Throughout the eighth century there were frequent embassies between eastern and western Asia, wars with the Caliphs, and even a matrimonial alliance. We need not wonder, therefore, that the teachings of the Taouist alchemists penetrated westward to the Arabian philosophers. It was at this period that Yeber - Abou - Moussah - Djaferal - Sofé, commonly called Geber, a Sabæan of great knowledge, started what to the West was a new philosophy about the transmutation of metals, the Philosopher's Stone, and the Elixir of Life; and this teaching was couched in highly poetic language, mixed with astrology and accompanied by religious directions and rites. He held that all metals were composed of mercury, sulphur, and arsenic, in various proportions, and that the noblest metal could be procured only by a very lengthy purification. It was in the salts of gold and silver that he looked for the Universal Medicine. Geber himself was an experimental philosopher, and the belief in transmutation led to the acquirement of a considerable amount of chemical knowledge amongst the alchemists of Arabia and Europe. This gradually brought about a conviction that the three reputed elementary bodies, mercury, sulphur, and salt or

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* Students of the Apocrypha will rember the expression in the Book of Wisdom, xi., 17, '*ἡ παντοδύναμος σοῦ χεὶρ καὶ κτίσασα τὸν κόσμον ἐξ ἀμόρφου ὕλης*' ('Thy Almighty hand, that made the world of matter without form'). The same book contains two allusions to the ordinary elements, vii., 17, and xix., 18 to 20. The word *στοιχεῖον* is used in the New Testament only in a general sense (2 Pet., iii., 10), or in its more popular meaning of the first steps in knowledge.

† Nearly all the statements relating to this Taouist alchemy are derived from the writings of the Rev. Joseph Edkins, of Pekin, and the matter is treated in greater detail in an article on the "Birth of Alchemy," in the *Argonaut*, vol. iii., p. 1.

acid, were not really the originators of all things. There was a transition period, during which the notion was itself suffering a transmutation. The idea became gradually clearer that all material bodies were made up of certain constituents, which could not be decomposed any further, and which, therefore, should be considered as elementary. The introduction of quantitative methods compelled the overthrow of mediæval chemistry, and led to the placing of the conception of simple and compound bodies upon the foundation of scientific fact. Lavoisier, perhaps, deserves the greatest credit in this matter, while the labours of the other great chemists of the eighteenth and the beginning of the nineteenth centuries were in a great measure directed to the analysis of every conceivable material, whether solid, liquid, or gaseous. These have resulted in the table of so-called elements, now nearly seventy in number, to which fresh additions are constantly being made.

Of this ever-growing list of elements not one has been resolved into simpler bodies for three-quarters of a century; and we, who are removed by two or three generations from the great builders of our science, are tempted to look upon these bodies as though they were really simple forms of matter, not only unresolved, but unresolvable. The notation we employ favours this view and stamps it upon our minds.

Is it, however, a fact that these reputed elements are really simple bodies? or, indeed, are they widely different in the nature of their constitution from those bodies which we know to be chemical compounds? Thus, to take a particular instance, are fluorine, chlorine, bromine, and iodine essentially distinct in their nature from the compound halogens, cyanogen, sulphocyanogen, ferricyanogen, etc.? Are the metals lithium, sodium, and potassium essentially distinct from such alkaline bases as ammonium, ethylamine, diethylamine, etc.? No philosophical chemist would probably venture to answer this question categorically with either "yes" or "no." Let us endeavour to approach it from three different points of attack—(1) the evidence of the spectroscope, (2) certain peculiarities of the atomic weights, and (3) specific refraction.

1. *The Spectroscope.*—It was at first hoped that the spectroscope might throw much light upon the nature of elements, and might reveal a common constituent in two or more of them; thus, for instance, it was conceivable that the spectrum line of bromine or iodine vapour might consist of the rays given by chlorine *plus* some others. All expectations of this kind have hitherto been disappointed; yet, on the other hand, it must not be supposed that such a result disproves the compound nature of elements, for as investigation proceeds it becomes more and more clear that the spectrum of a compound is not made up of the spectra of its component parts.

Again, the multiplicity of rays given out by some elements, when heated, in a gaseous condition, such as iron, has been supposed to indicate a more complex constitution than in the case of those metals, such as magnesium, which give a more simple spectrum. Yet it is perfectly conceivable that this may be due to a complexity of arrangement of atoms all of the same kind.

Again, we have changes of a spectrum at different temperatures; new rays appear, others disappear; or even there occurs the very remarkable change from a fluted spectrum to one of sharp lines at irregular intervals, or to certain recurring groups of lines. This, in all probability, does arise from some redistribution, but it may be a redistribution in a molecular grouping of atoms of the same kind, and not a dissociation or rearrangement of dissimilar atoms.

A stronger argument has been derived from the revelations of the spectroscope in regard to the luminous atmospheres of the sun. There we can watch the effect of heat enormously transcending that of our hottest furnaces, and of movements compared with which our hurricanes and whirlwinds are the gentlest of zephyrs. Mr. Lockyer, in studying the prismatic spectra of the luminous prominences or spots of the sun, has frequently observed that on certain days certain lines, say of the iron spectrum, are non-existent, and on other days certain other lines disappear, and that in almost endless variety; and he has also remarked that occasionally certain lines of the iron spectrum will be crooked or displaced, thus showing the vapour to be in very rapid motion, while others are straight, and therefore comparatively at rest. Now, as a gas cannot be both at rest and in motion at the same time and the same place, it seems very clear that the two sets of lines must originate in two distinct layers of atmosphere, one above the other, and Mr. Lockyer's conclusion is that the iron molecule was dissociated by heat, and that its different constituents, on account of their different volatility, or some other cause, had floated away from one another. This seems to me the easiest explanation of the phenomenon; and, as dissociation by heat is a very common occurrence, there is no *à priori* improbability about it. But we are not shut up to it, for the different layers of atmosphere are certainly at different temperatures, and most probably of different composition. If they are of different temperatures the variations of the spectrum may only be an extreme case of what must be acknowledged by everyone more or less—that bodies emit, or cease to emit, different rays as their temperature increases, and notably when they pass from the liquid to the gaseous condition. And again, if the composition of the two layers of atmosphere be different, we have lately learnt how profoundly the admixture of a foreign substance will sometimes modify a luminous spectrum.

2. *Peculiarities of Atomic Weights.*—At the meeting of this Association at Ipswich, in 1851, M. Dumas showed that in several cases analogous elements form groups of three, the middle one of which has an atomic weight intermediate between those of the first and third, and that many of its physical and chemical properties are intermediate also. During the discussion upon his paper, and subsequently,* attention was drawn to the fact that this is not confined to groups of three, but that there exist many series of analogous elements having atomic weights which differ by certain increments, and that these increments are, in most cases, multiples of 8. Thus we have lithium, 7; sodium, 23, *i.e.* $7+16$; potassium, 39, *i.e.* $7+(16\times 2)$; and the more recently discovered rubidium, 85, *i.e.* $7+(16\times 5)$ nearly; and cæsium, 133, *i.e.* $7+(16\times 8)$ nearly. This is closely analogous to what we find in organic chemistry, where there are series of analogous bodies playing the part of metals, such as hydrogen, methyl, ethyl, etc., differing by an increment which has the atomic weight 14, and which we know to be CH_2. Again, there are elements with atomic weights nearly the same or nearly multiples of one another, instances of which are to be found in the great platinum group and the great cerium group.† This suggests the analogy of isomeric and polymeric bodies. There is also this remarkable circumstance: the various members of such a group as either of those just mentioned are found together at certain spots on the surface of the globe, and scarcely anywhere else. The chemist may be reminded of how in the dry distillation of some organic body he has obtained a mixture of polymerized hydrocarbons, and may perhaps be excused if he speculates whether in the process of formation of the platinum or the cerium group, however and whenever it took place, the different elements had been made from one another and imperfectly polymerized.

But this is not the largest generalization in regard to the peculiarities of these atomic weights. Newlands showed that, by arranging the numbers in their order, the octaves presented remarkable similarities, and, on the

* *Phil. Mag.*, May, 1853.

† Another curious instance is the occurrence of nickel and cobalt in all meteoric irons, with occasionally chromium or manganese, the atomic weights and other properties of which are very similar.

same principle, Mendelieff constructed his well-known table. I may remind you that in this table the atomic weights are arranged in horizontal and vertical series, those in the vertical series differing from one another, as a rule, by the before-mentioned multiples of 8—namely 16, 16, 24, 24, 24, 24, 32, 32—the elements being generally analogous in their atomicity and in other chemical characters. Attached to the elements are figures, representing various physical properties, and these in the horizontal series appear as periodic functions of the atomic weights. The table is incomplete, especially in its lower portions, but, with all its imperfections and irregularities, there can be no doubt that it expresses a great truth of nature. Now, if we were to interpolate the compound bodies which act like elements—methyl, 15; ammonium, 18; cyanogen, 26—into Mendelieff's table, they would be utterly out of place, and would upset the order both of chemical analogy and of the periodicity of the physical properties.

3. *Specific Refraction.*—The specific refraction has been determined for a large majority of the elements, and is a very fundamental property, which belongs to them apparently in all their combinations, so long at least as the atomicity* is unchanged. If the figures representing this property be inserted into Mendelieff's table we find that in the vertical columns the figures almost invariably decrease as the atomic weights increase. If, however, we look along the horizontal columns or better still if we plot the figures in the table by which Lothair Meyer has shown graphically that the molecular volume is a periodic function of the atomic weights, we shall see that they arrange themselves in a series of curves similar to but not at all coincident with his. The observations are not so complete or accurate as those of the molecular volumes, but they seem sufficient to establish the fact, while the points of the curves would appear to be, not the alkaline metals, as in Meyer's diagram, but hydrogen, phosphorus and sulphur, titanium and vanadium, selenium, antimony. Now, if we were to insert the specific refractions of cyanogen, ammonium, and methyl into this table, we should again show that it was an intrusion of strangers not in harmony with the family of elements.

But there is another argument to be derived from the action of light. The refraction equivalent of a compound body is the sum of the refraction equivalents of its compounds; and, if there is anything known for certain in the whole subject, it is that the refraction equivalent of an organic compound advances by the same quantity (7·6) for every increment of CH_2. If, therefore, the increment between the different members of a group of analogous elements, such as the alkaline metals, be of the same character, we may expect to find that there is a regular increase of the refraction equivalent for each addition of 16. But this is utterly at variance with fact: thus, in the instance above quoted, the refraction equivalent of lithium being 3·8, that of sodium is 4·8, of potassium 8·1, of rubidium 14·0, and of cæsium about 13·7. Neither does the law obtain in those series in which the increment is not a multiple of 8, as in the case of the halogens, where the increment of atomic weight is 45, and the refraction equivalents are chlorine 9·9, bromine 15·3, and iodine 24·5.

The refraction equivalents of isomeric bodies are generally identical; and the refraction equivalents of polymeric bodies are in proportion to their atomic weights. Among the groups of analogous elements of the same, or nearly the same, atomic weight we do find certain analogies: thus cobalt and nickel are respectively 10·8 and 10·4, while iron and manganese are respectively 12·0 and 12·2. But, as far as observation has gone at present, we have reason to conclude that, if metals stand to one another in the ratio of 2 : 1 in atomic weight, their refraction equivalents are much nearer together than that; while, on the other hand, the equivalent of sulphur, instead of being the double of that of oxygen, is at least five times as great.

The general tendency of these arguments is evidently to show that the elementary radicals are essentially different from the compound radicals, though their chemical functions are similar.

There remains still the hypothesis that there is a "primordial element," from which the others are derived by transmutation. With the sages of Asia it was the "blue ether," with Thales water, with Dr. Prout hydrogen. The earlier views have passed away, and the claims of hydrogen are being fought out on the battlefield of atomic weights and their rigorous determination.

There does not appear to be any argument which is fatal to the idea that two or more of our supposed elements may differ from one another rather in form than in substance, or even that the whole seventy are only modifications of a prime element; but chemical analogies seem wanting. The closest analogy would be if we could prepare two allotropic conditions of some body, such as phosphorus or cyanogen, which should carry their allotropism into all their respective compounds, no compound of the one form being capable of change into a compound of the other. Our present knowledge of allotropism, and of variations in atomicity, affords little if any, promise of this.

The remarkable relations between the atomic weights of the elements, and many peculiarities of their grouping, force upon us the conviction that they are not separate bodies created without reference to one another, but that they have been fashioned or built up from one another, according to some general plan. This plan we may hope gradually to understand better; but if we are ever to transform one of these supposed elements into another, or to split up one of them into two or three dissimilar forms of matter, it will probably be by the application of some method of analysis hitherto unknown.

Nothing can be of greater promise than the discovery of new methods of research; hence I need make no apology to others who have lately done excellent work in chemistry if I single out the Bakerian Lecture of this year, by Mr. Crookes, on "Radiant Matter Spectroscopy." It relates to the prismatic analysis, not of the light transmitted or absorbed in the ordinary way by a solid or liquid, nor of that given out by incandescent gas, but the analysis of the fluorescence that manifests itself in certain bodies when they are exposed to an electric discharge in a highly exhausted vacuum. He describes, in an interesting and even amusing manner, his three years' quest after the origin of a certain citron band, which he observed in the spectrum of the fluorescence of many substances, till he was led into that wonderful labyrinth of uncertain elements which are found together in samarskite, and eventually he proved the appearance to be due to yttrium. As the test is an extremely delicate one, he has obtained evidence of the very general dissemination of that element, in very minute quantities—and not always very minute, for the polypes that built up a certain pink coral were evidently able to separate the earth from the sea water, as their calcareous secretion contained about $\frac{1}{2}$ per cent. of yttrium. We have reason to hope that this is only the first instalment of discoveries to be made by this new method of research.

I cannot conclude without a reference to the brightening prospects of technical chemistry in this country. I do not allude to the progress of any particular industry, but to the increased facilities for the education of those engaged in the chemical manufactures. First as to the workpeople. Hitherto the young artizan has had little opportunity of learning at school what would be of the greatest service to him in his after career. The traditions of the Middle Ages were all in favour of literary culture for the upper classes, and the education suited for these has been retained in our schools for the sons of the

* This exception includes not merely such changes as that from a ferrous to a ferric salt, but the different ways in which the carbon is combined in such bodies as ethene, benzene, and pyrene.

people. It is true that some knowledge of common things has been given in the best schools, and the Education Department has lately encouraged the teaching of certain sciences in the upper standards. In the Mundella Code, however, which came into operation last year, "elementary science" may receive a grant in all the classes of a boys' or girls' school, and in the suggested scheme there is mentioned simple lessons on "the chemical and physical principles involved in one of the chief industries of England, among which Agriculture may be reckoned," while "Chemistry" is inserted among "the specific subjects of instruction" that may be given to the older children. It is impossible, as yet, to form an estimate of the extent to which managers and teachers have availed themselves of this permission, for the examinations of her Majesty's inspectors under the new code have only just commenced; but one of the best of the Board schools in London has just passed satisfactorily in chemistry both with boys and girls. I trust that in those parts of the country where chemical industries prevail chemistry may be largely taken up in our elementary schools.

The great deficiency in our present educational arrangements is the want of the means of teaching a lad who has just left the common school the principles of that industry by which he is to earn his livelihood. The more purely scientific chemistry, however, may be learnt by him now in these evening classes which may be formed under the Education Department, as well as in those that have long been established under the Science and Art Department. The large amount of attention that is now being given to the subject of technical education is creating in our manufacturing centres many technical classes and colleges for students of older growth.

As to inventors and the owners of our chemical factories, in addition to the Chemical Society and the Chemical Institute, there has recently been founded the Society of Chemical Industry. It came into existence with much promise of success; at the close of its second year it numbered fourteen hundred members; it has now powerful sections in London, Manchester, Liverpool, Newcastle, and Birmingham; and it diffuses information on technical subjects in a well-conducted monthly journal.

May the abstract science and its useful applications ever prove helpful to one another, and become more and more one chemistry for the benefit of mankind.

Parliamentary and Law Proceedings.

Prosecution under the Patent Medicines Act.

At the Leeds Police Court, on December 14, before Mr. Bruce, James Barrett and William Lynch, shopkeepers, both of Meanwood, were charged with exposing for sale certain patent medicines without having obtained a licence, thereby rendering themselves liable to a penalty of £20. The defendants' shops had been visited, and it was found they were vending Keating's teething powders. The defendants pleaded ignorance of the requisitions of the law. They were each fined 10*s*. and costs.

Fatal Explosion of a Mixture.

At the Manchester City Coroner's Court, on Friday, December 21, before Mr. Sydney Smelt, City Deputy-Coroner, an inquest was held relative to the death of Wm. Turley, a shingler, late of 49, Gladstone Street, Warrington, aged 51 years, who died the previous day at the Royal Eye Institution, John Street, in that city. The circumstances were somewhat singular; and the inquiry occupied the court several hours. It appeared that on Wednesday week deceased went to the shop of Mr. J. H. Woods, a pharmaceutical chemist, carrying on business at 18, Butter Market Street, Warrington, for three pennyworth of quicksilver and three pennyworth of aquafortis. He had been in the habit of purchasing similar quantities of aquafortis and quicksilver in order to mix them into a kind of ointment which was applied in some way to his master's family. Deceased had a son employed by Mr. Woods as his errand boy, and the lad was present when his father came in to make the purchase. The boy says that the chemist served his father with both articles, and that they were placed in the same bottle, and that his father said to the chemist "Will it be all right?" to which Mr. Woods replied, "It's all safe." Deceased then placed the bottle in his breast pocket and left the shop, but shortly afterwards the stuff exploded and the contents of the bottle burnt the face and eyes of the poor fellow so seriously that he died, as stated, at the Manchester Eye Hospital, having been removed there from the Warrington Infirmary. In his voluntary statement Mr. Woods said that he had never known the mixture to explode before, though he had always served deceased with the articles separately, generally placing the quicksilver in a pill box. He should not have mixed the two, but deceased, after being served with the quicksilver, pushed the bottle towards him, and said "Give me three pennyworth of aquafortis." The cork did not fit tightly.

Mr. A. Hill Griffith, house surgeon at the Eye Hospital, said deceased was admitted suffering from severe burns over the face and eyes. Death resulted from collapse and shock. If aquafortis and quicksilver were put in the same bottle a strong gas would be given off, resulting most likely in the bursting of the bottle, or the sending out of the cork, the catastrophe being hastened by the heat from the body.

Mr. George Massy, chemist, Deansgate, gave similar evidence as to the formation of volatile gas from such a combination. He had often sold the two things together in one bottle, but always without a cork.

The Jury, in reply to the Deputy-Coroner, said they were unanimously in favour of a verdict that would be favourable to Mr. Woods, the death of the deceased being due partly to his own negligence and partly to the negligence of Mr. Woods.

The Deputy-Coroner said such a verdict would be equivalent to a verdict of manslaughter against Woods. Under the circumstances the inquest was adjourned until Wednesday next for the production of further evidence. —*Manchester Courier*.

Sale of Strychnine without Registration.

At the Worcester Borough Police Court, on Dec. 21, Mr. E. J. Kitson, chemist and druggist, Broad Street, attended in answer to a summons for a breach of the Pharmacy Act, 1868, by having sold to William Underwood strychnine, without, before delivery of the same, making or causing to be made an entry in a book which is kept for that purpose, stating the date of sale, name and address of purchaser, name and quantity of the article sold, the purpose for which it was stated by the purchaser to be required, and neglecting to obtain the signature of the purchaser.

William Underwood, son of Detective Underwood, proved the purchase of the poison, which was contained in a packet of "Kitson's Worcestershire Rat Killer," for which he paid 3*d*.

In defence, Mr. Kitson said his assistant had strict orders to carry out the provisions of the Act. This offence was committed without his knowledge, as he was away at the time.

A fine of £1 11*s*. 6*d*., including costs, was inflicted.

E. J. Clark.—Thanks for your communication.

Pharmacist.—It would be illegal for an unqualified person to carry on business, even with the aid of a qualified manager. For the grounds upon which the House of Lords held that certain bodies are exempt from this prohibition see the judgment (*Pharm. Journ*., [3], xi., 104).

Communications, Letters, etc., have been received from Messrs. Abraham, B. Redwood, G. Brown, Wrighton, Inquirer, A. P. S., M. M.

The Pharmaceutical Journal.

SATURDAY, JANUARY 5, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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1883.

IF ever another section should be added to the 'History of Pharmacy,' the year that has just closed will have to be described as politically one of expectation and preparation rather than of achievement. It is true hopes were raised more than once during the twelve months that it would be possible to make a mark favourable to pharmacy upon the statute book; but they were frustrated by causes that hindered much other projected legislation. Nevertheless, the preparatory work was not altogether without result, for it was the occasion of the manifestation of a considerable amount of unanimity amongst the chemists and druggists of the country, which in one instance resolved itself into a hint of considerable significance. If, however, all was not accomplished that had been intended, the year was by no means uneventful in its pharmaceutical aspects, as will appear from the following paragraphs.

Assuming, as is reasonable, that the Council of the Pharmaceutical Society is essentially the executive for all the registered chemists and druggists in the country, we take up first the record of its doings. The Council has undergone no change in its constitution during the year. The fourteen members who retired in May according to the bye-laws were all of them re-elected, and at the meeting of the Council in June, Mr. M. CARTEIGHE was requested to continue in office as President, Mr. ATKINS as Vice-President, and Mr. ROBBINS as Treasurer. At its earliest meeting in the year the Council devoted several hours to the discussion of a draft of a Pharmacy Act Amendment Bill that had been prepared by the Law and Parliamentary Committee. The details were not then, however, published, as it was thought desirable that the Committee should first confer with the officials of the Privy Council on the subject. At the meeting in February the subject again came up for discussion, on the report of the Committee recommending the adoption of the draft Bill, which it was then decided should be printed. When the Bill came to be published it was found that in the preamble greater emphasis was laid upon the expediency for the safety of the public that *sales* of poisons and dispensing of prescriptions should be regulated than in the Pharmacy Acts of 1852 and 1868, where the regulation for the qualification of *sellers* of certain poisons had been most prominent. Perhaps the least expected feature in the Bill was a provision in this spirit to regulate the sale of certain articles which can be sold under present circumstances by unregistered as well as registered persons. It was proposed to effect this by instituting a new class of scheduled articles, to be termed "poisonous," and making their sale subject to certain restrictions as to labelling. This step had been taken after long consideration and in consequence of urgent representations from a body representing a class of persons who considered they were exposed to danger and injury by the unrestricted sale of the articles referred to. As a first instalment it was proposed that this "poisonous" schedule should include sulphuric, hydrochloric and nitric acids, butter of antimony and carbolic acid, all articles which may be sold without any restriction as to vendor or label. It is important to remember that these substances had been all included in a list of articles which the Council of the Pharmaceutical Society, acting under its statutory powers, had in 1882 resolved it was desirable to add to the second part of the poison schedule, though the Privy Council had declined to approve the resolution. Another provision in the draft Bill had for its object the preservation during at least twelve months of a record of the details of all sales of poisons contained in the first part of the schedule. Another regulation extended to patent medicines and would have made it illegal to sell by wholesale or retail any such articles containing a poison within the meaning of the Pharmacy Act, 1868, unless the box, bottle, package or vessel in which the same was contained, the wrapper if there were only one, or the outermost wrapper if there were more than one, were labelled with the name and address of the first seller of the same, the name of the patent medicine and the word "poison." In the case of a "duly qualified keeper of an open shop for the sale of poisons" becoming subject to a penalty for breach of this provision in respect of a patent medicine not prepared by himself he was to have a right of indemnity against the person who supplied him with it, this right passing to all intermediate dealers until the real offender was reached. The unqualified keeper of an open shop had no such remedy and under another clause of the Bill he would be breaking the law in selling by retail a patent medicine containing a "poison." With respect to persons carrying on business, perhaps the most important provision was one to extend the scope of the present law and make it illegal for any person "to sell by retail, or to keep open shop for "retailing, dispensing or compounding medical pre-"scriptions or (whether as patent medicines or "otherwise) poisons" within the meaning of the Pharmacy Act, unless he were qualified by registration or came under the exemption as a trustee or administrator of the estate of a deceased pharmacist. In order to make the law more effective it was provided that in every case the seller upon whose behalf the sale was made should be deemed to be the person to whom the regulations as to the sale of poisons applied, whilst any assistant, apprentice or other servant was to be deemed to be simply the agent of the seller on whose behalf the sale was made. It was also provided that words importing the singular number only should include the plural, and in order to meet any case where doubts might exist as to the real owner or owners of a shop, it was proposed to give the Registrar power to serve an application for such information, requiring its delivery within seven days under a penalty. The Bill also proposed to make it unlawful for any qualified keeper of an open shop for retailing, dispensing or compounding medical prescriptions or poisons to keep open shop in more places than one without placing a qualified person *bonâ fide* in charge of each branch shop. Other clauses had for their object the conferring upon the Council the power to make, alter and amend by bye-laws the regulations as to examinations, and also to make it illegal for a chemist and druggist to take as an apprentice a person who was not registered as having passed the Preliminary examination. The promoters of the Bill, in addition, contemplated making an important alteration in the constitution of the Pharmaceutical Society, in that it was provided that every person who after December 31, 1886, might pass the qualifying examination under the Pharmacy Act, 1868, should be entitled to be registered as a "pharmaceutical chemist" and be eligible as a "member" of the Pharmaceutical Society; whilst any person who before that time might have been registered as a "chemist and druggist" in virtue of having obtained a certificate of qualification from the Board of Examiners would be eligible as a "member" of the Society, but not entitled to registration as a "pharmaceutical chemist."

The foregoing sketch will sufficiently reveal the nature of the draft Bill in the form in which it was adopte[d b]y the Council, and it includes all the points that subs[e]quently became the subjects of adverse criticism. Within a short time of its publication meetings of chemists and druggists were held at nearly all the principal provincial centres, at which, as a rule, the provisions of the Bill were considered *seriatim*, the result being a more or less emphatic expression of approval of the Bill as a whole in every case. We think this is quite a sufficient refutation of an *ex cathedrâ* dictum put forth a short time since by a person who is a member of the executive of the Trade Association, though not a registered chemist and druggist, to the effect that the Bill had not been framed by the true representatives of the chemists and druggists of Great Britain. Indeed it would appear probable that the speaker himself had forgotten for the time that at the annual meeting of the Trade Association the members had formally resolved that it was "most suitable that chemists and druggists generally, should be united in support of the Pharmacy Bill." The points which gave rise to the greatest amount of objection were those relating to the institution of a schedule of "poisonous" articles, the provisions as to the labelling of patent medicines containing scheduled poisons, the requirement of qualified managers for branch shops, and the proposition which would result eventually in only one grade of legal qualification and one kind of membership of the Society. The objections to the "poisonous" schedule proceeded from a somewhat unexpected quarter, and were not based upon the assumption of any possible restriction of trade by the regulations applying to the articles in that schedule, this point indeed having been satisfactorily disposed of by the majority of replies to the inquiry previously made by the Council throughout the country through the medium of the local secretaries. The objectors, who had Mr. G. F. Schacht for a leading spokesman, saw in the imposition of regulations applying to unregistered persons who sold such substances as it was proposed to class as "poisonous," a departure from the broad principle hitherto advocated by the Society that in the interest of the public only qualified persons should be allowed to deal in any such dangerous substances. In fact they preferred that the practice should remain as it is rather than the Society should recognize in any way the traffic in poisonous substances by unqualified persons. When the Bill was under the consideration of the executive of the Trade Association, this view was endorsed by a majority of 7 to 5, and a resolution was passed that among the amendments to the Bill to be suggested should be one to the effect that the whole of the clause dealing with the subject should be erased and the articles in the special schedule added to the second part of the poison schedule. This suggestion, with others, was in due time transmitted to Bloomsbury Square, but unfortunately without any mention of the manner in which it was contemplated that the latter part of the proposed amendment was to be carried into effect in the face of the opposition of the Privy Council. On the other hand, it was known that the Government had announced its intention of promoting legislation further to regulate the supply of poisons, and an indication had been given of its views upon the subject in the refusal of the Privy Council to approve the resolution of the Council of the Pharmaceutical Society that the articles specified ought to be included in the existing schedule. Moreover, it appeared to many that the restriction as to labelling would exercise an influence in the direction desired. It was, therefore, thought wiser by the majority of the Council and, we believe, of the trade, to recognize the situation and by responding to the good will of the Government, manifested in the request for advice, to bring a legitimate influence to bear in the interest both of the public and the trade. The criticisms of the provisions as to patent medicines were of a two-fold character. One took the form of an objection to the retail vendor being made primarily responsible for insufficient labelling, with a right of indemnity, instead of limiting the responsibility to the maker. The subject was discussed at the Annual Meeting of the Society, on a motion made by Mr. G. W. SANDFORD to the effect that the clauses should be altered, which, notwithstanding the suggestion that the incoming Council should be invited to reconsider the clauses, was carried by a small majority. The other criticism was that the word "and" should be inserted so as to ensure that the outer wrapper, as well as the containing vessel, should be always labelled "poison," and it was also suggested to require the name of the poison to be mentioned. The objections made as to the clause necessitating the passing of the Preliminary examination before apprenticeship have not been very numerous, whilst those directed against the requirement of qualified managers for branch shops, though in some instances originating in a dislike to the giving of any sanction to one person being proprietor of more than one business, have, as a rule, been somewhat sentimental and mainly based upon considerations of hardship in particular cases, although the provisions would affect none disadvantageously but those who have chosen to ignore the legislation of 1868. Lastly, although there have been some remonstrances against what has been termed the abandonment of the Major qualification, which phrase, however, does not describe what is intended quite correctly, the proposition has on the whole been received in the most liberal spirit by those who have acquired the title of "pharmaceutical chemist" by undergoing voluntarily an extra examination. As previously remarked, no very obvious result has attended all this preparatory work. The draft Bill was communicated to the Government and in March Mr. MUNDELLA announced that it was intended to introduce a Bill into the House of Lords, though little was revealed as to its nature beyond the statement that it would deal with patent medicines containing poisons. But the Government intentions in this direction, as well as in others, were frustrated and the session slipped away before anything further was done. The subject came up at the meeting of the Council last month, on the reading of a stimulant communication from the Lincolnshire Association for the Prevention of the Administration of Poisonous Drugs to Horses. The President then stated that he had reason to believe the subject was still under the consideration of the Government; but Mr. BOTTLE and Mr. HAMPSON appeared to be of opinion that if the Government does not soon move in the matter the Council should take steps to introduce a Bill independently.

In March a Bill for the Consolidation and Amendment of the Law relating to Medical Practitioners was introduced by Lord CARLINGFORD into the House of Lords. It proved to be essentially a Bill for reducing to order the incongruities at present affecting the system of medical examination and for the protection of medical titles; but it was free from the class of provisions in regard to "counter practice" that have made several previous medical bills obnoxious to chemists and druggists. The Bill dealt, however, with one subject in which pharmacists are closely interested, the preparation of new editions of the national Pharmacopœia, in regard to which it provided for a continuance of the existing arrangements, ignoring the opinion formally recorded by the Council of the Pharmaceutical Society that practical pharmacists should be associated with any future Pharmacopœia Committee. At the April meeting of the Council, therefore, Mr. HAMPSON moved that, as the Bill contained no provision by which pharmacists would be empowered, conjointly with members of the Medical Council, to revise and prepare future editions of the British Pharmacopœia, a Committee should be authorized to take steps to remedy the omission. The motion was carried unanimously and, as a consequence, it was reported at the next meeting that the President of the Society had had an interview with the Lord President of the Council, and had ascertained from him that the Government was not disposed to agree to the principle of the desired alteration in the Bill. Meanwhile it had become known, by the publication of an official report, that the Medical Council had long before made arrangements for the preparation of a new edition of the Pharmacopœia and that several months previously Professors REDWOOD, BENTLEY and ATTFIELD had been engaged to carry out the work under the direction of the Pharmacopœia Committee. The subject was broached at the May meeting of the Council by Mr. GREENISH, who expressed his disapproval of the course that had been taken by the Professors, a sentiment that was endorsed by several other members. Subsequently a copy of a printed memorandum, similar to others sent to many individuals resident in different parts of the country, was addressed to the President and Council of the Pharmaceutical Society, stating that the Pharmacopœia Committee would be happy to receive suggestions and to give them their most attentive consideration. It was unanimously agreed that this was not the form or degree of representation on the Pharmacopœia Committee to which pharmacists should be entitled, and it was resolved, if necessary, to oppose the Bill in Parliament, authority being given for the drawing up and sealing of a petition for presentation to Parliament if necessary. A similar view of the general subject was taken by the Council of the Pharmaceutical Society of Ireland, which found expression in a memorial presented to Lord CARLINGFORD and a petition to Parliament that was confided to the President of the British Society for presentation at an opportune moment. A few days afterwards a memorial was drawn up for presentation to the Privy Council, in which the case of the pharmacists was briefly stated and the insertion of a new clause in the Bill was suggested to the effect that a Pharmacopœia Committee should be established consisting of six medical practitioners, to be nominated by the Medical Council, and five Pharmaceutical chemists, four to be nominated by the Pharmaceutical Society of Great Britain (one to be resident in Scotland), and one by the Pharmaceutical Society of Ireland. Notwithstanding every effort, however, the Bill went down to the House of Commons without alteration in the direction desired. It was, therefore, felt that the time had come to prepare for making the influence of the trade felt in a constitutional manner. A form of petition, based upon the memorial was drawn up, copies of which were supplied to Local Secretaries of the Society in the provinces and to leading pharmacists in London, and through the praiseworthy efforts of those gentlemen, upwards of two hundred well-signed petitions were soon ready for presentation through the local members of Parliament upon reception of a notice from the Committee. The Bill, however, made little progress, having been "blocked" in the interests of some of the medical corporations affected by it, and the petitions were not presented until August, a few days before the Bill, notwithstanding much pertinacity on the part of the Premier, received its quietus by withdrawal before it had been read a second time. There is reason to believe, however, that the authorities have now become more appreciative of the views of pharmacists upon this subject, and it is hoped that this will become apparent in any future Medical Bill.

Another parliamentary Bill that occupied the attention of the Council was the Patents Bill, which, as originally introduced, contained a provision relating to the use of the royal arms, which might have become a source of great vexation to pharmacists, as well as to tradesmen generally. Attention having been called to the clause by Dr. SYMES, it was decided that an attempt should be made to effect its modification. After some correspondence, the Board of Trade drew up an amended form of the clause and suggested that if satisfactory the Council might arrange for this to be moved on the report of the Bill; the amendment was accepted as satisfactory, and was eventually adopted in Parliament. The Explosives Bill was passed in such haste that no time was given for its consideration; but immediately after it had passed attention was called in these columns to its possible aspect towards chemists and druggists carrying on a certain class of trade, and this view was confirmed subsequently by a communication from the Home Secretary. In order, therefore, to prevent as far as possible annoyance as the result of ignorance, our readers were supplied with a *résumé* of the Orders in Council applying to the sale and keeping of explosives. Bills for the amendment of the law of partnership and the registration of firms, both of which would have to some extent affected the working of the Pharmacy Act, were introduced into Parliament, but failed to pass, and the same fate befell a Petroleum Bill.

Education and examination are subjects that every year occupy a large portion of the time of the Council. In March a Committee appointed to consider the best method of giving effect to the resolution passed by the Council in the previous year in respect to the establishment of a curriculum presented a report. The Committee made sundry recommendations which it was suggested should, with those previously adopted, be incorporated into the bye-laws, and come into force after the end of 1887. The chief feature in the Report was a recommendation as to the division of the qualifying examination into two parts, one of them to be a written examination on prescriptions, pharmacy and theoretical chemistry, to be conducted in London and Edinburgh and certain local centres; the other to be *vivâ voce*, dealing with practical dispensing, botany, materia medica and chemistry, and confined to London and Edinburgh. This recommendation was practically identical with one that had been rejected in the previous year, the only difference being that the proposed interval between the two parts of the examination had been extended from six months to one year. The proposition was strongly opposed by Messrs. HAMPSON and WILLIAMS, who looked upon it as *ultra vires*, and by Mr. GREENISH, who objected to a written examination upon prescriptions and pharmacy. On a division, however, the report was adopted by a large majority. The subject then lapsed until August, when Mr. SCHACHT urged that steps should be taken to carry out the resolution of the Council, and in October a Committee was appointed to frame, with the assistance of the Solicitor, the necessary modifications in the bye-laws. In May the sanction of the Council was given to the new regulations for conducting the Preliminary examination which will come into force for the first time at the examination to be held next week. These regulations are altogether favourable to the candidates, since they secure a longer and definite time for each subject, and in the Latin a choice of one of two authors is given.

Whatever may be the amount of deterrent influence exercised by inroads of unqualified competitors or the stringency of the examinations, these causes combined are insufficient to prevent an increase in the number of aspirants to enter the business of a chemist and druggist. The gross number of persons who came up for examination last year reached 2426, being an increase, as compared with the previous year, of 396, in which all the examinations shared. For the Preliminary examination there were 1539 applicants, against 1260 in 1882, of whom 770 passed, or just 50 per cent., showing again a slight improvement. There were also 93 certificates received in lieu of examination, making no less than 863 persons who thus crossed the threshold of pharmacy. The legal qualifying, or Minor, examination, which had in respect of the number of candidates remained stationary at about 650 for three previous years, rose last year to 766; but the failures were very numerous, only 294 or 38·4 per cent. having passed, so that notwithstanding the largely increased number of candidates only six more persons became entitled to registration than in 1882. The statistics as to the Major examination are relatively satisfactory; for there were 111 candidates, of whom 55, or 50 per cent. passed, against 103 candidates in the previous year, with 60 per cent. of failures. In view of the large proportion of failures in the Minor examination, which might suggest the idea that it is made unduly stringent, it is important to note that Dr. Greenhow, the Government visitor at the examinations held in London, in his last report says that whilst it may possibly happen that a rather weak candidate occasionally passes, he believes that no competent candidate is ever rejected. Dr. Maclagan, too, the Government visitor at the examinations held in Edinburgh, in his report says that he "cannot attribute the large "proportion of failures to any other cause than the "want of preparedness, and the ignorance of what "constitutes preparedness, on the part of the candi- "dates." Indeed, he expresses an opinion that if the project of the Council be carried out with respect to the unification of the examinations an effort should be made to "raise the standard of the pass examination at least up to the level of the present Major." Whilst referring to these reports it may be mentioned that with respect to the proposed division of the examination, and the conducting of one portion in writing at local centres, Dr. Greenhow holds views resembling those of Mr. Greenish, and he also looks with disfavour upon the proposal to make a curriculum compulsory.

The Benevolent Fund has, as always, been the object of much solicitude on the part of the Council; nor is there any reason to be dissatisfied with the result. The yearly income to this noble fund is now a large one, and it is dispensed in the most catholic manner. There is still reason to regret that so small an interest is taken in it by the greater number of chemists and druggists who are not members of the Pharmaceutical Society, and in February last, the Council tried to cope with some of this indifference by sending a copy of this Journal, containing a list of the subscribers and a statement of the manner in which assistance is given, to every chemist and druggist on the register. The income during the year, independent of the interest upon invested capital, amounted to £1922 2*s.*, consisting of £1535 17*s.* in subscriptions, and £386 5*s.* in donations. On the other hand the expenditure has amounted to £1964 5*s.*, the sum of £1283 15*s.* having been spent in annuities, and £680 10*s.* in casual relief. During the year the list of annuitants has been decreased by seven, through death; but it has also been augmented by the election last month of six new annuitants, making the number now forty-one, of whom thirty-one are in receipt of £35 a year, they being over sixty-five years of age. For these annuities the annual responsibility amounts to £1385, and assuming that the casual relief granted in the coming year will reach the sum given in the past, it will be seen that upwards of £2000 will be required to meet the probable expenditure in 1884.

Among other subjects that have occupied the attention of the Council has been that of the investment of the capital of the Society, which previously had been made exclusively in Government funds. At the meeting in March the Finance Committee in its report recommended that a portion, not exceeding three-fourths of the invested capital, should be reinvested as occasion might offer in freehold ground rents or freehold ground. An amendment was moved by Mr. Williams, but the recommendation was adopted. The reference to the subject in the Report of the Council provoked some criticism from Messrs. Sandford and Stacey at the Annual Meeting, but no adverse motion was made and the resolution has since been acted upon to some extent. Another transaction was in respect to a desire that had been expressed that in addition to the class of Honorary Members of the Pharmaceutical Society at present in existence there should be a class of Corresponding Members, to be elected annually under similar conditions and to consist of persons who have distinguished themselves in connection with pharmacy or the allied sciences. In January the subject was, on the proposition of the President, referred to a Committee, which in March reported in favour of the suggestion, and recommended that a bye-law for the institution of such a class should be drafted ready to be brought forward at a convenient opportunity. In March, too, the Committee to which the subject of the importation and sale of spurious and worthless drugs had been referred reported that the practice was not on the increase and did not need further legislation to control it, but recommended the appointment of a permanent Committee to receive information, collect specimens and have them examined, and publish occasional reports. A committee was, therefore, appointed in accordance with the recommendation.

In the course of the year about one hundred and twenty reports of alleged infringement of the Pharmacy Act, in the selling of scheduled poisons by unregistered persons, were received by the Registrar. In the majority of cases any illegal practice that was being carried on was discontinued upon the receipt by the offender of an official letter of warning. In some cases, however, where the offence was persisted in, the authority of the Council to institute legal proceedings was given, and in certain instances it became necessary to recover penalties. There have also been about a dozen cases of prosecution under the 17th section of the Pharmacy Act reported, some of which have been instituted by the executive of the Trade Association and others by the police. There have been a few prosecutions of chemists and druggists under the Sale of Food and Drugs Act, one conviction being obtained for the substitution in dispensing a prescription of cinchonidine sulphate for quinine sulphate, and another for the substitution of sodium salicylate for methyl salicylate. Another batch of cases with respect to the alleged sale of defective spirit of nitrous ether and tincture of quinine were of a very trivial nature and were most of them dismissed. There have also been three convictions under the Patent Medicine Act, apparently due to forgetfulness of the fact that the recommendation of any preparation for internal use as a medicine necessitates the use of a stamp. One curious action brought against a chemist for damages resulting from the loss of a dog, which had helped itself to poisoned food during its perambulations on the wrong side of the counter, was very properly dismissed; but in another action, where loss of life resulted through substitution of a preparation of aconite for one of actæa, damages were awarded, which, it is understood, were paid by the wholesale firm in whose establishment the mistake originated. About an average number of cases of accidental poisoning have been reported, amongst which the particular poisons that the Council of the Pharmaceutical Society has attempted to bring under restriction figure prominently. One of the most noticeable, a glaring case of poisoning by a so-called patent medicine, will be found on another page of the present number.

With the month of May came the Annual Meeting of the Pharmaceutical Society, which was numerously attended. The Report of the Council and the verbal commentary upon it which constituted the President's address were well received, and although the curriculum scheme was the subject of some criticism and an amendment it was warmly defended and the Report was eventually adopted *nem. con.* Mr. Sandford then brought forward a motion for the alteration of the clauses in the draft Bill relating to the responsibility for imperfect labelling of patent medicines containing poison, which, as already stated, was carried. On the evening preceding the meeting the members of the Society and their friends dined together as usual, being favoured with the company of the Lord Mayor and Sheriffs, and a number of distinguished medical and other scientific men. On the evening of the meeting the usual Conversazione was held at South Kensington, which was also largely attended.

The Inaugural Meeting of the Session held in October, was rendered notable by two events. After the usual reports of the Professors, which it is hardly necessary to say were commendatory of the past students, and the distribution of the prizes, an admirable address was delivered by Professor Michael Foster, F.R.S., upon the subject of examinations. This was followed by the presentation of the Hanbury Medal to Mr. John Eliot Howard, F.R.S., to whom it had been awarded by the Committee constituted in accordance with the trust-deed. The occasion was one of deep interest and no one present could have anticipated that the eminent quinologist, who seemed to bear his years so well, would pass away within a few weeks from the time of receiving the honour. One drawback to the evening's proceedings was the announcement that the examiners were again, as two years previously, unable to award the Pereira Medal. With respect to the ordinary Evening Meetings it may be stated that the supply of papers has been moderately well sustained, the number read during the past year having been fifteen as compared with ten in the previous year. It may fairly be said also that most of them were of considerable interest, as will be seen from the following list:—"A Research on the Alkaloid Gelsemine and Some of its Crystalline Salts," by Mr. A. W. Gerrard; "Uranium Oleate," by Mr. W. Gibbons; "Liquid Extract of Cinchona," by Dr. B. H. Paul; "The Bitter Principle of Hymenodictyon Excelsum," by Mr. W. A. H. Naylor; "Remarks on Some Medicinal Plants of Ceylon," by Dr. W. C. Ondaatje; "Note on Essence from Green Ginger," by Dr. C. Symes; "A Note on Sap," by Professor Attfield; "The Classification and Properties of Red Resin known under the Name of Dragon's Blood," by Messrs. Dobbie and Henderson; "The Preparation of Lard for Use in Pharmacy," by Professor Redwood; "Notes and Suggestions upon Tincture of Nux-Vomica," and "On Extract of Nux-Vomica," by Messrs. Dunstan and Short; "Tincture of Cinchona," by Mr. E. G. Hogg; "The Alkaloidal Strength of Tinctura Cinchonæ Flavæ," by Mr. J. O. Braithwaite: "The Purgative Principle of Croton Oil," and "The Vesicating Principle of Croton Oil," by Mr. H. Senier. It it much to be regretted, however, that the Evening Meetings of the Society are not used by a larger number as a means of bringing forward the results of observations in practical pharmacy, which must often involve points that could be more profitably and conveniently discussed on such occasions than in any other way.

Among the educational appliances of the Society the Library and Museum hold a conspicuous place. It is satisfactory to be able to report that there has again been a marked increase in the attendance, the numbers having been 6011 in the daytime and 1764 in the evening, against 4260 and 1513 in 1882. The books taken out from the Library have been 3238, or within a dozen of the number of the previous year. During the same time about three hundred books and pamphlets have been received. An extensive manuscript 'Bibliography of Pharmacy' has also been acquired, and is now available for reference. In the Museum considerable alterations have been made. With the view of rendering its resources more available for purposes of study the crowded specimens in the Materia Medica Museum have been thinned out and those only left in it which it is desirable that students should become acquainted with; specimens which are chiefly used for purposes of comparison or reference, or which have only an historical interest, as well as the collections illustrative of the Indian and United States Pharmacopœias, have been removed into a new handsome series of cases around the walls of the examination room. Additional tables have also been placed in the Materia Medica Museum to permit of a larger number of students using the specimens at the same time. Another feature, which it may be hoped will prove useful to visitors, is the addition of a case for the exhibition of recent donations to the Museum or of new remedies, so that drugs or chemicals of recent introduction may be easily seen. This case will probably be open to inspection early in 1884. The Museum has been enriched during the past year by the addition of a valuable series of cinchona barks from the Government plantations and gardens in Madras, Darjeeling, Ceylon and Jamaica, their value being still further enhanced by a collection of herbarium specimens obtained from the identical trees from which the bark was gathered, and the fact that in many cases the bark is accompanied by the report of an analysis of it made by Dr. PAUL. Among the more noteworthy of the additions to the collection of foreign drugs may be mentioned a series of Japanese drugs, presented by the Director of Kew Gardens; a number of Brazilian drugs, presented by Messrs. T. CHRISTY and Co. and Messrs. SYMES and HALLAWELL; some interesting specimens of native Natal drugs, from the Curator of the Botanical Gardens, Mr. J. M. WOOD; some Cinghalese remedies, from Dr. ONDAATJE; a very interesting collection of specimens from Mr. R. JAMIE, of Singapore, including a section of the stem and foliage of the Siam benzoin tree, which has been hitherto unknown, as well as a very complete and valuable series of the different varieties of the famous ginseng root of China; and a series of drugs used by the Cree Indians of Hudson's Bay Territory, from Mr. W. HAYDON. The attendance in the Museum during the year amounted to 6268, being 5064 in the morning and 1204 in the evening. Some of the donations to the Museum are, we believe, in sufficient quantity to permit of chemical examination, and the Curator will no doubt be pleased to hand such to any competent gentlemen who are willing to investigate them.

The North British Branch of the Pharmaceutical Society would appear to have had a fairly prosperous year. The Library and Museum continue to be well appreciated, and our pages bear evidence that the Evening Meetings have been marked by the reading of some extremely valuable papers. At the Annual Meeting in April a favourable Report was presented, and Mr. ALEXANDER NAPIER having retired from the presidential chair, Mr. JOHN NESBIT, who had in the previous year been Vice-President, was chosen to fill the office of President, whilst Mr. HENRY BELLYSE BAILDON succeeded him as Vice-President.

In the sister island the course of events has transferred the Pharmaceutical Society of Ireland from a temporary shelter in the King's and Queen's College of Physicians to a home of its own in Harcourt Street, Dublin. The Annual Meeting was held in October, and it is much to be regretted that the address of Professor TICHBORNE revealed the fact that the characteristic negligent indifference of pharmacists is even more marked in that country than in this; for although more than two hundred licentiates had been enrolled in the thirteen years the Irish Pharmacy Act had been in operation, only between sixty and seventy were then members of the Society. Considerable activity has been manifested by the Council in enforcing the law, though legal proceedings will probably prove too expensive a luxury to be long indulged in unless the income of the Society is increased by the adherence of a larger proportion of those interested in keeping trespassers off the domain of pharmacy. Early in the year a request was received from the Government for information as to the working of the Sale of Poisons Act, Ireland. In reply, it was stated that by duly qualified pharmaceutical chemists and apothecaries the provisions as to labelling, etc., were carried out, but that they were ignored by the large class of general tradesmen, who under the Act are in Ireland allowed to deal in poisons; and it was recommended that in order to exercise some control the registration of all sellers of poison should be made compulsory. The Council has also had under its consideration the amendment of the Pharmacy Act, Ireland, and, as already mentioned, it joined with the British Council in endeavouring to secure the proper representation of pharmacists upon future pharmacopœia committees. A resolution having been adopted, at the suggestion of Professor TICHBORNE, limiting the term during which the office of President might be held continuously by one person, that gentleman, who had ably presided over the Society since he succeeded Sir DOMINIC CORRIGAN in 1878, vacated the Chair, and Mr. J. E. BRUNKER was elected the new President, Mr. DRAPER being chosen as Vice-President and Mr. HODGSON as Treasurer.

The Trade Association of Great Britain held its Annual Meeting in London in May. The Report presented cannot be described otherwise than as a gloomy one, since it showed a decrease in the income associated with a diminished balance, and in the words of the Vice-President there appeared to be a threatening of a financial collapse. An energetic attempt was to be made to place affairs on a better footing, which we heartily hope may succeed; for the past history of the Trade Association shows that within its proper sphere such a body is capable of rendering great service in respect to the trade interests of chemists and druggists. No doubt the falling off is partly due to the prevalence of more peaceful conditions in the trade; but the very fact that such an organization is known to be in existence, and can be appealed to, is an influence for good, and to neglect to support it except under the temporary excitement of harassing prosecutions may prove to be the source of regret when too late. Mr. HAMPSON having declined to serve another year as President, Mr. HARRISON, of Sunderland, was elected to succeed him in the office.

The annual gathering of the British Pharmaceutical Conference was held in Southport, in September, and was well attended. It was marked by the delivery of an extremely vigorous address by the President, Professor ATTFIELD, which had more of a political character than is usual in communications to the Conference. Assuming that it was the intention of the Legislature in passing the Pharmacy Act, in 1868, to give to persons who qualify under its provisions a practical monopoly in the supply of medicine to the public, it was not very difficult to prove that no such result had ensued, and a rather gloomy future for British pharmacists was suggested as probable if the Legislature did not interfere to ensure that its original intention should be carried out. The address was extremely well received, and was the topic of an unusual amount of editorial comment in the daily papers, much of which purported to be in favour of some legislation, though somewhat incoherently and with much difference of opinion as to its extent and nature. The scientific and practical papers read at the meeting were quite up to the average in quantity and quality, and most of them will be noticed elsewhere. The British Association also met in Southport, immediately after the close of the Conference, under the presidency of Professor CAYLEY. The American Pharmaceutical Association met in the same month at Washington, and the German Association in Wiesbaden, and both of the meetings appear to have been successful. In Vienna the first International Pharmaceutical Exhibition was held under the auspices of one of the Austrian Imperial Princes, and both in respect to the exhibits and the number of visitors it proved a very satisfactory experiment. Another meeting presenting points of interest to pharmacists was that of the Social Science Association at Huddersfield, in October, when papers were read on the amendment of the law relating to poisons by Professor TIDY and Mr. G. L. BROWNE. The former gentleman advocated the abolition of an authoritative schedule of poisons, arguing that the onus should be thrown upon the seller of deciding what articles he would treat as poisons, and he also maintained that in not issuing compulsory regulations as to the storage of poisons the Pharmaceutical Society had neglected a duty imposed upon it by law. The opportune presence of the President of the Society at the meeting, however, allowed of some light being thrown upon the question from another point of view. Amongst other societies that deserve special mention may be instanced some consisting mainly of junior pharmacists, such as the School of Pharmacy Students' Association, members of which have contributed valuable papers to the meetings of the Pharmaceutical Society and of the Conference, the Chemists' Assistants' Association in London, and a similar association in Edinburgh. At Hawick a new association has been started that promises to do well, and still more recently a students' association has been commenced at Hanley.

It cannot be said that the past year has yielded any very important contribution to the vegetable materia medica, such new remedies as have been recommended—and these have been not a few—consisting principally either of contributions from the chemical laboratory or new applications of old medicines. Neither has the year been so fruitful as some of its predecessors in the elucidation of obscure points as to botanical origin, some little advance made towards the identification of the tree yielding Siam benzoin and the contribution made by Drs. DOBBIE and HENDERSON to the history of the resins passing under the name of "dragon's blood" being almost the only noticeable incidents. The article which has probably occupied the pen most has once more been cinchona bark, one fact becoming more and more apparent that although cinchona cultivation is still increasing in different parts of the world, especially in Ceylon and Jamaica, considerable uncertainty exists as to the exact species that are being grown. It is evident that until this confusion is cleared up the commercial cultivation of the plants can only be carried on by rule of thumb, and the assistance the chemist would be capable of rendering to the cultivator will be minimized through the shortcomings of the botanist. Nevertheless some interesting facts have been placed on record, and one or two of these point to the probability that when the botanist has done his work, he will only have made it still more evident that the cultivator must always look to the chemist to help him to decide under what conditions of growth any species or variety of *Cinchona* may be made to produce the most favourable yield of alkaloid. In the first place Dr. TRIMEN has reported some experience with what were believed to be succirubra plants all raised from one kind of seed, which seems to show that elevation has a great influence on the development of alkaloids, nearly twice as much alkaloid being found in the bark grown at a height of 5500 feet as in the bark grown at 1500 feet, whilst the alkaloid in the former case was mainly lævorotatory (quinine and cinchonidine) and in the latter case principally dextrorotatory (cinchonine and quinidine). Analyses made by the late Mr. J. E. Howard of barks from different elevations in Jamaica and in Ceylon appeared to confirm this inference, and it is worth mentioning that in all the cases the bark grown at the lower elevation, though considered to have the best appearance, was poorest in alkaloid. Mr. D. Howard has recorded the observation that whilst in renewed bark produced on trees after stripping according to Mr. McIvor's plan, in which alternate strips are removed down to the cambium, the proportion of quinine is higher than in the original bark, the reverse is the case in renewed bark produced after the "shaving" process, in which the bark is usually removed uniformly and superficially, the tendency being then to develop cinchonidine at the expense of quinine. He also states, as evidence of the field there is for skill in the selection of cinchonas for cultivation, that he has met with original "red bark" yielding 4 or 5 per cent. of quinine, whilst calisaya bark from individual trees, grown in Ceylon under apparently similar conditions, varied from 3 to 9 per cent. in their yield of quinine. Such a result is perplexing; nevertheless, the general results seem to show that, other things being equal, the plants yielding the most valuable barks grow in the richest soil, which is quite in accord with what might be expected and also with the experience of Mr. Broughton, published a dozen years ago. A similar lesson as to the relative effect of the depth to which the bark is removed appears to be taught by some analyses, made by Mr. J. Hodgkin, of different pieces of Ceylon succirubra quill bark taken from the same consignment, some being natural, some renewed, and some partially natural and partially renewed on the same piece. In the renewed portion of the natural-renewed quill, where the shaving removed would necessarily be decreasingly thin, the quantity of quinine was less than in the entirely natural quills, while the cinchonidine was more than double. The entirely renewed bark showed an increase of quinine equal to 75 per cent., which more than outstripped the increase in cinchonidine. The cinchonine did not show much variation, but there appeared a considerable diminution of alkaloid in the natural bark in juxtaposition to the renewed bark. Similar results have been obtained before, though Mr. Hodgkin has been the first to make them known. Of course the value of any inferences drawn from these results would be dependent upon the extent to which the different pieces analysed were comparable one with another. Dr. Hesse has added two more to the already long list of cinchona alkaloids,—concusconine and concusconidine,—and he has endorsed the claim of the substance isolated from cuprea bark almost simultaneously by three sets of observers to be considered a new alkaloid. He, as well as others, has failed to obtain the crystalline compound of quinine and quinidine which was rather too hastily assumed to have been mistaken for a new alkaloid, but Messrs. Wood and Barrett have now published definite instructions for the preparation of this compound, as well as compounds of quinine and quinidine and quinine and cinchonidine with benzene, the difference in form of crystallization of which they state may be used as a delicate test for an admixture of cinchonidine with quinine sulphate.

Whilst on the subject of cinchona bark, it may be mentioned that Dr. Paul, having been struck by the fact that a sample of professedly B.P. liquid extract of cinchona contained only a very small amount of quinine, was induced to examine several other samples collected from different sources and found that they all agreed in containing but a very small proportion of quinine, varying from mere traces up to 2 grains per fluid ounce. As the liquid extract, if it fully represented the alkaloidal contents of an official bark, would contain about 35 grains to the fluid ounce, Dr. Paul made further experiments to ascertain whether an explanation was to be found in the official process being insufficient for the complete exhaustion, in which he used a sample of ordinary "flat calisaya," as now met with, and a sample of Indian bark, both of known composition. Upon analysing the liquid extracts made according to the B.P. process and the residual marcs, it was found that only about one-seventh part of the alkaloids in the original barks had passed into the preparations. These results were communicated to the Pharmaceutical Society at an Evening Meeting and gave rise to an animated discussion, Professor Redwood maintaining that the official conditions as to the choice of a bark had not been complied with, and that, therefore, the experiments could not be used as criteria in estimating the value of the official process. A remark made by Dr. Paul to the effect that he could not confirm a statement by Mr. Ekin as to the tincture being a good preparation led that gentleman to request Messrs. Hogg and Braithwaite to make some independent experiments, the results of which went to demonstrate the correctness of Dr. Paul's statement, that after the preparation of a tincture of cinchona by the official process as much alkaloid remains in the bark as the spirit has taken out. Connected with this discussion a bye-controversy was started in respect to the well-known preparation of the late Mr. Battley, which, however, revealed little beyond the fact that that gentleman knew better how to keep a secret than was commonly supposed.

Considerable progress was made during the year in working out the chemical and pharmaceutical history of nux-vomica and its preparations, in a series of investigations conducted by Messrs. Dunstan and Short. The first step was to contrive a process for the analysis of the drug, which consisted in exhausting the powdered seeds in an ingeniously contrived apparatus with a mixture of chloroform and alcohol, removing the alkaloids from this mixture as acid sulphates by shaking with dilute sulphuric acid, and then after decomposing with ammonia taking up the liberated alkaloids again with chloroform. When this process was applied to specimens of seeds authenticated as from Bombay, Cochin and Madras, it was found that their richness in alkaloid corresponded with the order in which they are named, ranging in one series from 3·46 per cent. in Bombay to 2·74 in Madras seeds. This variation, which had previously been suspected, having been established, it followed naturally as a corollary that it should be reproduced in the preparations, as indeed appeared in a paper sent by the same authors to the Conference meeting, giving the results of analyses of a dozen commercial specimens of tincture of nux-vomica. In this paper, the authors, availing themselves of the insolubility of strychnine ferrocyanide in dilute sulphuric acid as a means of separating that alkaloid from brucine, were able to show that not only did the proportion of total alkaloid vary, but that there was also a variability in the relative proportions of the strychnine and brucine present. In the results obtained, however, there were signs of another cause of variability in tinctures of nux-vomica, besides the quality of the seeds, which induced the authors to experiment as to the effect of using alcohol of different strengths, and they came to the conclusion, laid before an Evening Meeting last month, that the best results were obtainable in using a mixture of 100 volumes of rectified spirit with 25 of water as a menstruum. Practically the same results were arrived at by Mr. Conroy, who having called attention to the probability after the reading of the first paper, had been working independently on the subject. The use of sodium chloride to assist in the preparation of tincture of nux-vomica seeds had been recommended by Mr. Rother on chemical grounds; but Messrs. Dunstan and Short came to the conclusion that though the exhaustion of the seeds is facilitated by it, which they attribute to a physical and solvent action, the ultimate practical gain is doubtful. In a report upon twelve specimens of extract of nux-vomica the same authors showed that, as was to be expected, the range of variability in total alkaloid and in the relative proportion of strychnine and brucine was quite as great in that preparation, a fact that effectually disposes of the suggestion that the extract might be used as a basis for preparing a uniform tincture.

The bark of *Hymenodictyon excelsum*, which is used in India as a tonic bitter, has been investigated by Mr. Naylor, with the result of disproving the presence of æsculin, which had been alleged, and the isolation of an alkaloid free from oxygen, to which the bitterness appears to be mainly due, which he has represented by the formula $C_{24}H_{40}N_3$ and named "hymenodictyonine," and a peculiar neutral principle. Cusparia bark has yielded to Messrs. Körner and Böhringer three hitherto unknown alkaloids, two of which they have named "cusparine" and "galcipine." Mr. Gerrard has succeeded in obtaining "gelsemine," the characteristic alkaloid of the root of *Gelsemium sempervirens*, in a crystalline form, and as the result of analysis has attributed to it the formula $C_{12}H_{14}NO_2$. Dr. Hay has reported the isolation from *Cannabis indica* of a new alkaloid, which from its physiological properties he has called "tetanocannabin." Theobromine has been found to accompany caffeine in the kola nut by M. Schlagdenhauffen, the compliment being returned, according to Herr Schmidt, by caffeine accompanying theobromine in the cacao nib, where, Dr. Galippe says, it always has copper for a neighbour. Among other contributions to the history of the vegetable bases made during the year may be mentioned the reported isolation of "nigelline" and "connigelline" from the seeds of *Nigella sativa*; of "abrotine," from the common southernwood; of "doundakine," from a West Indian febrifuge bark known as "doundaké," and of "buxinidine," from *Buxus sempervirens*, as well as the formation of an "apo" derivative from colchicine. From oleander leaves Dr. Schmiedeberg has separated one glucoside which he has named "neriin," but which may prove to be identical with digitalein, and another less active that he has called oleandrin, and Mr. H. G. Greenish has given some further information respecting the bitter principles found by him in the allied *Nerium odorum*. Dr. Schmiedeberg has also obtained "apocynin" and "apocynein" from the root of *Apocynum cannabin*, and has pointed out that these, with the oleander glucosides and some other substances, form a group of active principles resembling digitalin in their physiological action, and some of them capable of replacing it with advantage in the treatment of certain forms of heart affection. Neutral principles have also been reported as having been isolated from "manaca" (*Franciscea uniflora*) and "Jamaica dogwood" (*Piscidia erythrina*); and also a camphor from *Lippia mexicana*.

At the February Evening Meeting Messrs. Dunstan and Ransom communicated two interesting papers, which threw light on the action of chlorine upon sodium carbonate in solution, as well as on the constitution of the official liquor sodæ chloratæ, which is generally stated to contain sodium hypochlorite, chloride and bicarbonate. Availing themselves of the observation that hypochlorous acid is soluble in ether, whilst the sodium salt is not, the authors were able to satisfy themselves that during the passage of chlorine gas into a solution of sodium carbonate under the B.P. conditions the sodium hypochlorite at first formed is all decomposed by more chlorine and the final product is a liquid containing free hypochlorous acid, sodium chloride and sodium bicarbonate. If, however, the passage of chlorine be continued beyond this point, the whole of the sodium bicarbonate is decomposed, hypochlorous acid and sodium chloride being formed. In view of this conclusion it was significant that no commercial specimen of liquor sodæ chloratæ examined yielded free hypochlorous acid to ether, but they all gave abundant evidence of the presence of sodium hypochlorite, and the authors therefore concluded that they had been obtained by the decomposition of a solution of bleaching powder with sodium carbonate. Another investigation, reported by Mr. Dunstan, had a bearing upon the chemistry of glycerinum and mel boracis, and was a continuation of previous experiments of the author as to the action of some polyhydric alcohols on borax. His observations went to show that when anhydrous glycerol acts upon anhydrous borax, it combines with half the boric anhydride contained in the salt to form an ethereal salt which he terms "glycerol borin," sodium metaborate remaining. This glycerol borin is decomposed by water, with the formation of boric acid, a reaction that explains the acidity of aqueous solutions of borax and glycerine. In the case of mel boracis there appears to be a liberation of boric acid by the action of the dextrose and levulose contained in the honey upon the borax in presence of water, sodium metaborate being also formed in this case.

A most interesting paper on acetic ether was in March read before the North British Branch by Dr. W. I. Clark; it contained the results of a large amount of experimental work upon the composition, specific gravity and solubility of that compound, so that its value was scarcely diminished by the fact that it was originally undertaken under a misconception as to the Pharmacopœia formula. Once more phosphoric acid has been the subject of a fresh suggestion for its preparation. In a paper read before the Pharmaceutical Association, Professor Wenzell described a process which consisted simply in the oxidation of stick-phosphorus by atmospheric air in the presence of moisture. By far the principal product under these conditions is phosphoric acid; some phosphorous acid, together with ozone, hydrogen peroxide and ammonium nitrate being also formed. Professor Runyon has since reported that he has used this process on the manufacturing scale with favourable results. The introduction into the German Pharmacopœia of a test for benzoic acid, which in order to secure a product sublimed from the resin was based apparently upon the presence of an accompanying impurity, has given rise to a vast amount of discussion. It was evident that the reduction of potassium permanganate, in which the test consisted, could be effected by other compounds than the one in question, and some interesting experiments made by Mr. Dymond, a student in the School of Pharmacy, appear to show that the condition is complied with even by a solution of impure urine benzoic acid. A still more interesting observation made by Mr Dymond is that when benzoic acid prepared from hippuric acid is submitted to sublimation it can be obtained in a form in which in odour, colour and behaviour towards the official tests it exactly resembles benzoic acid extracted by lime from Palembang benzoin. It may be mentioned here that although it has been asserted that the medicinal activity of sublimed benzoic acid depends upon a small quantity of an essential oil volatilized with it, some experiments made with a quantity of this oil by Messrs. Gehe appeared to show that it is practically inert. The nature of the deposits sometimes formed in liquid pharmaceutical preparations has been frequently the subject of speculation, but Mr. Cripps has made a praiseworthy attempt to determine their relative importance. The deposits from a number of different tinctures, collected from various sources, were examined, and as a general result it may be stated they were found to consist principally of starch, colouring matter, and other inert substances. Following up the subject of the solubility of calcic hydrate in water at different temperatures, started by Mr. A. C. Abraham, Mr. Maben has placed on record the results of a number of experiments from which he infers that the temperature of a shop rarely rises above the point at which water will hold in solution the quantity of lime required in the official liquor calcis, and that the explanation of the cases of defective lime water which have been the subject of prosecution is not to be found in that direction. He thinks it more likely to lie in the conditions under which lime intended for the preparation of lime water is kept in stock, since these often favour the production of carbonate. Nevertheless, even with equal parts of hydrate and carbonate Mr. Maben obtained a lime water containing equal to 0·5 gram of calcic oxide per fluid ounce. A singular error which had crept into the United States Pharmacopœia process for the estimation of hydrocyanic acid, has been pointed out by Mr. Cripps, and Mr. Siebold has given reasons for occasionally supplementing the B.P. test by the American one.

In a valuable paper on aromatic spirit of ammonia, read at the Evening Meeting in February, Dr. Thresh described a process which he said yielded a more uniform preparation than the official one. It consisted in distilling the essential oils with the spirit, dissolving the ammonium carbonate and solution of ammonia in the last portion of the distillate with the aid of a moderate heat, and after filtration mixing the two solutions. It was suggested during the discussion that it would be preferable to avoid even this amount of distillation and simply dissolve the essential oils in the spirit. Sweet spirit of nitre was the subject of still another paper, read before the Conference by Mr. A. C. Abraham, in which he suggested a process based on the intervention of calcium nitrate, provided for by the introduction of calcium carbonate instead of copper, as in the official process, which he sai gave a cheap and satisfactory product. Some examinations, made by Mr. W. H. Symons, of commercial samples of spirit of nitrous ether, have revealed considerable deviations from the official requirement and suggests that as long as these commercial preparations find favour amongst chemists and druggists, public analysts will not be at loss for a field in which occasionally to display their official activity. The examination of a sample of iodine liniment which emitted a pungent and irritating vapour led Mr. MacEwan to the conclusion that in its preparation methylated spirit had been used. This opinion received confirmation from other sources and the unpleasant result is considered to be probably due to the formation of iodo-allyl compounds from allyl alcohol present as an impurity in the wood spirit used. Preparations of ferrous iodide have yielded the usual crop of suggestions for their preservation, the principal ones being the addition of a few drops of alcohol immediately after the completion of the combination of the iodide with the iron in the preparation of the solution, the covering of the syrup with a layer of oil, the incorporation of a certain proportion of glucose with the cane sugar in the syrup, and the use of a mixture of glycerine and glucose syrup, which Mr. Percy Wells believes is destined one day to supersede cane sugar syrup in pharmacy.

A considerable amount of attention was devoted during the year to preparations having a basis of fat or a mixture of the paraffin hydrocarbons. The subject was treated in a very comprehensive fashion at the Conference Meeting by Mr. Willmott, who gave the results of a large number of experiments, extending over several years, and made with lard, oil and wax and mineral hydrocarbons. He expressed an opinion that the washing of lard, as ordered in the Pharmacopœia, is without advantage if not detrimental, an opinion which was subsequently confirmed in a paper read by Professor Redwood. In mixtures of oil and wax he found that substances met with under the name of "white wax" formed an unstable element, yellow unbleached wax yielding much more permanent preparations. He also noticed that some of the mineral hydrocarbons develop a disagreeable odour under certain conditions. At the same meeting the possibility of using sesame oil as a substitute for olive or almond oil was reported upon independently by Messrs. Conroy and Maben, the general impression conveyed by the papers being that its use in pharmacy will be limited. Mr. Maben also contributed earlier in the year a valuable paper upon the preparation and composition of nitrate of mercury ointment, in which he pointed out that the omission from the official formula of a statement of the temperature at which the ointment is to be prepared allows of a great variation in the product, which may either be an ointment of elaidate of mercury or an ointment of nitrate of mercury. The disputed question as to the amount of iodine present in cod liver oil has been taken up by Mr. Stanford, than whom no person could be more competent. Taking the average of six specimens from different sources, he found the mean percentage to be 0·000322, a quantity far below what has been asserted in text books. In fact, Mr. Stanford said if these statements had been true, cod liver oil would have been one of the richest sources of iodine known. Iodine, however, appears to be present in minute quantities in many other fish besides cod; indeed the herring contains about four times as much. Incidentally, Mr. Stanford described a very delicate test for iodine in oil. The general subject of the analysis of oils has been dealt with in an able paper by Mr. A. H. Allen, and a similar service for turpentine oil has been rendered by Dr. Armstrong. A further examination of croton oil has been made by Mr. H. Senier, who finds that whilst the portion not soluble in absolute alcohol constitutes the purgative principle, the portion that is soluble in it represents the vesicant property. A suggestion for using this portion of the oil in the preparation of blistering plasters has already been made. With respect to essential oils M. Naudin has pointed out that when they are distilled without the application of heat by means of methyl chloride they are extremely delicate in odour and very stable. Mr. Wells also has made the practical suggestion that the odour and quality of essential oils and distilled waters may be improved and the decomposition of the latter prevented by the addition of a little potassium permanganate to the water before distillation.

From the foregoing it will appear that the past twelve months were very fruitful in respect to the chemical aspects of pharmacy. But a number of other subjects are worthy of mention, being of considerable practical importance, such as the suggestion of Dr. Symes to use "green" ginger in the preparation of an essence of ginger; the preparation of pomegranate bark described by Mr. Siebold; suggestions for the dispensing of potassium permanganate in pills; the use of gelatine, collodion, and solution of gutta percha in the preparation of external dressings, and of wood wool and sphagnium moss for a similar purpose, as well as Dr. Symes's upward filter and Mr. Maben's drying closet. Dr. Quinlan's suggestion of ensilage as a method of preserving medicinal herbs is worthy of further investigation; but judging from the changes known to take place in hay and other fodder whilst in the silo, it cannot be expected that the product would represent exactly the fresh plant. The recommendation of new remedies has also brought some fresh substances under the manipulation of the pharmacist, amongst which may be mentioned paraldehyd, bismuth salicylate, sodium hippurate, the goose-grass and the mullein with its "spike of gold."

Every year brings fresh evidence as to the importance of the *rôle* played by organisms belonging to what are usually esteemed to be the lowest forms of life, and it cannot be ignored that not only such industries as brewing, vinegar making, wine fermenting and bread making, but also the practice of medicine, and, consequently, that of pharmacy, have been profoundly affected by the discoveries made in this direction. During the past year it has become more and more probable that such apparently widely separated diseases as cholera, leprosy, phthisis, whooping cough, gonorrhœa and yellow fever are all attributable to the disturbing influence of specific organisms. Consequently, the search for antiseptics continues, and among those brought forward more or less prominently have been mercuric chloride, trichlorphenol, naphthol, salicyl-resorcin-ketone, various antiseptic tows and carbonic anhydride. The interesting observation has been made that the peculiar action of an infusion of jequerity seeds in setting up factitious ophthalmia is also due to the presence of a bacillus, which is capable indeed of producing much more serious results. Further, the demonstration of the existence of organisms in the soil capable of such widely differing operations as the production of various alcoholic fermentations, the formation of nitrates and their decomposition, and the reduction of sulphur compounds, has afforded a glimpse at a subterranean laboratory of which the existence was, until recently, little suspected.

The book market has been as prolific as ever, and many valuable works more or less closely connected with subjects within the scope of pharmacy have been published. In botany, the *magnum opus* has been the 'Genera Plantarum' of BENTHAM and HOOKER, which has been brought to a close after years of persevering work by the authors. Of a more humble sort, but very valuable in its way, is a 'Student's Guide to Structural, Morphological and Physiological Botany,' which Professor BENTLEY has sent out. Messrs. VAN GORKOM and MOENS, two well-known authorities upon cinchona cultivation, have both published manuals upon the subject. Professor FLÜCKIGER has completed a second edition of his 'Pharmacognosie,' and a want in English literature had been supplied by Mr. H. G. GREENISH's able translation of the 'Plant Analysis' of Professor DRAGENDORFF. 'Fownes's Chemistry' has undergone further necessary modification at the hands of its editor, Mr. WATTS, whose name it now bears. Mr. BLYTH has given us a new work on 'Poisons' and a fresh edition of his 'Analysis of Food.' An entire army of books has resulted from the publication of the new Pharmacopœias for Germany and the United States, including a fresh edition of the celebrated 'Dispensatory.' Even while we write the new 'Year-Book' has come to hand; whilst, least in size, but one of the most welcome to the practical pharmacist, the 'Extra-Official Pharmacopœia' has made its way through a first and well into a second edition during the last half of the year.

The history of no considerable section of the community for a year can be written without having to chronicle the death of good men and true. Among the friends that pharmacy lost during the past year, may be mentioned Mr. WILLIAM SQUIRE; Mr. JOHN ELIOT HOWARD, who only a few weeks previously to his death had received the Hanbury Medal; Mr. JOHN HENRY ATHERTON, a former member of the Council of the Pharmaceutical Society; Mr. BENJAMIN HUMPAGE, a former Auditor and an ever-welcome attendant at the annual meetings; as well as Messrs. HOLLWAY, of Cardiff, Mr. HATRICK, of Paisley, Mr. RALPH DAVISON, of York, and Mr. DUNCANSON, of Stirling, all of whom had served the Society in the office of Local Secretary. Several of the "Founders" of the Society have also passed away, and a connecting link with its early history has been removed in the widow of Dr. JONATHAN PEREIRA.

We have thus once more endeavoured to weave into a coherent whole the story of the scattered incidents of another year. In doing so we have endeavoured to keep strictly within the limits of pharmaceutical subjects; but much more might have been written without going further afield than the changes which are revolutionizing the alkali industry, the progress of research in pure chemistry and physics, and the application of scientific principles to technical industries. We suspect, however, that the patience of some of our readers has already been sufficiently tried, and we lay down the pen with the wish that the year which is opening may be remarkable for the advancement of the true interests of pharmacy and the prosperity and happiness of all who follow it as a calling.

On Monday evening next, the London Section of the Society of Chemistry will hold a Conference in the rooms of the Chemical Society, Burlington House, to consider and discuss the subjects of the "Desirability of Uniform Methods and Bases of Analysis" and the "Practicability of Establishing an International Agreement concerning them." Representatives from the Chemical Societies, the Pharmaceutical Society, the Society of Public Analysts and other associations have been invited to attend.

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Within the last few days the authorities at the Patent Office have issued, in a pamphlet form, the new rules for the registration of trade marks, with the classification of goods and a table of fees, which will apply under the Patent Act that came into operation on Tuesday last. We propose to supply a *résumé* of the rules in next week's Journal.

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The *soirée* of the Associated Scientific Societies of Liverpool, which has now become an annual event, was held at St. George's Hall, on the 19th ult. It passed off with great *éclat*, more than three thousand ladies and gentlemen having been present.

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A meeting of the School of Pharmacy Students' Association will be held on Thursday next, January 10, at 8 p.m., when a paper on "Hydroxylamine" will be read by Mr. W. H. Ince, and a Report upon Inorganic Chemistry will be made by Mr. Lowe.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fifth meeting of the sixth session was held in the Pharmaceutical Society's rooms, 119A, George Street, Edinburgh, on December 26, at 9.15 p.m. Mr. Claude F. Henry, President, in the chair.

The minutes of the previous meeting having been read and confirmed, the President called upon Mr. George Coull to read a paper on some of the "Pharmacopœial Gum-Resins."

Selecting scammony and myrrh as being the most important gum-resins, the essayist gave a very interesting historical account of these drugs. Referring to the collection of scammony, he showed how want of care on the part of peasant collectors tends to lower the value of the product, and that low quality is not only due to carelessness but to intentional adulteration and sophistication. The various adulterants were then mentioned and means for their detection given. After briefly referring to the chemistry of the drug, he proceeded to speak of myrrh on the same lines; a most interesting part of this portion of the paper being that in which he treated of the botanical origin of the varieties of this gum-resin. The paper was well illustrated by diagrams and a full series of specimens.

The President, in moving a vote of thanks to Mr. Coull, said that the paper which had been read was a proof of the good influence of the Association, the writer having been a member for two or three years and one of the Association's prizemen. The paper reflected great credit on Mr. Coull, and was particularly commendable from the fact that he was still an apprentice.

Mr. Joseph Low seconded the motion, which was heartily accorded.

A discussion then took place, in which Messrs. Crowden, Hill, MacEwan and Thomas Stephenson took part.

Several queries were then submitted, and replied to by Messrs. Coull, Hill, Low, Robertson, Thomas Stephenson, Turnbull and others.

The President having intimated that the next meeting would be held early in January, when papers will be read by Messrs. Robbie and Stephenson, apprentice members of the Association, the meeting adjourned.

LIVERPOOL CHEMISTS' ASSOCIATION.

Soap Manufacture and the Soap of Commerce.*

BY ALFRED SMETHAM, F.C.S.

The manufacture of soap, although known in early times, has during the present century reached wider proportions than at any previous period, and has been the study of scientists who, without altering the fundmental principles of the manufacture, have made many improvements in the details. Formerly the term soap was applied to a variety of substances of an oleaginous nature, but it has now become narrowed to those substances used for domestic and industrial purposes for the removal of grease and dirt.

The soaps thus used are classed under two heads—soft and hard. The former is a compound of potash or potash and soda in combination with the fat of a drying oil: but it is simply with the hard soaps that I wish to deal this evening.

Until comparatively recent years the whole of the soaps manufactured were obtained by the action of a solution of soda upon an oil or tallow, sometimes with the addition of rosin; but with increased knowledge and greater competition, various additions have been made which, if not improving the quality, have certainly had the effect of cheapening the production.

* Read at a meeting of the Association, November 8, 1883.

But whether a pure soap or a mixed one be desired, the first proces is the same, viz., the saponification of a fat or as it is technically called the production of curd. To effect this, the fat to be operated upon is placed in large boilers or pans, around which are coiled pipes to conduct steam. The lye, which is solution of caustic soda, is then run in until the whole of the fat is saponified or decomposed. This, then, is the principal operation of soap making and it will be well to consider in what this consists.

Most of the oils and fats used by the manufacturers are complicated organic substances known as glycerides of the fatty acids. This may be more clearly stated, perhaps, by saying that they are a combination of fatty acids with glycerine. In the saponification of a fat the glycerine is displaced by the soda used, and a neutral soda salt formed in its place.

Thus if the fat operated upon were pure stearine we should have the following reaction:—

$$\underset{\text{Stearine.}}{\left.\begin{matrix}(C_{18}H_{35}O)_3\\ C_3H_5\end{matrix}\right\}O_3} + 3\,NaHO = \left.\begin{matrix}C_3H_5\\ H_3\end{matrix}\right\}O_3 + \left.\begin{matrix}(C_{18}H_{35}O)_3\\ Na_3\end{matrix}\right\}O_3$$

The fats, however, are more complicated, and generally cousist of a mixture of fatty acids such as stearic, oleic and palmatic in combination with glyceryl.

In England the chief ingredient of pure soaps is tallow. This is the fat obtained from sheep and oxen, the quality varying somewhat according to the source. As found in the market it is generally white or of a very light brown colour, contains only traces of moisture, and is practically free from mineral salts. Sometimes, however, the colour is dark and the percentage of water is found to be considerable. Unless it has suffered decomposition it is found to be a mixture of neutral fats, consisting chiefly of stearine and olein.

The fat next in importance to tallow is palm oil. This, as it arrives in this country, is a moderately soft fat, of a bright yellow or orange colour, and generally contaminated with variable proportions of water and dirt. It is, therefore, customary to sell it upon a fixed basis as shown by chemical analysis. Owing to the crude methods of production by the natives a portion of the neutral fats have become decomposed, and fatty acids in appreciable quantities are sometimes met with.

The yellow colour of the oil renders it unfit for use without previous bleaching. This is commonly performed by what is known as the bichromate method—a process which is equally applicable to dark-coloured samples of tallow.

The oil is first melted in a caldron and the dirt allowed to subside. The purified oil is then run off into a second vessel and treated with an aqueous solution of bichromate of potash and an excess of sulphuric and hydrochloric acids or hydrochloric acid alone.

The acid first decomposes the bichromate thus:—

$$K_2Cr_2O_7 + 2\,HCl = 2\,KCl + H_2O + 2\,CrO_3.$$

The chromic acid thus set free is again decomposed by the excess of acid with the formation of chromic chloride and nascent oxygen, the latter of which by oxidation destroys the colouring matter of the oil. The second reaction is principally as follows:—

$$2\,CrO_3 + 6\,HCl = Cr_2Cl_6 + 3\,H_2O + O_3.$$

Although I have expressed the reaction which takes place by two equations so as to render the changes more intelligible, the two decompositions really proceed simultaneously and in one operation. The resulting sesquichloride of chromium and the chloride of potassium are found in the water below, and the bleached oil floats on the surface and can be readily removed.

From the above equations it will be seen that the theoretical proportions are as nearly as possible equal quantities of bichromate and hydrochloric acid; but in practice it is necessary to use a large excess of acid in order to ensure the complete reaction, and acid from two to three times the weight of the bichromate employed is generally used. The acid in these quantities has no detrimental effect upon the oil and the exact proportion is, therefore, of no moment.

Besides the two fats already specified a large number of oils are extensively used. Olive oil is commonly employed upon the Continent, but is rarely used in this country. At home cotton seed oil, palm nut oil (a white solid fat, differing widely from palm oil) and cocoa nut oil are most frequently used. When the price is sufficiently low, castor oil and lard, and occasionally other oils, are used in the manufacture.

All these oils are essentially of the constitution before mentioned. The liquid oils are usually rich in olein, whereas palm nut oil and cocoa nut oil are rich in palmitin. On saponification they all yield about one-tenth of their weight of glycerine, which has to be removed by a process to be presently mentioned. This glycerine is now, I believe, being successfully recovered from the spent lyes, and should, at the present prices, leave a wide margin for profits.

Besides the fatty matters, rosin or colophony is employed in the manufacture of yellow soaps. This differs essentially from the fats, and is really a mixture of organic acids known as pinic, sylvic and colophonic acids. These are capable of combining directly with an alkali and forming compounds analogous to those derived from fats, but in the combination no glycerine is formed, and the use of rosin, therefore, reduces the percentage of glycerine in the spent lyes.

The alkali invariably used in the production of hard soap, is, as I have said, soda. In order to decompose the fats it is necessary for it to be in an uncombined or caustic condition, and the presence of even carbonic acid prevents saponification from taking place. The soda used in this country is obtained from common salt by decomposition with sulphuric acid. The sulphate so formed is again treated with coke and chalk and submitted to a high temperature. By this means carbonate of soda is produced which, purified by lixiviation and subsequent evaporation and heating, forms the soda ash of commerce. This it was which until the last few years was sold to the soapmaker, who, after dissolving it, causticized it by the addition of lime. The process was wasteful and required considerable room, which considerations have led to the manufacture of caustic soda by the alkali maker, and the use of soda-ash by soap boilers is now a thing of the past. Some of the largest manufacturers of soap make their own alkali, and thus not only save the profit on the alkali, but also the cost of concentrating the caustic solution, a point of no small consideration when the output is large.

Having now briefly described the raw materials at the disposal of the soap maker, we are in a position to understand the processes which are adopted for their conversion into soap. The boiler first supplies himself with a weak solution of caustic and then melts in a pan a quantity of the fat to be operated upon. The sp. gr. of the lye—as the solution of alkali is called—should not in the first instance exceed 1·050–1·060. The heat is maintained by means of steam, the direct use of a fire being now practically obsolete. The first action of the caustic is to produce an emulsion, and when this is properly formed more alkali is added, the strength of the lye being gradually increased. The reason why a weak lye must be used in the first instance is that soap is insoluble in a strong solution of caustic and the particles of fat would by the use of a strong lye become incased in an insoluble layer of soap which would prevent further action from taking place. The lye is added in until an excess of caustic is found in the pan. More oil or fat, or where required, rosin is then added, and the fat or rosin saturated by subsequent additions of lye. When the operator by examining the texture of the soap considers the reaction complete, the watery solution of soap and glycerine is decomposed by the addition of salt, in a solution of which soap is insoluble. The soap then rises to the surface in a finely divided state, and after complete separation the spent lye is removed. After the removal of the lye the soap is again heated, and if necessary, some weak lye added, so that the soap may assume a "close" texture, as it is called. When this is complete the soap is removed, usually by pumping, to another vessel where it is "crutched." This consists essentially in stirring the mass by rotating arms moved by machinery by which means the soap is brought into condition, and if of too great consistency more water is added. It is now ready for the frames, composed of slabs of wood or iron placed together in a rectangular form, and made in such a manner that when the soap has solidified the sides may be removed. The soap is left in the frames until it is completely set. When this has occurred, the block is taken out and cut into slabs by means of a wire pulled through it in a horizontal direction. The slabs thus formed are placed upon a table with a movable arm across which wires are stretched and the slabs are by this means again divided into bars. It is then, if it be a pure soap, ready for packing. Sometimes, however, it is desired to make up the soap in tablets of given weight. It is then cut up into pieces of the requisite weight and stamped in a press with dyes, the presses usually being worked by hand.

This, then, is a brief outline of the manufacture of a genuine soap; but the exigencies of the case render it necessary to produce a variety of soaps, at cheap prices. This has been brought about by competition and the inability of the public to discriminate between a well-made and a common soap, and consequently it is impossible for any firm manufacturing only pure soaps of high quality to hold its place in the struggle for existence. The cheaper soaps being more readily soluble in water produce a lather more quickly than a pure soap, and as the public does not as a rule make comparative trials as to the lasting powers, and is almost invariably led away by a cheap article, the sale of the best soaps has of late fallen off considerably, and the cheaper kinds have taken their place.

Although I have used the term pure soap to represent a soap manufactured from fat and alkali alone it would be unfair to designate the common soaps adulterated, as we shall see on considering their nature.

A pure tallow soap will only take a certain proportion of water and it becomes necessary to mix other substances with it if the percentage of water is increased. A substance which is useful in this respect, and which at the same time has detergent properties, is silicate of soda. This is the substance known as soluble glass, but it is usually sold to the soap boiler in solution. It is composed of silicic acid and soda in various proportions, and is formed of two kinds, the neutral and the caustic. The neutral has a sp. gr. of about 1·370 and contains about 65 per cent. of water. The proportion of silicic acid is about 26 per cent. and the remainder is soda and impurities. The caustic silicate is a much heavier solution and has a specific gravity of about 1·700. It contains about 43 per cent. of water, 33 per cent. of silicic acid and the remainder alkali and impurities.

These solutions are either used alone, or in combination, and are added to the soap before finishing. It is necessary to "crutch" well to ensure the complete mixing, and the crutching should be continued until the soap is about to set. The silicated soaps generally contain a larger proportion of water than pure soaps, besides the actual weight of silicate, and they can, therefore, be produced at lower prices. The detergent power of these soaps is greater than would be indicated by the pure soap contained in them, and in many districts this variety finds a market more readily than the better qualities. I should here point out that the value of a soap is not altogether determined by the composition. A pure soap may be produced from a discoloured tallow or oil, which as a rule injures the appearance and causes it to command a less value in the market.

A form of silicated soap which obtains a large sale is the mottled. This differs essentially from the mottled soap manufactured a few years back, which was pure, and necessarily of a high standard. It is usually manufactured from bleached palm oil, or from palm nut oil or cocoa nut oil as the chief ingredient. It is usually run with silicate to a considerable extent and contains a variable amount of fatty acids—the quantity depending on the quality it is desired to make. The mottling is produced generally by the addition of ultramarine, which gives to the soap a bright appearance.

Some samples, sold at low prices, have come under my notice which have not only been run with silicate but contain from 6 to 8 per cent. of common salt and not more than one quarter of their weight of fatty acids. The salt is of no value as a detergent agent, and must be looked upon simply as a "make weight." It is only with soaps made from palm nut and cocoa nut oil that the salt will combine properly. The peculiar behaviour of these two soaps in salt water renders them valuable for marine purposes. Very considerable experience is required in making a soap of low quality which shall be firm to the touch and present the appearances of a good soap, and the difficulty is increased in the case of common mottled soap, where it is necessary to have the mottling equally distributed throughout the mass. The methods by which this is attained are kept, as a rule, as trade secrets, but no great difficulty is experienced when the matter is approached on scientific principles.

In the common soaps which are usually used for scouring, etc., the proportion of soda in excess of the fatty acids may be greater than in those used for finer purposes or for toilet use. The choice of the fat must also be regulated by the purposes to which the soap is intended to be put.

The details of the manufacture require careful attention and can only be mastered after long experience, but it is necessary that all the processes should be carried on in the lines I have indicated. The peculiar behaviour of each kind of soap would occupy more time than is at my disposal: nor would it serve to elucidate the processes; but it is important that the manufacturer should be conversant with their properties. As a rule, the larger the amount of stearin or palmitin there is in the fat operated upon the harder will be the soap.

Before closing the remarks upon the manufacture I may just refer to two methods which are occasionally resorted to, to improve the appearance of common soaps. The first of these consists in placing the soap in an oven or stove so that it may become surface died and present a hard "skin." The second of these consists in dipping the soap in a strong solution of brine or other liquid. The salt has a great affinity for water and removes it from the surface of the soap, but the soap itself is quite insoluble. This process improves the appearance considerably and prevents the soap having a sticky consistency on the exterior of the bar.

In treating of the second part of my subject, it may be well to preface my remarks with a brief account of the methods by which I have arrived at the results which I propose to state, as showing the quality of the soaps found in the market. I have now in my possession upwards of three hundred analyses of soap from different sources, which have been submitted to me at various times. In analysing these I have found the following processes the most convenient and accurate.

The water is determined by drying in an air-bath a weighed portion of the soap at a temperature of 120° C. At this temperature the soap swells up and the water is soon expelled without any loss of the fatty matters or danger of losing the substance. The weight is taken after about three hours, and subsequent weights are made at intervals of about an hour until the weight is constant.

To obtain the percentage of fatty acids I find it best to weigh out about 3 grams of the soap in a porcelain or platinum basin, including in the weight of the basin a small stirring rod about 3 inches long. The soap is then dissolved in a small quantity of water in the basin, and when *completely* dissolved, about 5 c.c. of dilute sulphuric acid are added. This decomposes the soap, setting free the fatty acids and forming sulphate of soda. The solution is then gently warmed—preferably on a water-bath—until the whole of the fatty acids have risen. It is then allowed to cool, and the fatty matter will usually form a solid cake. If this does not occur a weighed quantity of purified wax must be added and the whole re-melted. When the cake is formed it is simply moved a little from the side, and the liquid from below, which should contain no fat, is poured off. The cake is re-melted with distilled water and allowed to settle as before. This is continued until the washings are free from acid. The cake is then melted in a water oven and again allowed to cool, and the water which still adheres is removed by gently touching with filter paper, and the basin is again placed in the water oven and weighed until the weight is constant. From the figures obtained the percentage of fatty and resinous acids is calculated.

The soda is determined by adding to the filtered solution from a given weight of soap an excess of standard acid and titrating back the excess of acid by means of standard alkali, using cochineal as indicator.

The percentage of silicate is obtained from the silicic acid found. To obtain this I prefer to ignite about 2 grams of the soap in a platinum dish until the volatile matters are dispersed. After cooling, the ash is covered with a glass and treated with an excess of hydrochloric acid. It is then evaporated to dryness, taken up with dilute acid, well washed and then ignited and weighed.

These are the constituents which it is usually necessary to determine, but it is sometimes required to make a more complete analysis. When this is desired it is a good plan to dissolve the soap in alcohol and filter. By this means most of the adulterating materials are separated The chlorine is best estimated after decomposing the soap with nitric acid and allowing the fat to solidify, as in the estimation of fatty acids, by precipitating with nitrate of silver and weighing the resulting chloride.

The percentage of free alkali is important. It can be obtained by precipitating the clear alcoholic solution with carbonic acid, but I prefer to titrate the solution with standard acid, using phenolphthalein as indicator. The results are good.

In making out the analysis of a soap it must be remembered that the fatty constituents actually exist as fatty anhydrides and not as fatty acids, and if, therefore, we determine the whole of the constituents of a soap and include the fatty matters as the estimated acids we shall find that the figures will add up to about 103 per cent. This is due to the absorption of water by the fatty anhydrides in decomposition. The actual percentage of fatty acids should always be placed as a footnote.

In making a choice of the soaps usually found in the market it is difficult to know which to take as representative, but it will perhaps be sufficient to divide them into two classes, the pure and the silicated, and to give a few of the figures which represent the average qualities:—

Pure Soaps.

	Fatty acids.	Soda.	Water.
Golden Crown. . .	59·16	6·81	33·83
Yellow, No. 1. . .	57·17	6·70	35·92
Yellow, No. 2. . .	56·59	6·38	36·89
White	53·74	7·36	36·57
Yellow	62·61	8·26	29·30
Crown	57·85	6·99	33·26
Brown	58·24	6·64	32·80
White	60·01	6·78	32·69
White	63·11	8·31	28·73
Yellow	55·57	8·27	32·13
Yellow	63·18	7·62	28·13
Pale	57·73	6·49	34·95

Silicated Soaps.

	Fatty Acid.	Soda.	Hydrated Silicate of Soda.	Water.
Common mottled . .	26·26	5·30	2·32	58·97
Common mottled . .	26·26	5 69	1·04	58·21
Mottled	43·76	6·94	4·78	45·12
Mottled	45·84	7·03	3·98	43·00
Common crown. . .	36·16	5·59	7·11	54·79
Common brown. . .	32·50	5·55	8·58	56·50
Mottled	56·91	7·45	3·00	31·41

In conclusion I have to tender my thanks to Mr. Briggs, of the firm of Messrs. Tyson, Richmond and Co., of this city, for kindly supplying me with samples descriptive of the various makes, and for the information and personal kindness he has shown in assisting me in the preparation of this paper.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, December 20. Mr. T. S. Dymond, Vice-President, in the chair.

After the minutes of the previous meeting had been read and confirmed, Mr. R. W. Giles read a paper on "The Relations of Pharmacy to Therapeutics," of which the following is an abstract:—

The Relations of Pharmacy to Therapeutics.

BY R. W. GILES.

The state of pharmacy in the past was so far from that which a scientific vocation ought to hold that pharmacists were not thought worthy of authority even in matters strictly pharmaceutical. The opinion of the doctor, who was supposed to be a man of science though not a pharmacist, was preferred to that of the pharmacist, who was supposed (with too much reason) not to be a man of science. Even now, although the improvement in pharmacy during the last generation has been great, pharmacists in the mass do not give proof of scientific qualification. The lowest evidence that could be accepted as proof of proficiency in the sciences collateral to pharmacy is the Major examination certificate of this Society; and the number of those who can offer that assurance is probably less than 10 per cent. of those who are engaged in the practice of pharmacy.*

It is not to be wondered at, therefore, that pharmacy, which ought to be treated as a department of therapeutics, had not in the past and has not even now a recognized place in therapeutical science. Or rather, it should be said, pharmacy has of necessity a place in therapeutics, but pharmacists are not yet privileged to be its exponents.

The relation of pharmacy to therapeutics may be viewed in two aspects, viz.:—

1. That of pharmacy collectively.
2. That of individual pharmacists.

The first of these aspects must materially influence the other.

The duties corresponding to the above classification are clearly distinguishable, and may be broadly stated as—

1. Pharmaceutical research.
2. Practical pharmacy.

1. Pharmaceutical research is necessary to therapeutics; and therefore the duty of prosecuting pharmaceutical research must lie *somewhere*. But no one will assert that any individual pharmacist is under the obligation to devote himself to the unremunerative task of research, although many have spontaneously done so. Research is a corporate obligation, in which pharmacists have a common as distinguished from an individual interest. It should therefore be undertaken by the corporate unit, that is by the Pharmaceutical Society.

But what is pharmaceutical research systematically conducted in the common interests of pharmacy? Practically it is the preparation of materials for the Pharmacopœia, which is the final record and application of all pharmaceutical research. The conclusion arrived at may therefore be stated thus:—It is the duty of the Pharmaceutical Society to prepare materials for compiling the Pharmacopœia. It must do this both in fulfilment of the obligation devolving upon it as the accredited representative of pharmacy, and in justification of the claim which it has urged to be admitted to share in the preparation of those formulæ by which all its members are bound. This essential preliminary operation has never been seriously undertaken before, and has never been satisfactorily performed; and, therefore, whenever a new edition of the Pharmacopœia has been called for, it had to be prepared in haste from such materials as could be casually collected from desultory investigations. This was intelligible when the College of Physicians had to do the best they could without any special fitness for the work, but if pharmacists claim to be consulted on the score of special fitness they must prove their claim by using the best means for accomplishing that work creditably on the pharmaceutical side—and obviously that is only to be done by systematic pharmaceutical research. If this course were followed the Pharmacopœia might perhaps present a more enterprising and less conservative aspect than that described by Dr. Redwood, at Southampton, in these words:—"He had no reason to anticipate that in the new edition changes so considerable as those which appeared in the new edition of the American work would be introduced. One principle acted upon in this country was that it was not justifiable to introduce into the Pharmacopœia new preparations which had not been proved in medical practice." If Dr. Redwood had said "new drugs," instead of "new preparations," his assertion would be less remarkable, but if it be not the business of the Pharmacopœia to introduce new preparations, what claim have pharmacists to share in its compilation?

But the duty of the Society must be left to the deliberations of its Council and to the decision of its members; it is not a proper subject for discussion by its students, to whom this outline is presented as a necessary element of the relation of pharmacy to therapeutics.

2. The duty of individual pharmacists is to qualify themselves by preliminary scientific training and by subsequent conscientious practice for the most effective co-operation with the higher branches of the therapeutical profession. The modes in which this may be done are too numerous for citation here. A more advanced pharmacopœia, in which standardized preparations will probably hold a conspicuous place, will demand more scientific knowledge and greater manipulative skill than heretofore. Medical practice, emancipating itself from empiricism, demands from pharmacy greater exactitude. An era of scientific development cannot be a period of sloth for those who would keep pace with it, and it is only by improved scientific attainments assiduously employed in the conduct of his business that the pharmacist will secure that professional status to which the practice of scientific pharmacy fairly entitles him. When therapeutics has accepted pharmacy as its coadjutor in the common ground of the Pharmacopœia, the relations of the

* The last year's summary represented the number of Majors as a little over 11 per cent. of the number of registered chemists and druggists; but as many of these Majors are not in business on their own account, the total must either be compared with the total of those engaged in pharmacy (principals and assistants) or an abatement must be made from the total of Majors for those who are still acting as assistants.

pharmacist to the professor of therapeutics must necessarily be improved, and the medical practitioner will not scorn to avail himself of the former's chemical science in aid of diagnosis. The happiest results should follow from such co-operation.

The changes in the future development of pharmacy will be great without being either sudden or startling; for they will be changes of *development*. Hitherto the changes have been organic, for they have been effected by legislation, to wit, compulsory examination and restriction (although imperfect) of the practice of pharmacy to qualified pharmacists. These have operated in the continental manner, and have so far tended to assimilate English pharmacy to the continental type. That assimilation will probably proceed no further: the continuance of the revolution will be essentially English, accommodating itself to English notions, aiming at the greatest practical convenience and disregardful of theoretic symmetry. In this way the whole of the pharmacies throughout the country will gradually follow the lead of the best English examples—they will become fewer in number and will shake themselves free from incongruous traffic, which neither needs nor suits a man trained to scientific pursuits. Yet they will not discontinue the traffic in the numerous articles which are accessory to though not strictly included in pure pharmacy; and pharmacists will continue to hold an intermediate place between the trades and the professions, discharging the functions of the one and possessing the recognized qualifications of the other.

As the result of these conditions they will attain to the status which an educated and scientific body must always enjoy; forming an integral part of the profession of therapeutics, occupying, indeed, a lower position therein than the medical members, but though inferior in professional status not necessarily inferior in scientific attainments.

Backed by the *prestige* of a profession that gives assurance of respectable scientific education, the pharmacist will no longer be excluded from asserting whatever scientific standing his personal qualifications enable him to maintain; and the grievance now felt by exceptional men (allusion to which on a former occasion suggested this discourse) will cease when such men cease to be exceptional.

A long discussion followed, in which the Chairman, Secretary, Mr. Joseph Ince and Mr. R. H. Parker took part. After Mr. Giles had replied, Mr. Baily proposed and Mr. Ranken seconded a vote of thanks to Mr. Giles for his interesting and suggestive paper, which was carried unanimously.

The Secretary then read the following note on "Munjeet in Chiretta," by the Reporter on Materia Medica.

Munjeet Stems in Chiretta,

BY WILLIAM ELBORNE,

Assistant Lecturer in Materia Medica and Pharmacy, and Curator of the Materia Medica Museum, Owens College.

About two months since, among other donations to our museum, I received from Messrs. Woolley and Sons an original bundle of a plant labelled "Roots found in Chiretta."

Owing to its being neatly folded and corresponding in size to an original bundle of chiretta, its physical resemblance to the true drug induced me to examine it more closely. On breaking the package open I observed that it consisted essentially of long slender *stems* divested (naturally) of the external bark, with the remains of a few leaves. I also noticed that towards the apices, where the outer bark remained attached, the stems were rendered square, whereas the stems where denuded were distinctly round, about the thickness of a quill, and of a dull red colour.

From these characteristics I readily discerned that the plant was not that of any species of *Ophelia*, and consequently not the false chiretta of Bentley.*

However, on referring to the Professor's paper I came across the following passage:—"Moreover, beyond the case of false packing described by Mr. E. A. Webb,† in which the roots of *Rubia cordifolia*, Linn. (Munjeet), had been *enclosed* in bundles of chiretta, I know of no published case of adulteration or substitution of the true chiretta in this country."

From the red fracture of the stems in question I had already imagined they were those of some species of *Rubia*, and the above remarks afforded me a clue to the matter. Referring to Mr. Webb's paper, I found that my specimen corresponded exactly with his description, with the exception of the roots being altogether absent.

I thereupon submitted a portion to Mr. E. M. Holmes to compare with specimens in the Museum of the Pharmaceutical Society, who referred it to *Rubia cordifolia*; and obtained authentic specimens from Kew, with which they entirely agreed. Thirteen years having elapsed since the case of "false packing" was recorded by Mr. Webb; its re-occurence will, I think, justify its again being brought under notice, lest the falsification be more frequent than brought to light. Previous to stating the essential characters whereby the stems of *R. cordifolia* may be distinguished from the true drug, I might allude to the fact that the plant is extensively cultivated in India on account of its roots, which when grown constitute Indian madder (European or genuine madder being derived from the roots of *R. tinctoria*), forming a very important article of export over the Himalayas to Thibet, where great quantities are consumed in dyeing the garments of the Shamas: consequently, it is not surprising that the Indian cultivators, finding their refuse stems somewhat resemble chiretta in appearance, should endeavour occasionally to turn them to some profitable account.

The following constitute the leading distinguishing characters botanically:—

Rubia corifoli a.	*Ophelia chiretta.*
Stem.—Long, trailing, outer bark mainly absent; stems on that account round and of a dull red colour. When the outer bark remains attached (at apex), quadrangular, covered with minutest prickles at the angles. Fracture, red. Pith, absent.	*Stem.* — Erect, smooth. Fracture, white, with shrunken pith.
Leaves. — Lamina about 1 inch in length, obcordolanceolate, five ribbed, ribs armed with prickles; supported on long petioles, arranged in whorls of four at the nodes, the latter very conspicuous.	*Leaves.*—Sessile.

Examined microscopically the internal structure of each is so marked that a glance will suffice to distinguish them. In the section of *R. cordifolia* it will, however, be noticed that the woody tissue is more abundant, permeated with very large vessels, and coloured throughout with red matter.

While writing I have been informed by Mr. F. C. Bird that several more bundles have been discovered in other bales. Chiretta being a drug generally supplied to pharmacists in the cut state, this tends, I imagine, to facilitate small quantities of such impurities escaping notice. The infusion and tincture yielded by *R. cordifolia* are, however, of a port wine colour as compared with those of chiretta, which are sherry-coloured.

In conclusion, I beg to acknowledge the services of the authorities at Kew, and those of Mr. E. M. Holmes, Mr. Kirby, and also of Mr. Hermann Woolley, who first detected the adulteration.

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* *Pharm. Journ.*, [3], v., 481.
† *Pharm. Journ.*, [3], i., 367.

Photographs of sections of *Ophelia chiretta* and *Rubia cordifolia*, as well as specimens of the drugs themselves, were exhibited.

After a short discussion upon this Report, the Secretary reported that the revised rules of the Association had been approved by the Council of the Pharmaceutical Society, and would therefore take effect during the present session.

Parliamentary and Law Proceedings.

Poisoning by Almond Flavouring.

Mr. J. C. Malcolm, the Leeds Borough Coroner, held an inquiry, on Dec. 14, 1883, into the death of Elizabeth Heselwood, who had been an inmate of a private asylum at Acomb, near York, and who returned to her family occasionally. She came home, after several months' absence, under the care of a nurse. All went well until the night of the 14th of December, when Mrs. Heselwood, who had been in unusually high spirits that day, was found dead in bed shortly after twelve o'clock. By her side was a small bottle, which had contained almond flavouring, but which was then empty.

Mr. Stacey, surgeon, who was called in, said that death had been caused by the flavouring, 2 drachms of which would be sufficient to poison a man.

Mr. Heselwood stated that on five or six different occasions his wife had attempted to commit suicide.

The Jury found that the unfortunate lady had committed suicide whilst of unsound mind. They were convinced that every care had been taken of her, and expressed their sympathy with Mr. Heselwood.

The Explosion of a Mixture.

On Wednesday, December 26, 1883, the adjourned inquiry into the circumstances attending the death of William Turley, who died in the Manchester Royal Eye Hospital, whither he had been removed from Warrington, was held before Mr. Sydney Smelt, the City Deputy coroner. It will be remembered that deceased purchased small quantities of aquafortis and quicksilver, which were mixed in one bottle and served to him by Mr. Woods, chemist; that deceased placed the bottle in his breast pocket, and that while walking home the bottle exploded and the contents seriously burnt his eyes and face.

G. Harry Nichol said he was an assistant to Mr. Woods and remembered the deceased coming for the two ingredients named. His master did not say, in reply to a question from the deceased, that the stuff would be all right or safe in the bottle. Mr. Woods had himself cautioned deceased as to the dangerous character of the drugs, but only on the first occasion, when deceased made his first purchase at the shop.

James Forster, a butcher in the employ of Mr. Gill, of Warrington, said he saw the explosion. The cork "flew" out of the bottle, and the contents were blown in the face of the deceased just as he reached his master's shop door. Deceased asked for water, which witness procured, and afterwards assisted him into a neighbouring chemist's shop.

Mr. A. H. Griffiths, house-surgeon at the Manchester Eye Hospital, said if deceased had recovered, one eye would have been blind, and the other injured. From the *post-mortem* examination of the deceased he found that the cause of death was collapse, brought on by diarrhœa, which resulted from ulceration of the bowels, and though the burns might have caused the ulceration he could not tell whether such had been the cause or not. Deceased was not a very strong man.

The Coroner having carefully summed up, the jury retired, and on their return the foreman said they were not satisfied that death had been caused by the burns. They were, however, satisfied that Mr. Woods, the chemist, had been guilty of negligence, but thought a censure from the Coroner would meet the case.

Mr. Smelt said he quite agreed with the jury. No one who had heard the evidence could doubt that Mr. Woods, being a member of the Pharmaceutical Society, had been guilty of negligence in mixing the two ingredients and giving them to the deceased in a corked bottle.

The formal censure having been given, a verdict was entered to the effect that deceased died from collapse caused by ulceration of the bowels.—*Manchester Courier.*

Poisoning by Carbolic Acid.

On Monday, Mr. William Carter, Coroner for East Surrey, held an inquiry at St. Thomas's Hospital, respecting the death of John Thomas Denton, aged 26 years, an auctioneer's clerk, who was to have been married on Christmas morning, but who was discovered in an insensible condition with a bottle labelled "Poison" by his side, while the bride and friends were awaiting his arrival at the church. The deceased afterwards tried to speak, but could not. The bottle was labelled as having come from Messrs. Brooks and Hadwin, surgeons, Waterloo Road, but the writing on the label had been rubbed out. A witness then took the bottle to Brooks and Hadwin's to ascertain what it had contained and was informed that it had contained a poisonous liquid, and Mr. Hadwin advised that the deceased should be taken to the hospital, whither he was conveyed i a cab.

Mr. Arthur Foxwell, house physician, deposed to receiving the deceased on his admission in an unconscious state, breathing stertorously, and with livid features. Witness attempted to administer an antidote, but could not. A bottle was shown to witness, which contained a small portion of carbolic acid. The deceased became worse and died about 2 o'clock the same day from the effects of poison.

Further evidence having been adduced, the Jury returned a verdict of "Suicide while in a state of temporary insanity."—*Times.*

Poisoning by a Patent Medicine.

The Coroner for Central Middlesex, Dr. G. Danford Thomas, held an inquiry on Monday at Paddington, as to the death of William Henry John Heath Shehan, aged seven months, which was alleged to have resulted from the administration of a patent medicine sold as a specific for whooping-cough.

William Francis Heath Shehan, 23, Marylands Road, Paddington, said deceased was his child. It had been brought up by hand owing to the death of its mother, and had been suffering about a month from whooping cough. He had given it a patent medicine called "Holt's specific," as many persons had recommended it, and a child in the same house, aged one year and nine months, was also taking it.

Martha Wilkinson, residing in the same house, said she took charge of the child on the death of its mother. She had given the child five doses of the "specific" altogether, the dose being one teaspoonful every four hours. She gave the doses regularly. On Wednesday night she put the child in its bassinet, and on Thursday morning, about 8 o'clock, she found it dead. She had intended to send for a doctor that morning, as its breath had been short all day on Wednesday. She expected the medicine to make the child sick, and it did so the first dose.

Dr. Finzi, who was sent for shortly before 9 a.m. on Thursday, said the child had been dead about an hour. There were no signs of suffocation. He had made a *post-mortem* examination and found the lungs healthy, but with the air-cells enlarged. There were patches of inflammation in the stomach and intestines which had been caused before death, which was due to failure of the heart from poisoning by antimony when suffering from whooping cough. He had analysed the specific, and found it contained antimony which would have the effect of creating excessive vomiting, depressing the heart's action, and irritating the stomach and intestines.

The Coroner: Now, taking into consideration the number of doses administered to the child and the quantity taken in each of those doses, do you consider the antimony had any share in causing the death?

Witness: Yes.

The Jury remarked that the Government ought to interpose to prevent the sale of these patent medicines, which were simply poisonous rubbish.

The Coroner concurred, but said under the existing law there was no mode of stopping the sale of these dangerous medicines. Persons could take out patents without being compelled to state the ingredients, which they kept a secret. In France the case was different. The law compelled a statement to be made outside the vessel what the contents consisted of. Such a law was required here to protect the public.

Dr. J. E. Curgenven, Craven Hill Gardens, deposed, in obedience to the coroner's warrant, that he had assisted Dr. Finzi in the *post-mortem*, and corroborated his evidence. There was half a grain of antimony in each dose. The witness added he had seen two children suffering lately from the effects of the same medicine. One had died, and an inquest was held on it; the other had its heart so enfeebled that he had been obliged to administer brandy to it, and it was now recovering. This specific was vended by a lady who kept a confectioner's shop, who did not, he supposed, know the effects of antimony.

The Coroner supposed the "secret" had been handed down to her, as the handbill advertising it said it had been established eighty years.

Dr. Curgenven then described the effects of antimony, and said that the deceased was healthy and well-nourished. There were no traces of disease in the lungs, and it would have lived had it not been for the administration of the antimony. No doubt the death had resulted from the effects of antimony contained in the preparation called "Holt's Whooping-cough Specific."

The Coroner here remarked that on the previous inquest held by him a fortnight since, the proprietress of this "Holt's specific" attended with her solicitor, but made no comments. It was strange, however, that neither of them were present on this occasion.

The Jury, having consulted for some time, returned the following special verdict:—"That the deceased had died from syncope through failure of the heart's action when suffering from whooping-cough; and the said jurors are further of opinion that the said death was accelerated by the administration of antimony contained in a mixture called 'Holt's Specific for Whooping-cough,' and the jurors desire to call the attention of the Home Secretary to the want of protection to the public in the sale of patent medicines, with a view to some legislation restricting the sale of those containing poisons and other dangerous remedies."—*Times*.

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Correspondence.

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

THE POISONOUS PROPERTIES OF RHODODENDRON PONTICUM.

Sir,—On reading the paragraphs in "The Month," in the Journal of December 29, relating to the queried poisonous properties of honey from the flowers of *Rhododendron ponticum*, and of the leaves of the same, I thought, as I was in possession of some facts bearing on the question, I would send them to you. In December, 1882, I was consulted as to the cause of death of some twenty sheep in this neighbourhood, suspected to have been poisoned. I had one of them brought to me entire and removed the paunch, which was much distended. In this I found, besides hay or grass, a considerable quantity of half-chewed leaves which I had no difficulty in identifying as those of the rhododendron. This was then confirmed by finding tracks of the sheep in the snow to a bed of rhododendrons in the park, which showed that they had been bitten and eaten. I was informed that the sheep rolled and staggered about before death, as if drunk. The veterinary surgeon who had charge of the case gave me at the time the medical particulars of the affection and the *post-mortem* appearances. I cannot now state them accurately, but could get them if required. My object is just to place on record what appears to me to be a very clear and decisive case of the poisonous action of *Rhododendron ponticum*, and it is the more important that this should be known, as the planting of this shrub and its hybrids in parks, etc., has much increased of late years.

Bradford. ROBT. PARKINSON.

"*Justitia*."—We do not remember having made such a statement. Your proper course would be to apply for the information to the Dean of the medical school you propose to enter.

R. Shenstone.—As to the dispensing of potassium permanganate pills see the references in the index to the last volume of this Journal.

J. A. L.—We have not heard that the work referred to has yet been published; neither are we acquainted with one of the same nature.

Query.—We do not believe there is such a work.

A. Wrighton.—The first of the Cantor Lectures on the Scientific Basis of Cockery was published in the Journal of the Society of Arts for December 29.

Inquirer.—The common sundew (*Drosera rotundifolia*) and other members of the Droseraceæ. See Darwin's 'Insectivorous Plants.'

M. M.—(1) The hypnotic and anodyne action of codeine is relatively slight (see *Pharm. Journ.*, [3], iv., 88). (2) 'Pharmacographia.'

"*Cryptogamic*."—(1) We do not think the book mentioned alone would quite suffice for the purpose. (2) We are not acquainted with the work.

Inquirer.—A list of the certificates accepted in lieu of the Preliminary examination is published in the Society's Calendar.

J. Straphey.—A candidate for the Minor examination must be of the full age of twenty-one years, and must also have passed the Preliminary examination or an accepted equivalent.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Wilkinson, Whitla, Möller, Tyrer, Bennett, Torkington, Harris and Co., Samuel, Druggist.

THE OCCURRENCE OF SUGAR IN TOBACCO.

BY PROFESSOR ATTFIELD, F.R.S.

About a year ago the following questions were put to me, "Does tobacco contain sugar or any similar saccharoid matter? if so, how much?" The subject not previously having come before me I could not definitely reply. Indeed, a search through the literature of tobacco showed that the questions could not satisfactorily be answered at all in the existing state of our knowledge. I therefore proceeded to obtain evidence on the matter by direct chemical investigation. Samples of cut and uncut tobacco were obtained and tested for sugar by the copper test, the fermentation method, and the polariscope. The copper test not yielding concordant results was discarded: it is a good test under most circumstances, but for the quantitative estimation of sugar in tobacco infusions, or, probably in similar vegetable infusions and decoctions, it appears to be untrustworthy. The examination of tobacco infusion by the polariscope will be referred to subsequently.

All the samples readily yielded alcohol when properly fermented with yeast; hence all, presumably, contained sugar, the amount varying from 4 to 9 per cent. But as they were obtained from ordinary trade sources, and as tobacco has been known to have molasses, honey, and other varieties of sugar mixed with it, the samples obviously might contain sugar, and yet sugar not be a natural constituent of tobacco. I therefore proceeded to examine specimens obtained from museums and one which had been raised in my own garden during the previous summer. The latter contained only traces of sugar; but it had been grown in the open, at anything but a tropical temperature, and was not, I think, ordinary Virginian tobacco, but rather the Maryland variety. I may even state, here, that a sample grown in my garden last summer, under better conditions of sunlight, with more care, and from which the flowering tops were frequently nipped off to promote development in the leaves, furnished less than two per cent. of saccharoid matter. Of the other samples some did and some did not afford evidence of the presence of sugar. A specimen of old dark coloured Indian leaf gave no sugar, a light coloured Indian leaf yielded 1·54 per cent., calculated as cane sugar. A bundle of leaves marked "Original sample as drawn from dock at Liverpool," furnished 10·84 per cent. These results being unsatisfactory, for my purpose, I at once asked six or eight of my chemical and pharmaceutical friends, residing in different parts of the great tobacco-producing States of America, namely, Virginia, Kentucky, and North Carolina, to obtain for me authentic samples of genuine tobacco. Each correspondent, kindly, at once, acceded to my request. Neither was in any way connected with the tobacco interest, each resided many miles from the rest, and neither of my friends knew that others were simultaneously collecting samples for me.

While waiting for these authentic samples of American tobacco leaves I ascertained that such precipitants as basic acetate of lead and lime water would remove, from tobacco infusions, alcohol-yielding material, equivalent, on the average, to about 3 per cent. of the tobacco. The saccharoid matter not thus separated may be termed *tobacco sugar*; while this, together with the fermentible matter precipitated by the reagents named, may be termed *total saccharoid matter.*

The samples from the United States duly reached me. They yielded the following results:—

	In 100 parts of tobacco leaf. Tobacco sugar.	Total saccharoid matter.
A	7·00	9·87
B	5·57	8·61
C	7·76	10·94
D	9·60	12·80
E	7·43	10·20
F	9·29	12·40
G	5·57	8·23
H	6·81	10·10
Average	7·38	10·39

The inference is obvious, namely, that tobacco does contain sugar, the amount varying from mere traces, in tobacco grown under conditions not favourable for the production of sugar within the plant, up to nearly 10 per cent., or possibly more, in the light coloured or bright Virginian leaf. I say that, bearing in mind the origin and the results of the analyses of these specimens, their sugar, or fermentible saccharoid matter, is natural; unless we make the absurd assumption that amongst tobacco growers there exists a secret yet apparently universally enforced convention for saturating tobacco plants with a solution of a special and elsewhere unknown variety of sugar.

In cases of suspected sophistication the fermentation method of analysis would probably be adopted, and then as much as 13 per cent. of natural saccharoid matter, or possibly more, might be obtained from tobacco. I myself have examined a large number of commercial samples of tobacco, both uncut leaf and cut, in the form especially of cigarettes, and I have obtained by this method percentages of saccharoid matter varying from 4 to 12½. Even a specimen of a popular dark coloured tobacco, specially fermented to develop highly prized odours and flavours, but which, as chemists would expect, had probably lost much of its sugar during the process, yielded 3 per cent. of tobacco sugar and 5¼ per cent. of total saccharoid matter. It will be seen that the greatest yield of sugar from the trade samples is less than the maximum from my standard samples of genuine tobacco. The average yields of the two sets were very close, both being very near to 10½ per cent. The results indicated, therefore, that the trade samples did not contain added sugar.

If a sample of tobacco contained added sugar its percentage of matter soluble in water would also be raised, and the proportion of matter insoluble in water *pro tanto* be reduced. My authentic samples yielded from 32 to 37½ per cent. of insoluble matter, the average being 35·7. One set of commercial samples yielded an average of 35·9 per cent. of insoluble matter; the assumption of any systematic sophistication of these by sugar was, therefore, again negatived.

The sugar in tobacco appears to possess little, if any, action on polarized light. Such a fact would be of considerable importance in any examination of tobacco infusion for added sugar,—sucrose, glucose, lactose, etc.,—which all exert well-marked dextro-rotatory or lævo-rotatory power on polarized light. The commercial samples of tobacco I have myself recently examined, with scarcely an exception, yielded infusions which, even when colourless, did not perceptibly affect a polarized ray; therefore, with a bare exception they were unadulterated by sugar. Certainly samples forwarded to me by officials of the Customs in London, at the request of owners, did not contain added sugar. But the fact has, also, theoretical importance, for the existence of a *tabacose*, as we may term it, if it is a true sugar, having such properties, would point to the existence of a sub-class of fermentible but non-rotatory sugars. Possibly, however, the action of this fermentible substance on a polarized ray is only masked.

The isolation and complete chemical and physical investigation of the saccharoid principle or principles in tobacco remain to be accomplished. I should myself proceed with this work, but am assured by a friend that he has already commenced and intends to complete and to publish the results of such a research.

I have to thank the following gentleman for supplying me with specimens:—Mr. T. Roberts Baker, Richmond, Virginia; Mr. C. Lewis Diehl, Louisville, Kentucky; Mr. Marshall C. Hall, Fredericksburg; Mr. F. H. Masi, Norfolk, Virginia; Messrs. Charles F. Tag and Son, New York; two friends in Danville and Lynchburg; Mr. E. M. Holmes,; and the representatives in England of Messrs. Goodwin and Co., Messrs. Allen and Ginter and Messrs. Kimball and Co. Messrs. Stillwell and Gladding have also been good enough to furnish me with information respecting the non-saccharoid principles of tobacco.

CANADIAN INDIAN REMEDIES.

In the course of a lecture on Canada and its Products, delivered by the Marquis of Lorne before the Society of Arts on the 19th ult., he said:—

"Much is said of the knowledge possessed by the squaws of simples; it is certain that they are very clever in producing decoctions and in making poultices from various trees and shrubs whose healing properties are well known to science. Thus, from the bark of a certain species of willow, a preparation can be made which stanches hemorrhage, and quickly heals a wound. Strange tales were told us of the efficacy of some of their medicines. A gentleman employed in botanical research was puzzled by an application made to a slight wound he had sustained; he had, when shooting, hurt his thumb by the accidental discharge of his gun, and for some days, having nothing but water with which to bathe it, he was in considerable pain, and the thumb became much inflamed. Lighting one day, in the course of his march, on a camp of Sioux Indians, one of the women observed his hurt; she came to him and gave him a milk-like liquid, and told to apply this when he felt pain; he did so, and from the first application the pain ceased, and in a few days a very complete cure was effected. A sergeant in the Mounted Police was an eye-witness of the effects of an opiate given to a man, for whom the ordinary remedies of opium, laudanum, and chlorodyne had proved useless. It was evident that the medicine man had some good stuff, although it was equally certain that he employed a great deal of what is known as *hocus pocus* in applying it. He asked for a vessel, and after a time poured into it a white liquid he had concocted. He then covered this vessel over with a skin, pierced holes in the covering, rolled up some pellets of buffalo hair in his hand, muttered some pretended incantations, and dropped these balls of hair through the skin into the liquid. After a while, the covering was removed, and it was seen that the vessel held no longer a white but a red liquor. This, with an amount of faith which one does not often find in a sick patient, was drained by the invalid, and a sound sleep, which was the beginning of a perfect recovery from the illness, appeared to be the result. There may be something worth discovering in the application made by the Indians of certain herbs; but it is to be noticed that the roots and plants hitherto found in the medicine man's lodge have, as a rule, been plants whose properties are already well known to science."

THE SALE OF POISONS IN IRELAND.—DEPUTATION TO THE CHIEF SECRETARY.

On Tuesday last a deputation from the Pharmaceutical Society of Ireland waited on the Chief Secretary, at the Castle, to draw attention to some of the defects in the Pharmacy Act of 1875, and to suggest certain amendments. The deputation consisted of Messrs. James E. Brunker, M.A., President; Harry Napier Draper, F.C.S., Vice-President; Drs. Allen, Collins, Grindley, Hayes, Hodgson, Montgomery, and Mr. Simpson. Mr. Hugh James Fennell, Registrar to the Society, accompanied the deputation.

Mr. Brunker said the object of the deputation in waiting on the Chief Secretary was to call his attention to the state of the law regulating the sale of poisons in Ireland. In the greater part of Ireland, at present, the Sale of Poisons Act was a dead letter. In small country towns and villages they were sold by hucksters, stationers, ironmongers, grocers and others. In England, up to the passing of the Act of 1868, there had been absolutely free trade in the sale of poisons and medicines. When that Act was passed it was provided that persons who at the time were actually carrying on business in that way should be allowed to continue it, but that they should be registered—without any qualification. In Ireland the position of chemist and druggist was different. Until the passing of the Act of 1875 they had the right of retailing poisons, but had not the right to compound medicines. Such chemists and druggists as were in existence at the time were allowed to continue in business. They were obliged to pass an examination but were not obliged to register. By section 31 of the Act such persons had reserved to them the right to continue to sell poisons without any examination, but no machinery was adopted whereby such persons should be registered. The Pharmaceutical Society had no power to register them—they did not know who they were; and others, besides those in business in 1875, were cropping up every day. For the protection of society, it was desirable that there should be a power given to them of registering those persons. The question was whether such a grade of men should be allowed to continue. There was some difference of opinion, but the Council, by a majority, thought that it would be in the interest of the public that in future all persons should be licensed to sell poisons only on passing a moderate examination. These it was proposed to call "registered druggists."

The Chief Secretary: Would the registered druggist be allowed to compound medicines?

Mr. Brunker said he would not. They felt, however, that at the rate at which men were coming up to them at the present time it would be many years before they could supply the wants of the public in small towns and country villages. The Council also recommended that patent medicines containing poison should have that fact and the amount of the poison printed on the label or wrapper. They also desired certain words in the Act to be made more specific to prevent what at present existed—namely, that a qualified man and an unqualified man could carry on business jointly, while, of course, an unqualified man could not carry on business alone.

The Chief Secretary: Before the passing of the Act of 1875, no one could compound medicines in Ireland except apothecaries.

Dr. Collins said that in England up to 1868, any man was at liberty to compound medicines. They generally served an apprenticeship, but there was no law requiring them to do so. In Ireland, for centuries, the compounding of medicines was confined to licentiates of the Apothecaries' Hall. In 1830 the various medical colleges found it necessary to extend their curriculum.

The Chief Secretary: Do I understand you to say that before 1875 there was no shop in Dublin where medicines could be compounded, except at an apothecary's?

Dr. Collins: There was not legally. There were a considerable number of persons who acted illegally, and we were obliged to prosecute them. The Pharmaceutical Society, while considering that it would be undesirable to have two grades of pharmaceutical chemists, yet recognized the inconvenience it would be for farmers to have to send a great distance for cattle and other medicines.

The Chief Secretary: Do you propose registration of these in business at the date of the Act or those now in business?

Dr. Collins said they considered the registration should date from 1875, as a large number of persons had sprung up since then who had no real knowledge.

The Chief Secretary: How many licentiates of the Pharmaceutical Society are there at present?

Mr. Brunker: Two hundred and forty.

The Chief Secretary: Of these how many are pharmaceutical chemists, and how many apothecaries?

Dr. Collins said all these had passed the examinatiou, but they had located themselves in the large towns: they would not go to the small places.

The Chief Secretary: What is the average number of certificates yearly?

Mr. Brunker: The year before last it was fifteen; last year it was nineteen. This year it is somewhat more.

The Chief Secretary: Where, then, does the main supply of medicines come from?

Mr. Brunker: From the old apothecaries who are rapidly dying out.

The Chief Secretary: Are you disappointed with the results of the Act of 1875?

Dr. Collins said that the first year was a year of grace. They allowed all chemists and druggists who could pass a reasonable examination to come up for examination. They had now a literary examination, and four years' apprenticeship, and then a final medical examination. He expected that after a few years a larger number of young men would present themselves.

The Chief Secretary: Are there a large number of young men serving as apprentices?

Mr. Brunker said that about three hundred had passed the preliminary examination. In answer to the Chief Secretary's question he would say that they were very much disappointed with the results of the Act. He thought this was very much to be accounted for by the want of technical schools in Ireland.

Dr. Collins: Three hundred and twenty-one young men had actually passed the preliminary examination. Only sixty-four out of these had yet passed the final examination.

The Chief Secretary: Is the literary examination at the commencement?

Dr. Collins: It is. We made that a *sine quâ non.*

The Chief Secretary: Would the registered druggists be able to sell patent medicines?

Mr. Brunker said that at present there was no restriction on the sale of patent medicines either in England or Ireland.

The Chief Secretary: Is the sale of patent medicines greater in Ireland than in England?

Mr. Brunker: No; very much less. The lower classes are almost entirely supplied with medicines from the dispensary medical officer. The Irish people, too, are not the medicine-taking people that the people of England are. As a rule the Irish people only take medicine on prescription.

The Chief Secretary asked what was the practical state of things in England?

Mr. Brunker said that in England every village almost had its qualified man. There was a glut of qualified men, whereas in Ireland there was a paucity.

The Chief Secretary said that what the deputation had put before him presented itself undoubtedly in a very reasonable form. If once, however, the question of amending the Act was started, there might be proposals from other quarters, and it might save time if other matters that might lead to controversy should be discussed also beforehand. With regard to the Bill of 1875—by whom was it introduced?

Mr. Brunker: By the Government.

The Chief Secretary: From the first?

Mr. Brunker: From the first.

The Chief Secretary said he had heard their representations with the greatest respect, and he should not hesitate to speak out if from the information that they had laid before him he saw any decided objection to the amendments they proposed. He could, however, do very little more than recognize the force of their arguments, and promise, unless he heard any counter-arguments which might appear of sufficient weight, to do all in his power to meet their wishes. There would be, no doubt, sufficient publicity given to what had passed in that room to-day to enable any counter statements to be brought forward, and these he should consider as carefully as he had heard their statement that day. It was quite impossible to bring forward any opposed bill on Irish matters early in the session with any chance whatever of its passing, because in the first place there would, no doubt, be important Government measures not relating to Ireland brought forward, and one could hardly hope that these would pass without a certain amount of controversy; and, in the next place, undoubtedly he had pledged the Irish Government, as far as a pledge could be given, to one or two measures—to one which would undoubtedly be opposed—he referred to the Sunday Closing Bill—and to another which, if not opposed, would at all events give rise to a good deal of comment and interesting debate. If, therefore, there was any serious opposition to this measure, he could not give a promise of its being carried at an early period of the session. There would, therefore, be plenty of time for them to consider the matter, to look for the minor details, and for those who might be opposed to it to bring their arguments against it.

The deputation then retired.

THE PUBLIC PRESS ON THE SALE OF PATENT MEDICINES CONTAINING POISONS.

From the British Medical Journal, *Jan.* 5.

. . . "Whatever good may result from the occasional use of quack remedies—and it is probable that good does occasionally arise from their use—the indiscriminate taking of secret nostrums by an ignorant public, for all sorts of purposes, is a most pernicious habit. We have been led to make these remarks . . . for the purpose of drawing attention to an inquest, held by the Coroner for Central Middlesex, reported in the daily papers of January 1. A child, seven months of age, and brought up by hand, was suffering from whooping-cough. For its relief 'Holt's specific' for that disease, formerly called 'Hooper's,' was given in teaspoonful doses every four hours. After the fifth dose the child succumbed, and no wonder, for, according to the evidence of Mr. Finzi, who made a necropsy and an analysis of the medicine, each dose of this contained half a grain of tartar emetic. There were patches of inflammation in the stomach and intestines, and death was due to failure of the heart, from poisoning by antimony, when suffering from whooping-cough. The jury, on this evidence, remarked that the Government ought to interpose to prevent the sale of these medicines, which were simply poisonous rubbish. The coroner stated that under the existing law there was no mode of stopping the sale of these dangerous medicines. Mr. Curgenven also gave evidence to the effect that he had seen two children suffering, lately, from the effects of the same medicine; one had died, and an inquest had been held, and the other had a narrow escape. The deadly 'specific' was vended by a woman who kept a confectioner's shop. The jury returned the following verdict:—'That the deceased had died from syncope through failure of the heart's action, when suffering from whooping-cough; and the said jurors are further of opinion that the said death was accelerated by the administration of antimony contained in a mixture called 'Holt's specific for whooping-cough,' and the jurors desire to call the attention of the Home Secretary to the want of protection to the public, in the sale of patent medicines, with a view to some legislation restricting the sale of those containing poisons and other dangerous remedies.' Speaking with some knowledge of these patent medicines, we have no hesitation in stating that we believe there is annually a large loss of life from their use. No inconsiderable number of these containing tartar emetic as a constituent. We have now before us a pink powder nearly entirely composed of tartar emetic, advertised and sold as a cure for dipsomania. Its use for this purpose must be attended with extreme danger."

From the MORNING POST, *Jan.* 3.

"Patent medicines sold by confectioners and grocers, and swallowed by persons of all ages and constitutions, should, as their most essential characteristic, be perfectly harmless; indeed, looking at the sad results frequently ensuing from these preparations, it must appear that the nearer these ingredients approach the famous bread pill and coloured water draught the better for those who take them. With culpable recklessness, however, powerful and even poisonous drugs are at present employed in patent mixtures, whose effects too often supply occasion for coroners' inquests. An instance of this kind has just occurred in Paddington, where an infant died in twenty-four hours from irritant poisoning, produced by a much-advertised 'specific for whooping-cough.' The medicine was purchased from a small sweet shop and administered in due quantities and at the prescribed times, but five doses proved sufficient to end the existence of a child after intense suffering. Medical testimony attributed the death to antimony, and analysis of the 'specific' showed that each dose contained ½ a grain of that poison. It was stated that an inquest uuder precisely similar circumstances was held in the same district, a fortnight ago, whilst numerous cases have occurred there of children rescued with difficulty from the fatal effects of the same potion. In returning a special verdict the jury stated their desire to call the attention of the Home Secretary to the want of protection afforded to the public in the sale of patent medicines, with a view to legislation forbidding the sale of those containing dangerous ingredients. It is matter for regret that the Patents Act, which has just come into operation, contains no provision dealing with this matter; but it is to be hoped the omission will be remedied and the patentees of medicinal specifics be no longer permitted to manufacture poisonous preparations of which the contents are undisclosed, and scatter them broadcast amongst the community with apparently entire irresponsibility. The plan adopted in France of requiring those who obtain patents for medicines to make a statement of the materials to be used; and, further, to declare on each vial or packet the nature of the contents might advantageously be adopted in this country, but would not meet the entire difficulty. Much of the peril and harm arises from the increasing practice of selling these drugs in conjunction with groceries and confectionery by shopkeepers as utterly unacquainted with the names and properties of chemical substances as their most ignorant customers. In vain would the significant word antimony be inscribed on the remedy for whooping-cough, or the deleterious compounds of various favoured narcotics for adults be openly proclaimed, and the only true protection for the public consists in depriving this class of persons of the right of selling them. Anything in the nature of drugs should be procurable only from chemists, whose knowledge and discretion would guide them in dispensing, and they should be made acquainted with the materials entering into the composition of the patent medicines which they sell. All these preparations cannot be classified as deleterious or worthless. Many are prepared from the prescriptions of men of high medical attainments. Others have stood the test of public trial for a great number of years. Without exception, however, the good, bad, and indifferent, down to the penny packets of vermin killer, should be swept from the shelves of ordinary tradesmen. When chemists become their sole legal vendors there will be a perceptible decrease both in the number of lives accidentally sacrificed and of those purposely destroyed through the agency of these preparations."

From the KENSINGTON NEWS, *Jan.* 5.

"A case of poisoning at Shepherd's Bush by hydrochloric acid, another case at Chelsea of poisoning by lobelia, and two recent cases of dog-poisoning, again draw our attention to the scandalous manner in which poisonous substances are permitted to be sold. It would be ridiculous to attempt to prohibit the sale of poisons; they are constantly employed in the arts and manufactures, as components in patent medicines, and as ingredients in rat-killers and the like. But the regulations under which they are sold are stupidly insufficient. The kind of shop at which the poison is bought ought to make no difference whatever; and it is quite immaterial whether it is sold as such, or as an ingredient in a mixture, paste, or other compound. So long as the quantity sold is sufficient to kill, the same measures ought to be required as if it had been bought from a chemist, and in a separate and undisguised form. Cyanide of potassium, for instance, is composed of potass and prussic acid. A chemist is not permitted to sell it except under certain provisions, but anyone who chooses can obtain it at a photographic material shop without question asked or answered. Hydrochloric acid, again, is a strongly corrosive substance, and, because of its smell and taste, no rational person would be likely to take it in mistake for medicine; but it is used for cleaning metals because of its very corrosiveness, and it would be as much out of the question to stop its sale, as it would be to put an embargo on photography by prohibiting the sale of cyanide of potassium. Green copperas, again, and most other disinfectants, are poisonous; but no sane man would think of arresting its sale, any more than arresting the sale of the powders used for making sheep-wash, or of creasote, carbolic acid, or other poisonous chemicals. Rat poisons, whether strychnine or phosphorus paste, and patent medicines, are in the same category. Indeed, an overdose of any active medicine—of one, for instance, containing antimony, mercury, arsenic, elaterium, digitalis, lobelia—is, naturally, likely to be followed by dangerous results, which may also supervene from mistaking a liniment or a lotion for a medicament intended for internal administration. But for all these there is one simple rule. Wherever a poisonous quantity is sold, caution should be exercised, a proper label affixed, and a record of the sale made. Until this simple rule is put in force, we shall continue to hear of constant accidental and intentional poisonings. A chemist, moreover, and not a grocer or the keeper of an oil shop, is the proper person to dispense poisonous articles of commerce. And whoever buys poisons, it should be made penal not to keep them out of reach. Traps, moreover, are the best things for rats, which do not then go and die in their holes, leaving a stench which may last for months."

The Pharmaceutical Journal.

SATURDAY, JANUARY 12, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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REGISTRATION OF TRADE MARKS.

ABOUT six months since, whilst the "Patents, Designs and Trades Marks Bill" was still before Parliament, we gave a brief sketch of its principal provisions, and especially of the part relating to the registration of trade marks. The Bill, which soon afterwards passed, came into operation on Tuesday week last, supplemented by certain regulations as to qualification, forms, fees, etc., for the drawing up of which by the Board of Trade provision had been made. We think, therefore, the occasion a convenient one for laying before our readers, who, many of them, are, or may become, interested in the subject of trade marks, a brief outline of the new law and rules upon the subject, describing the steps necessary to be taken under ordinary circumstances to effect registration of a trade mark. In doing so we shall have to repeat to some extent what was said whilst most of the provisions of the Act were still under legislative consideration, but this will be indispensable to a lucid description. There are some special provisions as to the registration of trade marks in use before the 13th of August, 1875, but we shall confine our remarks to those relating to the registration of new marks.

According to the new Act, the "Patent Office," which term is inclusive of the offices for both the granting of patents and the registration of trade marks, is to be under the immediate control of an officer called the "Comptroller-General of Patents, Designs and Trade Marks," acting under the superintendence and directions of the Board of Trade. It is to this officer that applications for the registration of trade marks have to be made, either directly or through an agent, by persons claiming them. Each application has to be made on a prescribed form,—not, however, that printed in the Schedule to the Act, but one substituted for it by the Rules,—which must be left at, or sent by post to, the Patent Office, accompanied in the case of marks relating to cotton, linen, jute and silk goods by four and in all other cases by three representations of the mark, one on the form of application itself and the others on separate half sheets of paper. It may be here convenient to state that, subject to other instructions from the Comptroller, all applications, notices, etc., have to be on durable foolscap paper, 13 inches by 8 inches, with a margin on the left hand side of not less than an inch and a half, and that all the authorized forms are now included in the Rules, which are purchasable at the Patent Office for sixpence. In virtue of powers conferred by the Act the Board of Trade has divided goods, for the purpose of registration, into classes, which are practically the same as those adopted under the Act of 1875. A trade mark must be registered for particular goods or classes of goods, and only goods contained in one and the same class should be set out in the same application, a separate application being required for each separate class. The fee payable on each application to register a trade mark for one or more articles included in one class is five shillings. The receipt of an application is to be acknowledged by the Comptroller, who may, however, if he thinks fit, refuse to accede to the request to register, the refusal being subject to an appeal to the Board of Trade, which may hear the case and give a decision or refer it to the Court to be tried. As the Comptroller is prohibited from registering as a trade mark any design that is not sufficiently distinct to prevent it being mistaken for any other already registered, it will be seen that unless care is taken to comply with this condition, refusal to register is likely to follow, and this preliminary stage may become both tedious and costly. Before exercising any discretionary power adversely to the applicant the Comptroller must, however, give him ten days' notice of a time when he may be heard personally or by his agent in support of his application. But if no objection be raised, the application is to be advertised, as soon as may be after its receipt, in the official journal, during such times and in such manner as the Comptroller may direct. The advertisement must contain either a representation of the mark desired to be registered or else a reference to a place where one may be seen, and for this purpose the applicant may be required to furnish one or more wood blocks or electrotypes, to the satisfaction of the Comptroller, an extra charge being made if the illustration occupies in the journal a depth of more than two inches. Any person wishing to oppose an application must within two months of the first advertisement give notice of opposition to the Comptroller, in duplicate, stating the grounds upon which it is based, the fee for entering such a notice being twenty shillings for each mark to which it applies. One of the copies is to be sent by the Comptroller to the applicant, who is allowed two months to prepare a counter claim. In the event of this being done the opposition cannot be carried further unless security is given by the person raising it for costs in the trial that would follow. In the event of no opposition being raised, as soon as may be after the expiration of the two months, and on the payment of a fee, which for one or more articles included in one class amounts to twenty shillings, the Comptroller is to effect the registration in the Register of Trade Marks and notify the applicant that this has been done.

For the purposes of the Act a trade mark must consist of or contain at least one of the following essential particulars: (*a*) a name of an individual or firm printed, impressed, or woven in some particular and distinctive manner; or (*b*) a written signature or copy of a written signature of the individual or firm applying for registration thereof as a trade mark; or (*c*) a distinctive device, mark, brand, heading, label, ticket, or fancy word or words not in common use. The Comptroller is not, however, prohibited from entering in the Register, as an addition to the trade mark, any distinctive device, mark, brand, heading, label, ticket, letter, word or figure, or combination of letters, words or figures, though the same is common to the trade in the goods with respect to which the application is made, provided that the applicant disclaims in his application any right to the exclusive use of it. The number of classes into which goods are divided is fifty, of which those most likely to interest our readers are the following:—(1) Chemical substances used in manufactures, photography, or research, and anti-corrosives; (2) chemical substances used for agricultural, horticultural, veterinary and sanitary purposes; (3) chemical substances prepared for use in medicine and pharmacy; (4) raw or partly prepared vegetable, animal and mineral substances used in manufactures, not included in other classes; (8) philosophical and scientific instruments and apparatus; (11) instruments, apparatus and contrivances, not medicated, for surgical or curative purposes; (20) explosive substances; (42) substances used as food or as ingredients in food; (43) fermented liquors and spirits; (44) mineral and aerated waters; (47) candles, soap, detergents, illuminating, heating and lubricating oils, matches, and preparations for laundry purposes; and (48) perfumery. Although a trade mark must be registered for particular goods or classes of goods, several trade marks, resembling each other in the material particulars and differing only in details, may be registered as a series in one registration, each being deemed and treated as registered separately, except that the series can only be assigned as a whole. In this case the fee for registering is to be twenty shillings for the first representation in each class and five shillings for every additional one after the first in each class. A trade mark may be registered in any colour, and this (subject to the provisions of the Act) confers on the registered owner the exclusive right to use the same in that or any other colour.

The registration of a trade mark is to be deemed equivalent to the public use of the mark, whilst the registration of a person as a proprietor of a trade mark will be *primâ facie* evidence of his right to the exclusive use of it, and becomes conclusive evidence at the end of five years. Hereafter no person is to be entitled to institute proceedings in respect to infringement of any trade mark that is capable of registration, unless it has been registered or has been objected to by the Comptroller. A registered trade mark can be assigned and transferred only in connection with the goodwill of the business concerned in the particular goods or classes of goods for which it has been registered and it is determinable with that goodwill. Upon the passing of the right in a registered trade mark from one person to another the new proprietor may upon application to the Comptroller, and, in addition, making a statutory declaration, supplying any other evidence required, and paying a fee of twenty shillings, have his name entered in the Register as such, and the person entered as proprietor is to be deemed for the time being, unless otherwise shown, the person entitled to use and deal with the trade mark. The Register of Trade Marks is to be open to the inspection of the public daily, except on Sundays and holidays, the fee payable being one shilling for every quarter of an hour occupied in the inspection. At a time between two and three months before the expiration of each period of fourteen years from the date of the registration of a trade mark, the Comptroller is to send notice to the then registered proprietor that unless before the expiration of the fourteen years a fee of twenty shillings is paid the trade mark is liable to removal. If the fee be not paid at the expiration of a month a second notice is to be sent, and if the period of fourteen years run out whilst it is still unpaid the Comptroller is authorized to remove the mark from the Register after the lapse of another three months, unless meanwhile he receives the increased fee of thirty shillings. After erasing a trade mark from the Register for this cause the Comptroller is at liberty to restore it upon payment of a fee of forty shillings; but in any case the mark is to be deemed, in respect to any application for registration during the five years next after the date of its removal, a trade mark which is already registered. Besides the foregoing provisions there are others as to corrections and alterations, as well as the settlement of disputes, and the second schedule to the "Rules" contains a series of forms adapted for such emergencies as can at present be foreseen.

It is not surprising that the fatal case of poisoning by a proprietary preparation containing antimony, which was reported in the *Pharmaceutical Journal* last week, has provoked in the public press some outspoken condemnation of the present state of the law in respect to the unrestricted supply of poisons to the public under this and similar forms. It is to be regretted, however, that such condemnations are so spasmodic, and are, as a rule, only uttered under the stimulus of more than usual publicity being given to some particular case out of the many in which, no doubt, injurious results follow the indiscriminate and unintelligent manner in which preparations containing powerful poisons are now scattered broadcast among the community under cover of the patent medicine stamp. One most disheartening feature is the marked absence, where it might fairly be expected, of the knowledge of existing facts, so essential to any useful discussion of the subject, as, for instance, it is manifested by an important public officer when, whilst acting in a semi-judicial character, he talks about persons being able to "take out patents without being compelled to state the ingredients," or when the editor of a leading daily paper, under a similar misconception as to what constitutes a "patent medicine," expresses a "regret that the Patents Act, which has just come into operation, contains no provision dealing with this matter." In like manner, a medical gentleman, in a letter printed on another page, writes as if pharmacists had not yet given any consideration to the subject, and expresses astonishment at a fact in respect to the persons who carry on the patent medicine manufacture, with which everyone connected with medicine or pharmacy might be expected to be familiar.

* * *

An Evening Meeting of the North British Branch of the Pharmaceutical Society will be held on Wednesday next, in the Rooms, 119A, George Street, Edinburgh, when papers will be read on "Salts of Nicotine," by Mr. D. B. Dott; "Preparations of Galazyne, or Artificial Koumiss," by Mr. A. Gibson; and "Aqueous Mixtures containing Chlorate of Potash," by Mr. J. R. Hill.

* * *

Wednesday next is the date fixed for the Chemists' Eighteenth Annual Ball, and it would hardly be necessary to call attention here to the fact were it not that the reminder may save some of our readers disappointment through neglecting until too late to secure the tickets they require, as the number is to be strictly limited. Applications should be made at once to the Honorary Secretary, Mr. F. W. Warrick, Old Swan Lane, E.C., or to one of the other gentlemen whose names are mentioned in the advertisment.

* * *

Another social gathering of pharmacists and their friends that seems to increase in favour with every repetition is the Annual Soirée of the Midland Counties Chemists' Association, which is to be held this year as usual in the Town Hall, Birmingham, on Friday, the 25th inst. Tickets may be had from the Stewards or Mr. C. Thompson, Honorary Secretary, Stratford Road, Sparbrook.

* * *

We learn from an advertisement that the Madras Government has decided to adopt the advice given by Dr. Trimen and appoint a chemist as quinologist in connection with the Nilgiri Cinchona Plantations. The appointment is to be for five years, and the desiderata for it are a thorough qualification in the practice of organic analysis, and, if possible, experience in the analysis of cinchona bark, whilst the salary offered is 350 rupees per month, rising to 500 rupees, with a free passage to India and back. The estimate of the Government as to the value of the services that can be rendered by the new officer, so far as it is revealed by the remuneration, appears to be somewhat moderate, and considering the rarity of the most essential qualification, a practical experience in bark analysis, it is in our opinion considerably below the requirements of the case.

* * *

A report has just been issued dealing with the Oxford Local Examinations held at thirty-six centres in June last. From this it appears that the total number of candidates examined was 1845 (1192 juniors and 653 seniors), of whom 1055 (636 juniors and 419 seniors), or 57 per cent., passed; some of the 160 seniors were unsuccessful in more than one of the essential "preliminary" subjects, as there were 81 failures in grammar, etc., and 127 in arithmetic; but taking those who only failed in one "preliminary" subject, there were 34 unsuccessful in grammar, etc., and 79 in arithmetic. In like manner among the 277 unsuccessful junior candidates there were two failures in reading, three in writing, nine in spelling, 75 in dictation, 81 in grammar, and 174 in arithmetic; but of those who failed in one "preliminary" subject only 34 were incompetent in dictation, 34 in grammar, and 138 in arithmetic. The number of failures in arithmetic is very suggestive of imperfect teaching of this essential branch of education, but it is quite in accordance with the experience in connection with the Preliminary examination of the Pharmaceutical Society.

* * *

According to a statistical abstract of failures in the United Kingdom, published in *Kemp's Mercantile Gazette*, the total number of persons who failed in business in the course of the year 1883 was 11,465, of whom 93 were described as chemists and druggists, against 87 in the previous year. The bills of sale registered, however, during the same time, fell in the case of chemists and druggists from 223 to 79.

* * *

On Thursday evening, January 3, Dr. MacAlister delivered at the London Institution a lecture, the title of which was "How a Bone is Made." He commenced by showing the construction of the femur, and then opened an interesting discussion upon the advantage of the shape and hollowness of that bone. He spoke of the femur as consisting of a hollow tube, broadening out into lobes at either end, which were filled with a cancellated mass. In comparing the value of several materials as to their capabilities of sustaining tension or compression, the lecturer mentioned that in both steel and bone they were found to be nearly equal, whilst cast iron could withstand nearly six times as much power used in compression as that used in tension. In the use of cast iron, therefore, a great deal of material would be wasted in the making of the tension power up to the required capability, and this would necessitate bulkiness in comparison to bone and steel. With reference to the hollowness of the bone, Dr. MacAlister explained very clearly that the strength of the bone did not nearly decrease in the same ratio as the quantity of of material taken from the interior. As an example of this he showed that although a femur of a person of twenty-one years of age weighed nearly two and a half times as much as a femur of the same external appearance and size, which had belonged to a person of one hundred and three years of age, and had become more hollow with age, nevertheless the latter was very nearly as strong as the former.

* * *

At the next meeting of the Chemical Society, to be held on Thursday, January 17, papers will be read on "Camphoric Peroxide and Camphorate of Barium," by C. T. Kingzett; "On the Decomposition of Silver Fulminate by Hydrochloric Acid," and a "Supplementary Note on Liebig's Production of Fulminating Silver without the use of Nitric Acid," by Messrs. Divers and Kawakita, and "On Hyponitrites," by Messrs. Divers and Haga.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, January 9, 1884.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Messrs. Borland, Bottle, Butt, Churchill, Gostling, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Symes, Williams, Woolley and Young.

The minutes of the previous meeting were read and confirmed.

The VICE-PRESIDENT said he had been glad to see published in some of the daily papers the list of the examiners. He should also like to see the result of the examinations published in the same way. He understood this was done in Scotland.

The PRESIDENT said there would be no objection to this if the names of unsuccessful candidates were not given. The information could be sent to the press, but of course its insertion could not be guaranteed.

THE LATE MR. J. E. HOWARD, F.R.S.

The PRESIDENT read a letter received from Mrs. Howard, in acknowledgment of the letter of condolence sent her, and also thanking those members of the Council and other officers of the Society who had attended the funeral.

THE BOARD OF EXAMINERS.

The Secretary read a letter, which had been received from the Privy Council, approving the appointment of the Examiners appointed last month.

DIPLOMAS.

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

Bing, Charles.
Burford, Samuel Francis.
Collins, Herbert Sleight.
Cornwell, Thomas Chinsura.
Dolbear, John.
Dymond, Thomas Southall.
Jones, Charles.
Low, David.
Mitten, Flora.
Mowatt, John Rodman.
Sergent, William Thomas.
Taylor, Ernest Sanderson.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following pharmaceutical chemists, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Bing, Charles	Canterbury.
Burford, Samuel Francis	Leicester.
Collins, Herbert Sleight	Bradford.
Cornwell, Thomas Chinsura	Penzance.
Loumeau, Edmond	Mauritius.
Low, David	Hexham.
Mitten, Flora	Hurstpierpoint.
Mowatt, John Rodman	London.
Phillips, John Edwards	Ealing.
Pirie, William	Edinburgh.
Sergent, William Thomas	North Shields.
Taylor, Ernest Sanderson	Grantham.

Chemists and Druggists.

The following chemists and druggists, who were in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Coley, James	Bootle.
Evans, William	Mold.
McMurray, James	Helensburgh.
Nicholson, William Ostler	London.
Shepherd, Charles William	Ilkley.
Sleight, William Wilson	New Wortley.
Trundle, William E. Rust	Plaistow.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society.

Brook, Samuel Verlander	Cradley.
Grove, Harry Nicholas	Walsall.
Jones, John Wesley	Llanelly.
Laing, Arthur Laurenson	Lauder.
Law, Thomas Wm. Thorburn	Partick.
Robertson, Alexander	Oban.

ASSOCIATES.

The following, having passed their respective examinations and tendered their subscriptions for the current year, were elected "Associates" of the Society:—

Minor.

Ashton, Charles Sampson	Yeovil.
Barnes, William Robert	Plaistow.
Bell, Charles Russel	London.
Brampton, Wm. Saml. Howes	Stanion.
Brown, Edgar Marshall	Derby.
Brown, Horace	Thrapston.
Daniel, George	Holsworthy.
Farrer, Edward	Kendal.
Gibson, John	Barnard Castle.
Jackson, Walter	Catterick.
Jackson, William John T.	Lytham.
Lipp, George	Elgin.
Morris, Henry Ridley	Ipswich.
Owen, Henry	Gravesend.
Rees, David	Haverfordwest.
Richardson, John	Mansfield.
Riley, John Cowgill	York.
Roberts, Rowland	Holyhead.
Robertson, Charles	Edinburgh.
Shacklock, James Harvey	South Cave.
Smith, Albert Edward	Sudbury.
Stocker, George	Exeter.
Sutherland, Adam Gordon	Edinburgh.
Tallantyre, John Mortimer	Manchester.
Wride, Francis Blake	Shirley.

Modified.

Price, Benjamin William	Farnham.

APPRENTICES OR STUDENTS.

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

Allen, Richard	Ramsey.
Anthony, Thomas	St. Austell.
Aston, Alfred Valentine	Tarporley.
Balmford, John Archibald	Huddersfield.
Bard, Cecil Harry	Exeter.
Barritt, Ernest Henry	Colchester.
Barton, John	Warwick.
Bates, John	Bicester.
Bates, John	Manchester.
Baxter, George Munnerley	Chester.
Black, James Watson	Aberdeen.

Bonnett, Frederick	Doncaster.
Boole, Lucy Everst	London.
Bostock, John William	Ashton-under-Lyne.
Brown, Henry Armstrong	Sunderland.
Browne, John	Lowestoft.
Casewell, Job Parry	Market Drayton.
Chamberlain, Charles John	Portsea.
Courtis, Terrell	London.
Cullinan, Edward, jun.	London.
Dancy, Ralph	Turner's Hill.
Dell, Frederic Barton	Llanelly.
Donack, James	Moffat.
Dunn, Isaac George	Chard.
Earle, Ernest Haworth	Hull.
Egg, George Frederick	Highbury.
Evans, Daniel Thomas	Llandyssul.
Farlow, James Southward	London.
Featherstone, Robert Horne	Derby.
Fellows, Vincent Litchfield	Hampstead.
Fifield, Tom Hadley	Birmingham.
Fletcher, Harold Goodwin	Ripley.
Fothergill, Alfred	Newport (Mon.)
Fuller, George Sydney	Thornton Heath.
Golds, Lewis George	Steyning.
Golightly, John William	Durham.
Griffiths, Cornelius Albert	Cinderford.
Hampson, Herbert Edwin	York.
Harrison, Thomas	Birmingham.
Hearnden, Frederick	London.
Henderson, Thomas Cuthbert	Lochee.
Hepworth, John Stafford	Hyde.
Herbert, Henry William	Barton-on-Humber.
Hider, Francis	London.
Hind, William Tom	Leicester.
Hobbs, Alfred Ernest	Tunbridge Wells.
Horne, Joseph	Aberdeen.
Hughes, Philip Henry A.	Liverpool.
Johnston, William	Montrose.
Johnstone, John	Selkirk.
Jones, Edwin Pryce	Aberdare.
Kent, Charles Edwin	Hertford.
King, James, jun.	Kilmalcolm.
Lewis, John Lloyd	Llandyssul.
Lockyer, Cuthbert Henry Jones	Bruton.
Manfield, Robert Hall	Pontefract.
Matthews, Edwin James	Cowbridge.
Maudson, Charles Fredk.	Leeds.
Meacham, Vincent Whittenbury	Ledbury.
Mitchell, John	Inverness.
Munro, James Innes	Perth.
Padley, Frank Robert	Birmingham.
Paine, William	Ashton-under-Lyne.
Parry, John	London.
Paternoster, George Sidney	Cirencester.
Patterson, David	Bolton.
Potts, Robert	Newcastle-on-Tyne.
Price, Peter	Bromsgrove.
Purchase, Francis William	Bideford.
Rees, John	Aberystwith.
Roberts, Willam Arthur]	Bangor.
Sales, John William	Doncaster.
Salter, Albert Joseph	Uckfield.
Scott, Walter H.	Beverley.
Selby, Henry Collingwood	London.
Smith, Edward Gibbs	Walton-on-the-Naze.
Smith, Samuel Henry	Leamington.
Stuart, Findlay	Dumbarton.
Sursham, Frederick Thomas	London.
Townsend, William Thomas	Bradford.
Tugwell, Ernest Harry	Greenwich.
Turner, Ebenezer	Whifflet.
Twivey, Arthur	Tadcaster.
Webster, John, jun.	Buckie.
Whitehead, John Henry	Leeds.
Williams, Alfred	London.
Williams, Joshua Edward	Bryn Glas.

Restoration to the Register.

The name of the following person, who had made the required declarations and paid a fine of one guinea, was restored to the Register of Chemists and Druggists:—

Sutton Dudley Gill, 221, Spon Lane, West Bromwich.

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

Additions to the Register.

The Registrar reported that—

William Botterill Parker, 5, West Street, Leeds, and
Henry Barker Travis, 528, Brightside Lane, Sheffield,

having respectively made statutory declarations that they were in business before the passing of the Pharmacy Act, 1868, and these declarations having been supported by duly qualified medical practitioners, their names had been placed on the Register.

Reports of Committees.

FINANCE.

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

Mr. Greenish suggested that it would be well if in each case the resolution approving the reports of committees should be moved by the member who had acted as chairman of the committee. He could then draw the attention of the Council to any subject which seemed to require notice.

Mr. Richardson supported the suggestion. He said it was very important that the attention of the Council should be called to anything in connection with these reports which was of general interest.

Mr. Schacht suggested that it would be a great convenience in the conduct of business if a permanent chairman were appointed to the Finance Committee each year. The business of this Committee differed from most others in being of a character not so readily mastered, and he had often noticed that information had to be obtained from the Secretary or the office on the bearing of certain matters which came before the Committee.

Mr. Williams said the bye-laws provided that the President or Vice-President should preside at the meeting of any Committee at which they were present.

Mr. Schacht said it would be very easy for the President or Vice-President to be appointed chairman of the Finance Committee for the year.

Mr. Gostling said it had been the practice for the Vice-President to act as chairman of the Committee, and if he was not present there was generally a former President or Vice-President who could fill the post.

The Vice-President thought it would be very well to have a permanent chairman for the Finance Committee.

Mr. Richardson said it was impossible for the President or Vice-President to take the chair at every meeting of a committee, but it would be very useful to have a permanent chairman of the Finance Committee.

Mr. Young thought it was a pity to disturb the existing arrangements which had worked so well, and it seemed very proper that the President or Vice-President should preside at the Committee meetings. The point raised by Mr. Greenish was simply that whoever had officiated as chairman of the Committee should bring forward the report and mention any point which required notice.

Mr. Greenish remarked that he was quite satisfied, after what had been said, to leave the matter in the hands of the President.

BENEVOLENT FUND.

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

£20 to a former member, aged 62, who had a similar grant in 1880. Suffering from a paralytic seizure. Surrey.

£10 to the widow of a registered chemist and druggist, aged 49; has six children. Applicant has had two previous grants. Middlesex.

£10 to the widow of registered chemist and druggist, aged 42. In ill health; has three children. Has had three grants previously. Lancashire.

£10 to a registered chemist and druggist, aged 40. Formerly in business, but now out of employment. Middlesex.

£20 to a former member and subscriber to the Benevolent Fund, aged 62. Applicant has had three previous grants and was an unsuccessful candidate at the last election. Middlesex.

£10 to the widow of a registered chemist and druggist, aged 63. Has had three previous grants and was an unsuccessful candidate at the last election. Surrey.

£21 to be placed in the Secretary's hands and used at his discretion in securing the election of the youngest of Ord's orphans to the London Orphan Asylum.

The Committee recommended the addition of certain names and amounts to the Benevolent Fund Donation Board and the alteration of the amounts in other cases where the donations had been increased.

The Committee had considered the regulations for the distribution of the Fund and recommended the following alterations*:—

Rule 8. "In all petitions for assistance from the Fund the truth of the statements shall be certified by at least two Members or Associates in Business of the Society, or two donors or subscribers to the Fund, who are personally acquainted with the facts of the case."

Rule 9 to be concelled.

The Vice-President, in moving the adoption of the report, said he was glad to see that the attention called to the Benevolent Fund was finding a response outside. The question raised by Mr. Hampson's letter, calling attention to the difficulty which might arise in initiating applications for relief, had been reconsidered and after full and careful consideration, the decision arrived at was that two signatures only should be required, either of members, associates or subscribers, but that no limit of amount should be placed on the subscription qualifying the signature to be appended. If there had been any difficulty in getting recommendations, that would now be obviated, and he trusted this conclusion would be accepted.

The President said the change practically consisted in reducing the number of signatories from four to two, and abolishing the restriction as to the length of time during which the subscription had been current and the amount.

Mr. Schacht seconded the motion.

Mr. Bottle moved as an amendment—

"That the recommendation of the Benevolent Fund Committee to reduce the number of signatures from four to two on the application paper for relief be not entertained, but that the number of signatures be four as heretofore."

* The following are the clauses in the Regulations proposed to be amended:—

"8. In all petitions for assistance from the Fund the truth of the statements therein contained shall be certified by at least four members of the Society, or donors to the Fund of five guineas, or persons who have subscribed not less than half-a-guinea per year for the three preceding years, and who are personally acquainted with the facts of the case.

"9. In the case of a widow or orphan applying for relief and unable to obtain the required evidence under Rule 8, the Council will receive and consider in lieu of such evidence the testimony of four respectable householders, to whom the circumstances of the applicant are known, provided that the persons so certifying are respectively subscribers or donors to the Fund of not less than half-a-guinea for the current year."

He thought there had been no necessity shown for the alteration, and he was conservative enough to believe in keeping things where they were when no cause was shown for change. The Council was told that difficulties might arise, but he thought the regulations might remain *in statu quo* until difficulties did arise. He also spoke in the interests of the applicants, because the Committee scrutinized every recommendation which came before it, and if one came signed by two names only and another signed by four, he thought the applicant recommended by four, would have a considerable advantage over the other. The decision was only come to in committee by a narrow majority, and therefore he thought it might be reviewed. It might be said there was a difficulty in a deserving candidate getting signatures, but he did not think that there was, and inasmuch as it necessitated the petition being handed about before it was presented to the Council, it was an advantage to the Fund. He was quite willing to allow a subscriber of any amount the privilege of nominating, but did not like to see the number of signatories reduced.

Mr. Robbins seconded the amendment, as he thought the proposed alteration would prove pernicious. He had had some experience of the Benevolent Fund and had never found this difficulty arise. The Committee was generally guided by the fact that the application was supported by persons of whom something was known, and although four names were necessary in the majority of cases one good name was sufficient to act upon. Now the Committee might not be able to pick one good name out of two so well as one out of four, and considering the other alterations, the names would not be so good. A paper might be signed by two apprentices, and if made too easy some might be tempted to apply to the Fund who otherwise would not have done so. When it required the names of influential members of the Society there was some difficulty, no doubt, and there was an advantage in there being some little difficulty in obtaining relief, but these difficulties had not been sufficient to prevent applicants coming forward, seeing that in the last year nearly £2000 had been expended. If it were necessary to make any change at all, let the Council insist on the signature of the Local Secretary, or someone it knew something about.

Mr. Hampson was sorry that this question did not seem likely to be settled without another discussion. When the report of the Committee was read he felt grateful to the Committee for arriving at a conclusion which, if carried out, he felt sure would not only promote the interests of the Fund, but make the investigations as to the character and position of the applicants more easy, and probably the information when obtained would be of a better quality. He could not understand the objection of the last speaker, that if only two persons signed the paper their names would be of little use. He also said that one signature generally guided the Committee, and surely out of two there might be one in whom the Committee would have confidence. He maintained that it was a hardship that a person who signed these papers should have either to be a donor of five guineas or a subscriber of half-a-guinea for three years, and in many cases applicants had to undergo great trouble and inconvenience in getting signatures.

The President reminded Mr. Hampson that the only point in question was whether the number of names should be two or four.

Mr. Hampson thought the proposal of the Committee would in no way damage the Fund. He could not agree that there had been no inconvenience in the past; there had been great inconvenience in getting the right signatures, and almost invariably the names attached to the papers had not the quality mentioned by the Treasurer, that is to say persons signed the paper not of their own personal knowledge.

Mr. Robbins explained that his meaning was, if there were four signatures there was a greater probability of finding one amongst them whom the Committee knew than if there were only two. As to the quality of the signatures he thought there was a better quality now than there would be under the proposed alteration, which might mean only the signatures of two apprentices.

Mr. BORLAND said the members of the Council seemed to be all agreed as to the abolition of the restriction on the amount, and the only difficulty was as to the number. Now on looking over the Calendar he found that out of about six hundred and eighty places or towns in which there were chemists subscribing to the Fund there were only one hundred and thirty-seven in which there were four subscribing chemists, the remaining five hundred and forty not having the necessary number. If then the number were maintained at the four the applicants at those places must go outside their own district to find two additional subscribers. In Kilmarnock any person requiring four signatures would have to go at least twenty miles, and then would only get individuals who in all probability knew nothing whatever of the character of the applicant. On that ground he supported the report of the Committee.

Mr. SAVAGE thought the suggestion of the Committee a very wise one, and scarcely thought the mover of the amendment was right in stating that hitherto the regulations had worked well. The Council was really not in a position to know what difficulties had arisen in obtaining signatures, and no doubt there had been considerable difficulty here and there which the Committee knew nothing about. If the minimum number was reduced to two, it did not prevent the Committee obtaining further information if necessary.

Mr. WOOLLEY supported the amendment. He had been for some years on the Benevolent Fund Committee, and no difficulties had come under his notice, and it was not usual to legislate for difficulties of which one had no knowledge. He thought the Council should be content with a reduction of the amount, which would increase the number of subscribers; and to meet the point suggested by Mr. Borland he thought there would not be much difficulty in getting two persons in a place to subscribe a small amount, and thus become eligible to sign the paper.

Mr. HILLS suggested that the decision on this point should be deferred; it was rather difficult for those not members of the Committee to vote suddenly on a question of this kind, altering the regulations which had been in force for many years. He had not yet heard of any case of difficulty which had arisen, and should be inclined to leave things as they were, but perhaps if he had further time to consider the alterations he should be better able to form a judgment. He asked if he correctly understood the proposition, that two apprentices by each giving a donation of half-a-crown for a specific object should be able to sign an application paper.

The PRESIDENT said, Certainly.

Mr. HILLS said he objected to that altogether.

Mr. HAMPSON said the Council did not contemplate such a case arising. If thought desirable it might be limited to householders or persons over twenty-one years of age.

Mr. RICHARDSON said some gentlemen seemed to lose sight of the fact that the object of the Benevolent Fund Committee was to get in all possible applications with the least possible difficulty to the applicant. It did not at all follow that all applications would be acceded to. The Committee sat every month to sift these applications, and even if two apprentices signed an application for relief, it did not follow that the Committee would act on the suggestion. Each case was first sifted by the office, and then submitted to the Committee, so that there was every possible safeguard. He hoped this discussion would have the effect of increasing the number of chemists and druggists who subscribed to the Fund. No doubt the previous arrangements were somewhat restrictive, and in small towns it must be difficult for persons to get their applications signed. At the present time it was often found that the signatories were members of wholesale houses in some other town. Only on the previous evening there had been a case in which the application was signed by three or four wholesale druggists, who could not possibly have that knowledge which even an apprentice might have in the town from which it emanated.

Mr. SYMES said although difficulties had not been numerous no doubt some had arisen which had not come under notice, and as the matter had been under consideration for a month it would be as well to come to a decision. The members of Council seemed all agreed that the existing rule was a hardship, but he should support Mr. Bottle's amendment if he meant to limit the number to two subscribers; in fact, that there should be four names, including two subscribers, whose names should appear on the Register of Chemists and Druggists, and two respectable householders. He could not conceive any place where a difficulty may arise in a person getting such signatures. There was a little danger in making it too easy to obtain relief; it had a prejudicial influence on the candidates themselves, for it was a remarkable fact that when a person found out the means of getting a grant he generally came again. Under the new regulation the paper might be signed by persons not subscribers.

Mr. WILLIAMS said he strongly supported in committee the view taken by Mr. Bottle that the number of signatories should be four. He did not consider that number at all too many, and even if it were increased it might be a safeguard to the Committee. It was very important that the Committee should not be misled in any way by misstatements or informal applications; there was a greater safety in four signatories than in two, but he did not at all agree with Mr. Symes that those who did not subscribe at all should have the privilege of signing the paper. He was quite willing and anxious that the alteration should be made so far as taking away the restriction that persons must have subscribed half-a-guinea a year for three years previously, which, no doubt, was a hardship; but he thought the amount of half-a-guinea ought still to be retained, as the lowest amount to be subscribed by those who signed the paper, though he was willing to waive that, and accept the half-a-crown, which was the smallest amount taken, if the Council thought fit. He had hoped, however, that the Council would reverse the decision carried by a very small majority in the Committee, and insist on four names being appended.

Mr YOUNG said it seemed to be generally accepted that the present arrangements were not satisfactory, owing to the difficulties which applicants might have in finding four individuals in a small place who were subscribers of half-a-guinea to the Fund. The question seemed to be whether the subscribers to the document should be two or four, but since he had been a member of the Committee he had often noticed that, while there were four subscribers' names attached, when these persons were written to they often replied that they knew very little about the applicant. That arose from the circumstance mentioned by Mr. Richardson that in many cases they were members of wholesale houses with whom the applicant had done business. The Committee would not be tied to two, but might still require four; in addition to that the Council knew the careful investigation which was made in every case by the Secretary; he, therefore, thought it would be a great improvement if the nnmber was limited. He certainly was not prepared for the statement that two apprentices might sign the document, and he should certainly prefer two householders; two good names would be better than a long list of persons who did not know the applicant personally.

Mr. GREENISH said he should support the amendment. Two questions were considered in the Committee, one whether this clause, with regard to the subscribers of half-a-guinea for three years, should be retained, and the other, whether four names were necessary, or whether the number should be reduced to two. He was quite agreed with the first alteration, that any subscriber to the Fund should be eligible to sign; but, having made that concession, it was more than ever important that there should be four names, because they were now likely to include a different class of subscribers. A person might get two apprentices to sign their names, but it was not likely he would get four.

Mr. Radley supported the proposition of the Committee, and he was influenced in this course, to a certain extent, by the difficulty that had been experienced with regard to widows. There was frequently great difficulty in widows getting their papers properly signed, they not, as a rule, being known to members of the trade. He certainly felt a little objection to the idea of the paper being signed only by two apprentices, and should prefer the word "householders;" but the process was only the initiatory one.

The President said the lines on which some members of the Council seemed to regard the application paper were, in his opinion, quite erroneous. They seemed to look upon this paper as a passport to the money; but it was nothing of the sort. It was intended so to be when first instituted, but it had proved utterly untrustworthy. He asserted that as the result of his experience during the last two and a half years and from former experiences on the Benevolent Fund Committee. When there were four signatures, it might be of large subscribers or respectable members of the Pharmaceutical Society, the chances were that the case was not known to more than one out of the four persons signing, and the intention that the application paper should be a passport to a grant was a failure. That being so he preferred to regard the paper as a simple recommendation that the case should be considered. If that were so, was it necessary to ask for four signatures? The question had been discussed in committee whether householders alone should be eligible; but the Secretary, who had more to do with the Benevolent Fund than all the Council put together, had during the recess actually proposed that the alteration should be—and he agreed with him—that any householder should sign. The Secretary said the limiting of the signatories in the case of non-members and non-associates to subscribers did not produce money to the Fund, and he (the President) did not think it did. The real information on which a committee made a grant was that obtained on an application for further information to either one or all of the individuals signing, and the Committee often referred to other persons, or applied direct to the Local Secretary. The paper ought to be regarded as no more than it was worth, the preliminary or initial stage. It would have been impossible to give the relief that had been given if each of the four persons who had hitherto signed these papers had been obliged to swear that he was personally acquainted with the cases for the number of years stated, and could confirm all the particulars to the best of his belief. What was really wanted was to get at one or two persons who knew the case, not a number of respectable people who would support, but who did not know it thoroughly. He believed that by reducing the numbers from four to two the chance of getting the right information would be increased, and the temptation to sign the paper formally out of kindness decreased. With regard to apprentices, why should not they sign if they were subscribers and knew the case. Members and associates of the Society were practically subscribers by virtue of the large sums tranferred from the General Fund to the Benevolent Fund in days gone by, and to that extent, therefore, it was considered that every member and associate in business was a subscriber. If the signatories were limited to members, associates or subscribers, why should not apprentices, if subscribers, be eligible? It was not at all likely that many would be unable to get signatures except from two apprentices, but if any person could not it was no reason his case should not be investigated. The Committee did not make a grant on the application, but on the investigation. On these grounds he hoped the Council would take a broad view, and adopt the report.

Mr. Churchill said he was glad this discussion had taken place in order that subscribers might see how carefully the Fund was administered. He quite agreed with the President in believing that the main thing which influenced the Committee was the application of the Secretary to the signatories for an exact account of what their real knowledge of the person was, and further than that he had the opportunity of asking the Local Secretary or a member of the Council to look into the case. In that way the Committee had often been able to get at facts which did not appear on the application paper.

Mr. Williams said it seemed a most extraordinary line of argument that two names should be better than four.

The Vice-President said the amendment would permit four apprentices to sign, but he did not think many apprentices would do so. He wished to emphasize one point, viz., that this was nothing but the initiatory stage; it was the collateral evidence by which the Committee was guided.

The amendment was then put with the following result:—

For—Messrs. Bottle, Butt, Churchill, Greenish, Hills, Robbins, Symes, Williams and Woolley.

Against—Messrs. Atkins, Borland, Carteighe, Gostling, Hampson, Radley, Richardson, Savage, Schacht and Young.

The amendment was, therefore, lost.

Mr. Williams then moved as an amendment to the original motion—

"That after the word 'subscribers' the words 'being householders' be inserted."

He thought it would be very dangerous if papers were to be signed by apprentices or anybody else who might choose to put down half-a-crown for the privilege of signing.

Mr. Hills seconded the amendment.

Mr. Hampson hoped that Mr. Williams would withdraw this amendment as it would exclude all assistants who might be interested in the Fund.

Mr. Williams said if there were a paper signed by two apprentices and the Secretary wrote to them for further information, what guarantee was there that he would get anything like a proper and reasonable statement of the case. When the Council was administering a fund collected all over the country it ought to take the greatest care that the money was distributed properly. If any person wanted a grant he could not have much difficulty in finding two subscribers who were householders.

Mr. Savage said the great point to be remembered was that this was merely the initiative. The Committee was not limited to those two individuals; the Secretary had the opportunity of writing to the Local Secretary, or anyone he knew.

The President hoped the Council would vote upon this amendment without entering into another long discussion. It appeared to him that the testimony of two educated apprentices was quite worthy of attention.

Mr. Woolley said it was not at all a question of the respectability or education of the apprentices, but it was a question of whether a man was of full age or not. There were apprentices perfectly competent to initiate an application of this kind, but there were others who would not be. It seemed to him the Council was making a sudden departure without any reason, and opening the door far too wide for those applications.

Mr. Richardson considered that every person who subscribed to the Benevolent Fund was entitled to sign an application for relief.

Mr. Greenish thought now the subscription was lowered to half-a-crown some method of hedging the Fund round should be adopted.

Mr. Gostling suggested that the word "householders" might lead to difficulties. He should prefer a limit of age.

The amendment was then put with the following result:—

For—Messrs. Bottle, Butt, Churchill, Hills, Radley, Williams and Woolley.

Against—Messrs. Atkins, Carteighe, Gostling, Hampson, Richardson, Savage and Schacht.

Messrs. Borland, Greenish, Robbins, Symes and Young were present at the division, but did not vote.

The numbers being equal the President gave his casting vote against the amendment.

Mr. Bottle then proposed another amendment.

"That the proposed alterations be printed and referred back to the Benevolent Fund Committee to report upon."

Seeing the division was so very close it appeared to him to be the wisest course to adopt.

Mr. Hills seconded the amendment.

Mr. Hampson said he had confidence in the Committee's report. This was the second time it had considered the question, and surely its decision ought to be treated with some respect.

Mr. Gostling supported Mr. Bottle's suggestion. He thought there was nothing to be gained by precipitancy, and as there was such an even balance of opinion on each side, he thought it would be much better to wait until the members of the Council were more at one as to the desirability of the alteration.

Mr. Schacht said he should regret if this question were again deferred. Last month he gave his reasons for the opinion he then expressed in favour of making the thing as open as possible, providing the recommendation was limited to those who in some form or another supported the Fund. He deprecated any further postponement of the question, because at the February meeting there would be a great deal of other business to do.

The Vice-President also hoped that it would not be deferred, as it would lead to a great waste of time in going over the whole question again.

Mr. Robbins said the new Calendar was issued at the beginning of the year; the regulations there given would therefore be wrong for the next twelve months if the proposed alterations were now made.

Mr. Symes said the error would be in the right direction. He did not think anything would be gained by reconsidering the subject.

The President said the Committee was very equally divided before, and would be equally divided again. It would be much better to settle the matter one way or the other.

Mr. Greenish said he was surprised to hear any member of the Council say it was a waste of time to discuss a question of this importance.

Mr. Bottle said he would withdraw the amendment, but in doing so he wished to protest against the assertions made over and over again that the recommendatory paper was only the initiative. It was so in the sense of bringing the matter before the Council, but it was the line upon which the Secretary at once acted in getting the information upon which the Council made the grants. He for one personally knew nothing of any individual who came forward on the previous evening as recommended for relief; he accepted what was placed before him as evidence to judge of their merits, but in each case the Secretary had travelled on the lines of the application paper.

The original motion for the adoption of the report was then put and agreed to.

Robbins' Fund.

Mr. Robbins said he had been requested by the Benevolent Fund Committee to transfer the South Metropolitan Gas Shares to 4 per cent. Debentures of the Gas Light and Coke Company, which he had done. The shares realized £129 12*s.*, and the Debentures were £134 16*s.*, so that there was a difference of £5 4*s.*, which he had made up. He moved that the seal of the Society be affixed to the transfers.

The motion was seconded by the President, and carried.

LIBRARY, MUSEUM, LABORATORY, AND HOUSE.

Library.

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

Attendance.		Total.	Highest.	Lowest.	Average.
November	Day	478	28	9	18
	Evening	243	19	5	11

Circulation of books.	Town.	Country.	Total.
		No. of Entries.	
November	191	138	329

Carriage paid, £1 17*s.* 11*d.*

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

Allgemeiner österreichischer Apotheker - Verein, Zeitschrift, 1883. From the Verein.

Alumni Association of the Philadelphia College of Pharmacy, Nineteenth annual report, 1883. From the Association.

American Journal of Pharmacy, 1883. From the Philadelphia College of Pharmacy.

American Pharmaceutical Association, Proceedings, vol. 30. From the Association.

Analyst, 1883. From the Editors.

Annuaire des Spécialités médicales et pharmaceutiques, 1883. From the Publishers.

Archiv for Pharmaci og technisk Chemi, 1883. From the Publishers.

Botanical Society [of Edinburgh], Transactions, vol. 14, part 3. From the Society.

British Pharmaceutical Conference, Year-Book of Pharmacy, and Transactions, 1882. 2 *copies.* From the Conference.

Canadian Pharmaceutical Journal, 1883. From the Ontario College of Pharmacy.

Chemical News, 1883. From the Editor.

Chemical Society of London, Journal, 1883.

— List, 1883. From the Society.

Chemist and Druggist, 1883.

Chemists' and Druggists' Diary, 1884. From the Proprietors.

Chemists and Druggists' Trade Association, Seventh annual report, 1883. From the Association.

Ephemeris of Materia Medica, Pharmacy, Therapeutics, etc., 1883. From Dr. Squibb.

General Medical Council, Medical register, 1883.

— Medical Students Register, 1883.

— Dentists Register, 1883.

— Minutes, vol. 19–20. From the Council.

Guy's Hospital Reports, vol. 26, 1883. From the Hospital.

Imperatorskie S.-Peterburgskie Botanetsheskie Sad, Acta horti petropolitani, tom. 8, fasc. 1-2. From the Sad.

Institute of Actuaries, Journal, and Assurance Magazine, 1883.

— List of Members, etc., 1882. From the Institute.

Institute of Chemistry, Register of Fellows and Associates, 1883. From the Institute.

Kaiserliche Akademie der Wissenschaften in Wien, Anzeiger, mathematisch - naturwissenschaftliche Classe, 1883. From the Akademie.

Linnean Society of London, Journal, 1883.

— List, 1883.

— Proceedings, 1875–83. From the Society.

Mason Science College, Calendar, 1883. From the College.

Massachusetts College of Pharmacy, Catalogue, 1883. From the College.
Massachusetts State Pharmaceutical Association, Proceedings, 1883. From the Association.
New Jersey Pharmaceutical Association, Proceedings, 1883. From the Association.
New Remedies, 1883. From the Editors.
New York State Pharmaceutical Association, Proceedings, 1883. From the Association.
New Zealand, Pharmaceutical Register for 1883. From the Pharmacy Board of New Zealand.
Newcastle-upon-Tyne Chemical Society, Transactions, vol. 5, No. 12. From the Society.
Ny pharmaceutisk Tidende, 1883. From the Publishers.
Owens College, Manchester, Calendar, 1883. From the College.
Pharmaceutical Society of Ireland, Calendar, 1883. From the Society.
Pharmaceutical Society of Victoria, Australasian supplement to the Chemist and Druggist, 1883.
— Twenty sixth Annual Report, 1883. From the Society.
Pharmacie Centrale de France, L'Union Pharmaceutique, 1883.
— Bulletin Commercial, 1883. From the Pharmacie Centrale.
Photographic Society of Great Britain, Journal and transactions, 1883. From the Society.
Radcliffe Library, Catalogue of books added during 1882. From the Library.
Royal College of Physicians of London, List of Fellows, etc., 1883. From the College.
Royal College of Surgeons of England, Calendar, 1883. From the College.
Royal College of Veterinary Surgeons, Register, 1883. From the College.
Royal Dublin Society, Scientific Proceedings, vol. 3, part 5.
— Scientific Transactions, vol. 1, parts 15–19; vol. 2, part 2. From the Society.
Royal Institution of Great Britain, Notices of the Proceedings, no. 75. From the Institution.
Royal Medical and Chirurgical Society of London, Medico-chirurgical Transactions, vol. 66.
— Proceedings, new ser., nos. 1–3.
— Additions to the Library, 1881–82. From the Society.
Royal Society of London, Proceedings, nos. 89–92, 222–26. From the Society.
St. Bartholomew's Hospital, Reports, vol. 18.
— Statistical Tables for 1882. From the Hospital.
Smithsonian Institution, Annual reports for 1863 and 1881. From the Institution.
United States Army, Index-Catalogue of the Library of the Surgeon-General's office, vol. 4, 1883. From the Surgeon-General.
Université de Bruxelles, Annales, Faculté de Médecine, tome 3, 1882. From the Université.
University College, London, Calendar, 1883. From the College.
University of Durham, Calendar, 1883. From the University.
University of Glasgow, Calendar, 1883. From the University.
University of London, Calendar, 1883. From H. M. Government.
Victoria, Pharmaceutical Register for 1882. From the Pharmacy Board of Victoria.
Wisconsin Pharmaceutical Association, Proceedings, 1883. From the Association.
Yorkshire College, Ninth Annual report, 1883. From the College.
Dragendorff (G.), Plant Analysis, translated by H. G. Greenish, 1883. From the Translator.
Jones (H. M.), Treatise on aural surgery, 2nd ed., 1881.
— Atlas of Diseases of the Membrana Tympani, 1878. From the Author.
Plugge (P. C.), Natriumhypobromit als Reagens zur qualitativen und quantitativen Bestimmung des Ammoniakharzes, 1883. From the Author.

The Committee recommended the purchase of the undermentioned books:—

Blyth (A. W.), Poisons, 1883.
De Candolle, Monographiæ Phanerogamarum, vol. 5, pars 1.

The Librarian reported that the cabinet of slips forming a bibliography of pharmacy, which had been purchased by the Council, had been received, and was available for reference.

The Committee recommended that sundry volumes and parts of the Pharmaceutical Journal be presented to the Smithsonian Institution to complete a set for reference in the United States National Museum, Materia Medica Department.

The Committee recommended that the Journal of the Chemical Society, for March, 1881, February to December, 1882, and the indexes for the same years, be purchased for the Society's Library in Edinburgh.

Curator's Report.

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

	Total.	Highest.	Lowest.	Average.
Morning	497	31	9	19
Evening	136	12	1	5

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

Specimen of Turtle Oil from the Seychelles. Presented by Messrs. Wright, Layman and Umney.
Specimen of Oil of Petit Grain distilled in Paraguay. Presented by Messrs. W. B. Cranwell and Co.
Thirteen specimens of native remedies used by the Cree Indians of Hudson's Bay Territory. Presented by Mr. W. Haydon.
Specimen of Tupelo tree wood with bark attached. Presented by Messrs. Parke, Davis and Co.
Very fine specimen of Zanzibar Anime. Presented by Mr. E. Fielding.
Specimen of the root of Piptostegia Pisonis. Presented by Messrs. Symes and Hallawell.
Specimen of Cinchona succirubra cultivated in St. Thome, W. Africa. Presented by Messrs. T. Christy and Co.
Specimen of the bark of Strychnos Gautheriana. Presented by Mr. John Sellers.

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

The report and recommendations of the Committee were adopted.

Mr. Greenish said he should like a Committee, with the sanction of the Council, to consider the question of sending additional copies of the Journal to directors and curators of Museums and Botanical Gardens. At the present time the Journal was distributed very liberally and he himself had furnished several names of persons of the character referred to, to whom it should be sent; but he thought if the Committee went into the subject systematically, the distribution might be a little extended with great benefit.

The President said he would bring the matter before the Committee at its next meeting.

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor stating the progress of cases which had been placed in his hands.

Two other cases had been considered by the Committee and in one case proceedings were recommended.

The Council, as usual, went into committee to consider this report, and after a long discussion on a case of appeal from the Registrar's decision not to place the name of an applicant on the Register, the report and recommendations were adopted.

Preliminary Examination.

It was resolved that the following certificates be received in lieu of the Preliminary examination:—

The Entrance Examination in Arts of the Faculty of Medicine in the Victoria University.

The Preliminary Examination of the Victoria University.

The Junior Students' General Examination of Owens College.

Analyses of Cinchona Barks.

The President said he had received a communication from Dr. Paul, which would be published in the Journal, containing a report of analyses he had made of the samples of cinchona bark presented to the Museum by the Secretary of State for India.

It was moved by the Vice-President, seconded by Mr. Bottle and unanimously resolved—

"That the best thanks of this Council be given to Dr. Paul for the analyses of bark made by him, and which are of so much interest in connection with the specimens presented to the Society's Museum by the Secretary of State for India."

Reports of Committees—*continued.*

Law and Parliamentary.

The report of this Committee stated that the President had given to it an account of the action he had taken since the last meeting with reference to the draft Pharmacy Bill now in the hands of the Government.

A resolution had been moved in the Committee that immediate steps be taken to organize a deputation to the Lord President of the Privy Council, which had not, however, been carried.

The Council went into Committee whilst the President gave further details on the above subject.

The Council having resumed, it was moved and seconded—

"That the report of the Law and Parliamentary Committee be received and adopted."

Mr. Hampson said he thought the Council had now arrived at an important crisis with respect to the Bill which had been submitted to the Government, and it was quite time the Council should take the initiative in the matter. It had been well represented by the President, and personally the members of the Council felt obliged to him for his activity and zeal, but he believed his hands would be strengthened if the Council publicly expressed its desire to obtain the ear of the Lord President of the Council on this subject. At the Committee on the previous day he had moved a resolution that the Lord President be asked to receive a deputation, so that an opportunity might be afforded to press the claims of pharmacy on his lordship, but that proposal was not accepted. He would, therefore, move—

"That the report of the Law and Parliamentary Committee be received and that the Lord President of the Council be asked to receive a deputation with respect to the draft Pharmacy Bill sent to the Privy Council in February last."

The Council of the Irish Society was moving in the matter, and was anxious that the law in that country should be altered. In England it had been discovered long ago that the Pharmacy Act was defective, and in the interest of the public as well as pharmacy it behoved the Council to take some public steps in the matter.

Mr. Young hoped it would not be needful to have an amendment, because he thought all would agree to this suggestion. He knew the amount of labour the President had bestowed on the matter, and should be satisfied to leave it very much in his hands; but still it was the usual way in this country if you wanted anything to show that you were really in earnest about it. He had been lately struck in reading the life of Lord Palmerston, for in some of his letters he gave accounts of various subjects in connection with his own particular sphere of duty, and referred to the pressure put upon him by different parties. It seemed to him also that he was very much guided by the kind of pressure brought to bear. As an illustration, not long ago, Lord Randolph Churchill, at Edinburgh, seemed to think that it was not necessary to make any more concessions with regard to the franchise, because there were no great meetings or petitions to Parliament about it. He believed that an influential deputation supported by local members of Parliament would have a good effect.

Mr. Greenish also thought the time had arrived when some application should be made to the Lord President with regard to the Pharmacy Bill, and the question arose whether it should be done by the President or by a deputation. He was very much in favour of the old-fashioned mode of deputation, consisting not only of the President and members of the Council, but influential men from different parts of the country. He took it, of course, that the deputation might be introduced by members of Parliament.

Mr. Symes said it was not from any dissatisfaction with the way in which the President had dealt with the matter that he supported the amendment. The President had done an immense deal in the business, but the time had arrived when something additional should be done. He thought it would be very useful to have an influential deputation such as was suggested, especially if it were carried out early in the session.

Mr. Hills said it was the general feeling that there should be a deputation, but the feeling of the Committee appeared to be that Lord Carlingford would be better prepared to inform them what course the Government would be likely to take in two or three weeks than he was at present.

Mr. Williams said he had voted for an immediate deputation and was still convinced that that was the proper course to take. The Council should not wait for Lord Carlingford to move, but should endeavour to move him. The only question which arose incidentally was, whether the deputation should consist of members of the Council only, or should be strengthened from outside.

Mr. Symes said that could be decided when the Council got a reply.

Mr. Bottle recommended a deputation entirely composed of members of the Council. If the Council went outside its own body to get up a large deputation it would look as if an attempt were being made to put pressure on the Government. He believed the Council was bound to its constituents to introduce the Bill in the next session, and in order to do that it wanted to know from the Government whether it was prepared to take up the matter or whether the Council must act independently. The great point was to get the Bill introduced, because if it were deferred the interest which had been awakened during the last five months would die out. He believed there was a large feeling of public interest in favour of amending the law and also amongst medical men, so that there would be a prospect of getting the measure through if it were introduced early in the session. The first thing to know was what the Government intended to do.

Mr. Savage thought a deputation from the Council would be the most appropriate.

The President said the principal point seemed to be whether anyone outside the Council should join the deputation. Perhaps the Council would leave the details in the hands of the Law and Parliamentary Committee to arrange.

Mr. Bottle thought the Council should appoint the deputation.

Mr. Hampson said it would be well for the Committee, who would have to arrange for the deputation, to understand what character it should assume. He was anxious that it should be such as to impress the Lord President of the Council with the importance of the question. On the previous evening someone suggested that the presence of a number of medical men would be important, but he should rather like the Council, if it had confidence in the Committee, to leave the arrangements in its hands. If the deputation was very small it would not be so impressive. It might be strengthened by medical men, members of Parliament, coroners, and so on.

Mr. SCHACHT said if there were too many persons present there might be a risk of having conflicting views.

Mr. GREENISH thought if there were medical men and coroners who had not gone into the various questions thoroughly with the deputation, these persons would be very likely to express views with which the Council could not agree.

The PRESIDENT said he believed that members of Parliament who introduced a deputation were not regarded as part of it.

The VICE-PRESIDENT thought the Council should settle the principle and leave details to the Committee. He did not think it advisable to have a very large deputation for fear of having varied opinions. He should prefer to have as influential a deputation as possible from their own body.

Mr. YOUNG thought it would be right for the Council to nominate the deputation, but it would be well if it were strengthened by gentlemen from different parts of the country. The Committee would take care that the views expressed were in consonance with the Pharmacy Bill which had been drawn up.

Mr. ROBBINS thought it would be very well for different parts of the country to be represented, but better representatives could not be found than those who sat on that Council.

Mr. SCHACHT thought the desire was rather to discuss with the Government whether it would or would not take this matter up from the chemists and druggists' point of view, and it seemed to him it would be rather hindering a free expression of opinion on the part of the minister if the Council were to go accompanied by members of Parliament or any other section of society outside its own particular organization. So far the Council had been in semi-confidential communication with the department, and what was wanted now was to urge upon it the pushing forward of this Bill during the present session. It was hardly desired to urge the matter or bring upon Government that kind of pressure which would imply that there was a large public demand. He doubted whether it would be wise to do more than have a well-selected representative deputation from the Council to confer confidentially with the department as to what might be expected. If the deputation got the cold shoulder it might then be necessary to use a little pressure from without, and under those circumstances outside agitation might be of great service, but he did not think the present was the right time for that purpose. There might be a few points which would require alteration, and he should not like to put any trammels on the utterances of the minister who was approached.

The Council here went into Committee to further discuss this subject. On resuming, the amendment was put and carried in the following form:—

"That the Report of the Law and Parliamentary Committee be received, and that the Lord President of the Council be asked to receive a deputation with respect to the draft Pharmacy Bill sent to the Privy Council in February last. That the members of the deputation and details be left to the Law and Parliamentary Committee to arrange."

DIVISION LISTS.

Mr. GREENISH then moved the following resolution:—

"That the names of the voters for or against any resolution submitted to this Council be published in the Journal reports of the proceedings."

He said his object in moving this was to correct some of the irregularity which had appeared to him to occur in the proceedings. About 1873, Mr. Hampson had proposed a similar resolution, which was considered right and proper, but the Council thought it would be drawing too hard and fast a line. His simple object was to do away with the irregularity. It would have been noticed by members of Council that it was possible to express opinions on a particular subject in language characterized by a felicity of ambiguity which left nothing to be desired, except the knowledge of which way the speaker intended to vote. At the present time every member of the Council saw which way his colleagues voted, but those outside who read the reports did not see which way the members recorded their votes, and as they now possessed the glorious institution of reporting the proceedings of the Council it was right that their constituents should see exactly not only what was said, but which way the persons speaking voted. It would have also a beneficial effect another way. He had observed occasionally that calling for the names had had the most paralysing influence on some members, so that they were utterly unable to hold up their hands. If this rule were general it would reconcile them to the regular reporting of the votes as well as to the remarks which were made. He believed it would be an advantage in every way to have the votes recorded, but he did not like it left to members to call for votes on particular occasions.

Mr. HAMPSON seconded the motion. He thought it would possibly give weight to the proceedings, and those whose votes were recorded might perhaps give a little more consideration to the questions which were discussed, whilst it would do away with any distinction between names being taken at one time and not at another.

Mr. GOSTLING supported the motion. It always appeared to him disagreeable when a little feeling was introduced into the discussion for gentlemen to rise and call for the names to be recorded.

The PRESIDENT said he did not see much harm in the motion, but he thought it would be very inconvenient at times, and it might lead members to call for a ballot under certain circumstances, which they could do under the bye-laws. It was a constitutional practice to take a show of hands, and then, if the decision were challenged, to divide and take the names. He did not think there was anything unconstitutional in the present practice, or anything which did any serious harm. There were occasions, such as the appointment of officers, and others which he could not call to mind at the moment, where it would be inexpedient to publish names. He would rather leave the matter to the good sense of the Council in each case.

Mr. WILLIAMS said there was no doubt it would delay the business. It had always been the practice for any member to have the names taken down if he desired, but he was not aware that it had ever led to any great show of feeling. There might be instances, but it did not last long. If it was held that it looked invidious for a member to call for names to be taken down in a division, by all means adopt the motion. If, also, it was considered necessary that their constituents should know exactly how they voted on every little insignificant occasion, it was another argument in favour of it, but he did not think it was so essential. The names were always taken down in every division of consequence.

Mr. BOTTLE thought an equal amount of inconvenience and personality would arise if this motion were carried. It had occurred to him that if there was a desire that the names should be published, that it should be called for before the division took place. In practice it was otherwise; a show of hands was taken, and then someone who was disappointed at the result asked that the names should be taken down.

Mr. Schacht thought it would be wise to have a rule and keep to it. That was the great recommendation of Mr. Greenish's motion.

The President said there was a rule now, and a constitutional one.

Mr. Schacht said where there was no division no loss of time would take place; but when it came to a question where there was a difference of opinion the taking down of names would not occupy much time. If it were a delicate point, such as had been referred to, it would be easy to introduced the ballot. He agreed that it was rather disagreeable because a man thought he was going to be beaten that he should call for the names to be recorded as a sort of threat. He never paid any attention to it, but it was an offensive thing to hear.

Mr. Greenish said all he desired was that there should be some regularity in the proceedings. He did not care if the names were never taken; but he did not wish it to be in the hands of any members to call for the names at any particular time, when they would not in the ordinary course be taken, thus giving special prominence to a subject which might not deserve it. He had no wish to press the motion on the Council.

Mr. Young thought perhaps Mr. Greenish would be content with having broached the subject.

The President thought it might have the effect desired.

Mr. Schacht did not think it would.

The President said that if names were called for in any invidious manner the matter could easily be balanced by calling for the names in other cases, but he did desire to impress upon the Council that it was unwise to introduce unnecessary restrictions in the conduct of business.

Mr. Greenish withdrew the motion.

Report of Examinations.

December, 1883.

ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.
Major (12th)	6	4	2
„ (13th)	7	4	3
„ (19th)	6	4	2
	— 19	—12	—7
Minor (12th)	21	5	16
„ (13th)	23	5	18
„ (19th)	22	6	16
„ (20th)	27	14	13
	— 93	—30	—63
Modified (12th) . . .	2	1	1
	114	43	71

Preliminary Examination.

Twelve certificates received in lieu of the Society's examination.

2 College of Preceptors.
1 Society of Apothecaries.
5 University of Cambridge.
4 „ „ Oxford.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, January 2; the President, Mr. James E. Brunker, M.A., in the chair.

Present:—The Vice-President, Mr. H. N. Draper, F.C.S.; Drs. Collins, Montgomery; Professor Tichborne, Ph.D.; Messrs. Allen, Doran (Bray), John Evans, Grindley, Hayes, Hodgson, McIlwain, Pring (Belfast), Simpson and Wells.

A letter was read from Mr. James N. Hardy, L.P.S., Dublin, calling attention to his former correspondence in reference to a legal point arising on the Pharmacy Act, and pressing for a reply.

The Registrar (Mr. Fennell) said queries arising on Mr. Hardy's letter had been submitted, about two months ago, for the opinion of Mr. Naish, Q.C., Attorney General for Ireland. As yet, however, the learned counsel had not given his opinion.

It was resolved that the Registrar be instructed to communicate with Mr. Naish, asking him to expedite his reply to the queries, and that Mr. Hardy be informed of the steps that had been taken.

Mr. W. H. Brown, of Portadown, wrote inquiring whether the certificate of the Intermediate Education Board would be accepted by the Pharmaceutical Society as an equivalent for their Preliminary examination.

Dr. Collins said that this matter had been discussed by the Councils of the Apothecaries' Hall and the College of Surgeons, and the result was that at both these institutions they had resolved to discontinue their Preliminary examinations and to accept in lieu of them, for the future, the certificates of the Education Board that the candidate had passed in the several subjects required.

Mr. Draper observed, Mr. Brown's letter made no mention of botany, which was one of the subjects required for the Preliminary examination of the Pharmaceutical Society.

Dr. Collins: Of course you will not accept a certificate which does not include all the subjects.

The President: Mr. Brown states in his letter that the Intermediate Education Board do not hold any examination in botany for boys.

Dr. Montgomery apprehended that settled the matter. He proposed that the Council decline to accept the certificate referred to, as it did not include all the subjects mentioned in the curriculum.

Mr. Simpson seconded the motion, which was agreed to.

The President read a letter from Mr. Trevelyan, M.P., Chief Secretary for Ireland, as follows:—

"Chief Secretary's Office, Dublin Castle.
"*December* 27, 1883.

"Sir,—I beg to acknowledge the receipt of your letter of the 24th instant and, in reply, to say that I shall be happy to receive a deputation from the Pharmaceutical Society of Ireland, on Tuesday, January 8, at 1 o'clock p.m.

"Yours faithfully,
"G. O. Trevelyan."

The President said that as he had a notice of motion on the agenda paper in reference to this deputation, he would ask the Vice-President to take the chair while the matter was being discussed.

The Vice-President (Mr. H. N. Draper) then took the chair and—

Mr. Brunker (President) moved—

"That it be an instruction to the deputation about to wait upon the Chief Secretary, to recommend that in any amendment of the law affecting pharmacy or the sale of poisons in Ireland, power shall be given to this Society to license, by examination, a grade of registered druggists, who shall be empowered to sell poisons but not to dispense prescriptions."

He would very much prefer some other member of the Council had brought this question before them, but as no other member had done so he had given the notice in order to bring the matter up for discussion. From what occurred at their last meeting it was necessary the question should be settled one way or other. Until that meeting he was unaware it was such a "burning question" as it appeared to be, or that there was so much difference of opinion upon it. On two occasions, at all events, the Council had expressed a strong opinion upon it and he would have thought that if amongst the general body of the Society there was any strong opposition to it, the opposition would have found expression at the annual meeting, but so far from that, the annual meeting consisted only of the members of the Council and two outside members, which certainly would lead one to suppose there was not any strong opinion held by the outside members on the subject. The matter was before a committee four years ago who, after very full consideration, recommended the establishment of a new grade of druggists, as well as the registration of all existing chemists and druggists who were entitled to continue the sale of poisons under the Act. That proposition was adopted by the Council, but was rejected by the Society at its annual meeting four years ago. The question came again before the Council last year, and, again, the opinion of the great majority was in favour of establishing such a grade as that referred to. He would, in the first instance, observe that this Society was not founded as a Trade Protection Society in any sense of the word. It was formed in order to administer the law as it existed, and if there was any defect in the existing law to suggest a remedy. Now the opinion of every member of the Council he believed was that some change was required. There was no difference of opinion as to the necessity of registering those persons who by the existing Act were entitled, although unqualified, to continue the sale of poisons; but there was a difference of opinion as to the perpetuation of that grade. For his part he (Mr. Brunker) thought the grade ought to be perpetuated with some restrictions and modifications. This Society could not at its present rate of going supply the wants of the public throughout the country. They had on their roll 251 licentiates, but deducting those who were out of the country, the actual number was only about 220. Of those he believed not more than half were in business on their own account, and allowing for those who were residing in Dublin, Belfast, and Cork, they had not at the outside more than between 40 and 50 men qualified as licentiates of the Society to supply the wants of over two hundred towns in Ireland of upwards of 1000 inhabitants. At their present rate of going, therefore, the Society could not for many years supply every town with a qualified pharmacist; and the question arose, would it not be advisable an educated man should be appointed for those towns and villages? There was no doubt whatever the people in those localities wanted men who could sell them such drugs as a pennyworth of arsenic or an ounce of laudanum, and the object of establishing the proposed grade of druggists was that the public should have a guarantee that the persons who sold those things should understand what they were selling—that they should at all events know the difference, for example, between corrosive sublimate and washing soda. He believed at the present day there were hundreds engaged in the trade throughout the country (from the representations the Council had got in reply to their queries) who did not even know that, and the public were completely at the mercy of those people. There were one or two arguments which he believed would be urged against the proposition; one was that when the Society was founded they decided on only having one grade. He, however, did not think that affected the question, for even if they had established two grades of members, the members of both grades would have had the same rights, and both would be entitled to dispense prescriptions, the only difference they could make between them would be that which existed in England, viz., a difference in the standard of examination. Now he did not think any member of the Council would say the Society would be justified in turning men loose on the country to dispense prescriptions on a lower standard of examination than they had at present, nor did he believe that even if they had a higher grade they would find many availing themselves of it. Another argument which certainly possessed some weight was that the establishment of the proposed grade of druggists might tend to encourage illegal dispensing, but he believed that could be avoided by efficient registration. He would suggest that those persons who entered the proposed grade should be required to pay a small annual licence—if it were even as low as 2*s.* 6*d.*—and that lists of those licensed persons should be furnished to the police authorities, so that in each district the police would know who were licensed to sell poisons and who were not.

Mr. Pring (Belfast), in seconding the motion, said after the Pharmacy Act became law they had a discussion in the Council as to the desirability of having two grades of members, but it was decided to have only one, the chief argument being that under their Act as it stood, if they formed two grades they would both possess the same legal rights as to dispensing prescriptions, the only difference would be that a man in the second grade could not call himself a pharmaceutical chemist, but might style himself "chemist and druggist." He (Mr. Pring) believed that it was illegal for a druggist to sell poisons, if they went by the strict letter of the law. He knew a great number of persons in Belfast who considered it a great hardship that the Society had not a second grade of licentiates such as that now proposed—a grade of persons licensed to sell drugs. A great many persons wished to become druggists—to acquire the legal right to sell poisons—who yet did not want to dispense prescriptions; but as the law now stood they must become pharmaceutical chemists, and, in fact, take out a qualification they did not want. For these reasons he seconded the proposition.

Mr. Grindley moved the following amendment:—

> "That inasmuch as the majority of the licentiates of the Pharmaceutical Society of Ireland are of opinion that the proposed grade of registered druggists should include only those at present in business, and should not be extended by examination or otherwise to more than those at present keeping open shop as chemists and druggists, this Council shall not seek power to register such persons for the sale of poisons in Ireland beyond those at present in business."

The meeting of Council at which the proposition to establish this new grade was adopted was attended by only a few members, and it was not unanimous, for the matter was strenuously opposed by two of the members present. He thought this question ought not to be raised at all at any Council meeting, inasmuch as at the Society's annual meeting in October, 1869, it was settled that the grade of registered druggists should not be perpetuated. Of course all existing chemists and druggists,—those who were in business at the time of the passing of the Act,—were entitled to their rights and would not be interfered with; but he (Mr. Grindley) and the body of licentiates for whom he appeared objected *in toto* to this class being perpetuated, as the fact of being licensed to sell poisons would include the right to sell other drugs and would destroy any chance their regularly qualified licentiates had of living. The Act was passed to supply the public with a class of men properly qualified to dispense drugs and compound prescriptions, but if they now established this third grade of men their licentiates would be deprived of all chance of living.

Mr. Pring: What do you mean by a third grade?

Mr. Grindley: There were first the existing "chemists and druggists," those who were in business when the Act passed; secondly, there would be this new grade of registered druggists; and lastly, there were their own regular licentiates, and how were these latter to live if this proposal was carried out? Every man who had passed the Society's examination as a pharmaceutical chemist had expended his time and money on the faith that the Society would protect him and in the belief that only one grade would be established, and never would have gone in for examination if he thought this class of "chemists and druggists" was to be perpetuated. The great majority of their licentiates were opposed to the proposition and between one hundred and forty and one hundred and fifty of them had memorialized the Lord Lieutenant against it.

Mr. Wells seconded the amendment, as he believed the proposition would, if carried out, be destructive of the interests of the great body of the Society's licentiates, injurious to the Society itself and detrimental to the public. The Society had already at one of their annual meetings rejected the proposal. When the matter was brought forward again at a recent meeting of the Council it was not properly explained in the notice paper, and the consequence was only nine or ten members of the Council attended out of the total of twenty-one members. Mr. Grindley and he (Mr. Wells) opposed it at that meeting, but the other seven or eight members present voted for it. Under those circumstances Mr. Grindley and he determined to bring the matter before a meeting of the Society's licentiates in Dublin and let them know what the Council proposed to do. Forty licentiates attended that meeting and were unanimously against it. They also sent circulars to the licentiates in the country, the result being that nearly one hundred and fifty signatures had been affixed to the memorial referred to by Mr. Grindley. He believed the establishment of the proposed class of druggists would increase illicit dispensing Illicit dispensing and compounding were carried on at present, and the Society was unable to prevent it; but if this new class of traders who could style themselves "registered druggists" were established, how could the public distinguish between them and the fully qualified chemist? The result would be the Society would dwindle away. They might have qualified pharmaceutical chemists in the large towns, but in small towns and villages men would not deem it worth while obtaining the qualification for the small advantage they could get by it. The pharmaceutical chemist would be regarded by the public, especially in small towns, much in the same light as people formerly regarded the apothecaries—as persons who charged "tall" prices—and they would suppose the druggist would sell more cheaply and give him their custom. As to the argument that by this proposal they would have a class of educated persons to sell drugs and poisons in the country, the proposition was that they should be examined in the nature and appearance of certain poisonous drugs and chemicals, but he (Mr. Wells) failed to see how that would secure a grade of educated men. Any person with brains could in a short time learn that much; yet that was all that it was proposed to require of him; he need not even know how to write his name. His belief was that the Act as it existed was gradually supplying the country with educated and qualified men to dispense drugs, and numbers of country towns where there never was a qualified dispenser before the Act was passed had one now. In a few years if they continued their system every town in Ireland would have a qualified chemist. He did not see any reason why the sale of poisons should be entrusted to a man who was unfit to make up prescriptions. The better qualified a man was the more careful he was likely to be in dealing with dangerous drugs. At present they heard of arsenic and other poisons being sold in country towns by grocers who were unable to write their names.

Mr. Pring: We want to take the sale out of the hands of such persons.

Mr. Wells said that was all right. He and those whom he represented did not object to that at all. What they objected to was the proposed perpetuation of an inferior grade of sellers of drugs. What they asked was that the names of all existing druggists should be registered, and that while leaving their rights untouched, the Act should provide against the perpetuation of that class of traders.

The Vice-President: Why do you propose to recognize them at present and not continue them?

Mr. Wells: Because you cannot interfere with the existing rights of persons in business. What we say is, register the names of all existing persons in the trade, and then if any unqualified person attempts to sell in future, you can prosecute him. One difficulty the Society has in prosecuting unqualified persons is, because there was no registration of the existing druggists when the Act first became law. Mr. Wells concluded by seconding the amendment.

Professor Tichborne thought as regarded the merits of the proposition there was a good deal to be said for and against. He quite agreed with the remark that in large towns it might be an inducement to illegal compounding, for no doubt many people—especially the lower orders—would not discriminate between a licensed druggist and a qualified pharmaceutical chemist. On the other hand there was no question there were many small towns in Ireland where there was neither an apothecary nor a pharmaceutical chemist keeping an open shop for sale of medicines, and there was no use passing a law which it was impossible to carry out. There must be some people in small towns and villages to sell poisons. Would it not meet the difficulty if it were provided that on a requisition stating that there was no licentiate or qualified man keeping open shop in a town for sale of drugs, the Society should in such cases have the power of licensing a druggist to sell poisons in such town? The first thing they had to consider was whether it was necessary, and if so they ought to ask for it in the interests of the public. That was the light in which Government would regard the question, apart from the interest of any body of men.

Mr. Hodgson observed that if what Mr. Wells proposed was carried out it would be wholly contrary to the spirit of the age, which was decidedly opposed to anything approaching a monopoly. He would never be a party to establishing a huge monopoly, and it never was the intention of the framers of the Act that there should be a monopoly for the sale of drugs and poisons in the hands of the pharmaceutical chemists.

Dr. Collins spoke in favour of the proposition, and observed that ten years ago, when the Pharmacy Bill was before the country, the trade was then quite favourable to what they were now opposing—the establishment of a second grade of druggists—licensed merely to sell, and not to compound medicines.

Mr. Evans said he had received a letter from Mr. Lester, of Cork, who believed the proposed grade would ruin the business of pharmaceutical chemists in small sowns. They would have a lot of half-qualified men telling at ridiculously low prices. He believed the establishmeat of the proposed grade of druggists would be a great mistake.

Dr. Montgomery said the Government would have to look at the question, not from the pharmaceutical chemist's point of view, but in the interests of the public. He believed it would be for the public advantage to have a grade of men qualified to sell poisons, though they might not possess qualifications enabling them to compound prescriptions.

Mr. Simpson said if a man was not sufficiently qualified to compound medicines he was unfit to deal in poisons, for he was ignorant of the character of the articles he was dealing in, and it was unsafe to entrust such a man with the power of selling poisonous drugs. He regarded it as a most unfortunate thing that there was not a registration of the existing chemists and druggists when the Pharmacy Act became law. If that had been done they would not be in the condition they were in now. He intended to vote for the amendment.

The President replied to the observations of the previous speakers, and said of course it was not intended to give any man the proposed new grade of registered druggist unless he could show that he possessed a fair amount of education, besides some technical knowledge of poisons and potent drugs. With regard to Professor Tichborne's suggestion, he quite concurred in the spirit of it, and if he were asked to suggest details, that would be one he would strongly recommend for consideration. If any Bill, however, were introduced at all, it would be a Government Bill, and though of course the framers of it would be likely to consult the opinion of the Council of the Society as to the details of the measure, they would act on their own views and frame such clauses as they thought best in the interests of the public, for this matter must not be regarded in the light of a trade protection question, but as a public question in which all classes of the people were interested.

The votes were:—

For the amendment.—Messrs. Allen, Doran, Evans, Grindley, McIlwaine, Simpson, Wells.—7.

For the original proposition.—The President, the Vice-President, Dr. Collins, Dr. Montgomery, Messrs. Hayes, Hodgson, Pring, Tichborne.—8.

The amendment was therefore lost. The President's proposition was then put, and carried.

A discussion ensued as to the procedure to be adopted upon the proposed deputation to the Chief Secretary, and it was resolved that the President and Dr. Collins should be the speakers to state the views of the majority of the Council, but that as many members of Council should be requested to attend on the deputation as could find it convenient to do so.

In consequence of the lateness of the hour, the remaining business on the paper was adjourned to the next monthly meeting.

Obituary.

Notice has been received of the death of the following:—

On the 5th of December, Mr. John Tribe, Pharmaceutical Chemist, High Street, Chatham. Aged 78 years. Mr. Tribe long held a prominent position in the municipality of Chatham, having, among other offices, filled those of Alderman and Mayor. He was one of the Founders of the Pharmaceutical Society, and served it during several years as a Local Secretary.

On the 8th of December, Mr. William Henry Jackson, Chemist and Druggist, Sutton, Surrey. Aged 57 years.

On the 9th of December, Mr. James Edward Wheeler, Pharmaceutical Chemist, Upper Tollington Park, N. Aged 69 years. Mr. Wheeler had been a Member of the Pharmaceutical Society since 1846.

On the 22nd of December, Mr. Alfred Wright Hardcastle, Chemist and Druggist, Finkle Street, Stockton-on-Tees. Aged 35 years. Mr. Hardcastle had been an Associate of the Pharmaceutical Society since 1873.

On the 23rd of December, Mr. Timothy Grisdale, Chemist and Druggist, Market Street, West Houghton. Aged 48 years.

On the 24th of December, Mr. Edwin Cridland, Chemist and Druggist, Stradbroke, Suffolk. Aged 55 years.

On the 25th of December, Mr. John Ransome Oxley, Chemist and Druggist, Market Hill, Sudbury. Aged 70 years.

On the 25th of December, Mr. John Walton, Pharmaceutical Chemist, High Street West, Sunderland. Aged 61 years. Mr. Walton had been a Member of the Pharmaceutical Society since 1848.

On the 29th of December, Mr. Alfred Uriah Row, Chemist and Druggist, Fore Street, Devonport. Aged 47 years.

On the 30th of December, Mr. George Stuart, Chemist and Druggist, Penny Street, Lancaster. Aged 24 years. Mr. Stuart was an Associate of the Pharmaceutical Society.

On the 1st of January, Mr. Robert Rowell, Chemist nd Druggist, Green Street, South Shields. Aged 47 years. Mr. Rowell had been a Member of the Pharmaceutical Society since 1874.

On the 3rd of January, Mr. Joshua Broughton, Chemist and Druggist, High Street, Wrexham. Aged 75 years.

BOOK RECEIVED.

The Druggists' Pocket Price Book, for Retailers, Jobbers, Manufacturers and Travelling Salesmen. Third Edition. By Benjamin Lillard. New York: J. H. Vail and Co., 1883.

Correspondence.

Patent Medicines containing Poison.

Sir,—Another case of child poisoning by a patent medicine has lately been reported. Holt's specific for whooping-cough was taken, and it is said to contain antimony. The jury very properly desired to call the attention of the Home Secretary to the sale of patent medicines.

The indiscriminate sale of such medicines, some of which are known to contain opium, antimony, and other potent and deleterious ingredients, is a crying evil, and surely demands the intervention of some law in the matter, either to prohibit altogether or to regulate.

Dispensing chemists ought to co-operate with members of the medical profession and represent to the proper quarter the great danger and unfairness of allowing grocers, oilmen, and others, to sell medicines of which they know absolutely nothing.

It should be enacted that the manufacturers of patent medicines be compelled to state on their bottles whether or not their preparations contain any ingredients dangerous in themselves, or that might prove so in an increased dose; and the retailers of such medicines, who ought to be licensed chemists and no others, would be able to warn purchasers as to the nature of the medicines bought.

Or a more sweeping and justifiable enactment might be made prohibiting manufacturers of patent medicines from making up any ingredients whatever of the nature of what comes under the category of poisons. Why are the makers of patent medicines not held responsible for the melancholy results which sometimes ensue from taking their mixtures? A licensed chemist or medical man would not get off so easily, if a mistake were committed in regard to the dispensing of medicine. An unaccountable leniency is displayed toward the quack.

Let chemists, then, join with medical men in representing this flagrant abuse, and urge the State to interpose on behalf of the innocent beings who are victimized by patent so-called specifics, by herbalists who give poisonous doses of lobelia, as in a case recently recorded, and by unprincipled quacks.

On looking at the list of patent medicine manufacturers, etc., I am astonished at the number who are in no way connected with pharmacy or medicine.

Robert Connell, M.D.

"*Druggist.*"—If possible the prescriber should be consulted.

"*Associate.*"—The substance mentioned is not included in the schedule of poisons.

J. W. S.—Mr. Warren's paper was printed *in extenso* in the *Journal of the Society of Arts* for December 7.

"*Tr. Card. Co.*"—Try Attfield's 'Manual;' but you should remember that chemical experiments and the writing of equations are only useful as means to an end, and are dealt with from this point of view in all good works on chemistry.

"*Coccus.*"—*Liquid Cochineal.*—The following formula is said to yield a preparation that will keep well:—Cocci cacti, potass. carb., potass. tart. acid., pulv. aluminis, āā ℥j; aquæ, ℥viij. Boil the cochineal, carbonate of potassium and water together, then add the alum and acid tartrate of potassium; when cold add half a drachm of rectified spirit to each ounce and filter.

Communications, Letters, etc., have been received from Messrs. Clagur, Robinson, Abraham, Howard, Martin, Hodgson, Apprentice.

LABORATORY NOTES.

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

Pharmaceutical Chemist.

Professor Attfield, in his famous Presidential Address to the British Pharmaceutical Conference, describes "the pharmacist proper" as "not only a distributor but a manufacturer or compounder of most pharmaceutical preparations he distributes; the man who can warrant the purity and efficiency of every drug he distributes, either because he has tested it, or because he has made it himself from materials which his professional knowledge tells him to be trustworthy." A glance at the *Pharmaceutical Journal* or the 'Year-Book of Pharmacy' shows that there are such pharmacists and that they give an immense amount of time to the investigation of drugs and chemicals. But, as a rule, it would seem that only the results of very exhaustive researches are published and the little every-day experiences of the laboratory remain hidden in the note-book; whereas, if published, they might be of material assistance to fellow workers and tend to raise the general standard of purity of the articles examined.

In the hope that others may be induced to publish more valuable work, I have selected the following from memoranda concerning the analyses of over two hundred and fifty drugs and chemicals purchased in the usual course of business and examined in my laboratory during the past year.

The processes by which my results were arrived at were, except when otherwise mentioned, the usual recognized methods; but in some few instances processes have been adopted and described simpler, perhaps, than those used for similar purposes in more important chemical investigations, yet sufficiently accurate for purposes of comparison. Care in every case has been taken to avoid giving any result which might be doubtful.

An alphabetical arrangement has been followed as the most generally suitable.

Acidum Hydrocyanicum Dilutum.—Sample No. 1 contained when purchased 1·42 per cent. HCy. Sample No. 2, 1·46 per cent.; after being stored four months in small blue bottles, stopper downwards, in shop cupboard, 1·36 per cent. Both samples contained a notable amount of chlorides.

Acidum Sulphurosum.—When purchased contained 6·72 per cent. SO_2; after being kept in an inverted stoppered bottle and not opened for four months, it contained 5·72 per cent. SO_2. The Pharmacopœia demands 9·2 per cent., but it is well known that practically such a solution cannot be obtained, that 7 per cent. is a good commercial specimen, and that 5 per cent. would be a much better standard.

Acidum Tartaricum.—Three commercial samples were examined; all of them were affected by sulphuretted hydrogen. An attempt was made to estimate the amount of metals present by colorimetric tests, comparing solutions of known quantities of the acids with a standard solution of lead and pure acid, by means of solution of sulphuretted hydrogen. 0·003, 0·004 and 0·010 per cent. were the results arrived at; but the presence of metals other than lead somewhat interferes with the accuracy of the method.

Alumen.—The commercial article is invariably potash alum, but "alumen, B.P.," is still obtainable when specially ordered.

Amylum. — Obtained from three sources. One firm invariably supplies wheat starch; a second for "amylum" sends out maize starch, but for "amylum, B.P.," wheat starch; a third firm sent what on inquiry they said was rice starch, but which I found to be maize starch. Maize starch is quite equal to that of wheat for general pharmaceutical and toilet purposes, and is less often musty.

Bismuthi Subcarbonas.—Five specimens examined; all contained large traces of nitrate.

"*Calamine.*"—Five samples examined. No. 1 contained 90·5 per cent. barium sulphate. No 2, 3, and 4 were apparently similar to No. 1; being unacted upon, to any considerable extent, by acids, they were not further examined. No. 5 treated with hydrochloric acid dissolved with much effervescence, leaving only 2 per cent. insoluble. The acid liquid with ammonia yielded a copious precipitate, almost entirely soluble in excess. Another portion dried at 105° C., lost 0·28 per cent. moisture. At a full red heat it lost 19·46 per cent.

Calcii Chloridum.—A sample of foreign manufacture, examined immediately on opening a sealed bottle, lost 22·4 per cent. at 250° C. Another sample, labelled "pure anhydrous chloride of calcium," lost under similar circumstances 9·94 per cent. The Pharmacopœia directs in the formula for "solution (saturated) of chloride of calcium" 4 ounces of the salt to 5 ounces of distilled water; unless recently dried chloride of calcium be used, a saturated solution will not be obtained. The same authority gives the formula of chloride of calcium dried at 400° F. as CaCl (old style). Fresenius in his 'Quantitative Chemical Analysis,' 6th edition, p. 95, says that when exposed "for several hours to a tolerably strong heat (about 200° C.)" (=392° F.) "the white and porous mass obtained . . . consists of CaCl+2Aq." Roscoe and Schorlemmer also give it as $CaCl_2+2\,H_2O$.

"*Citrate of Magnesia.*"—A commercial sample gave after solution in water—

Free acid reckoned as tartaric . . .	1·3 per cent.
Magnesium sulphate ($MgSO_4 7\,H_2O$) .	12·0 per cent.
Sugar	18·0 per cent.

Creta Præparata.—This preparation, inelegant at all times, has this year been the subject of gross adulteration, a lot having been put on the market containing two-thirds its weight of plaster of paris. Had it been recommended only as "so much whiter" and "greatly superior to the common as a face powder" it would have been bad enough; but what are we to say when we are informed that "This preparation is a great improvement upon the common Prepared Chalk usually sold, and can be strongly recommended as much purer for medicinal purposes"?

Fortunately, a timely warning was given in your columns by Mr. F. Harris Alcock (vol. xiii., p. 1015), and I have reason to believe "this preparation" has not since been offered for sale by London houses. A box of this chalk (?) came into my hands a few days before Mr. Alcock's communication appeared. I found 67·25 per cent. total impurities, the bulk of this being calcium sulphate. It is only justice to the sellers to state that previous and subsequent lots from the same maker and with the same circular have not contained more than 7 per cent. impurities, and we may hope that the writer of the circular was not acquainted with the nature and extent of the adulteration.

Dispensing Measures.

One oz. conical glass measure, graduated both sides (verified).			Two drachm cylindrical measure (verified).			Half drachm cylindrical measure (verified).			Minim tube four trials on minim i. and minim v.	
Graduation.	Weight in grains.	Measure in minims.	Graduation.	Weight in grains.	Measure in minims.	Graduation.	Weight in grains.	Measure in minims.	Weight in grains.	Measure in minims.
ʒj. . .	64·46	70·7	♏v. . .	5·53	6·0	♏v. . .	4·68	5·1	·885	0·97
ʒij. . .	123·17	135·0	♏x. . .	10·16	11·1	♏x. . .	9·28	10·2	1·030	1·13
ʒiij. .	178·14	195·5	♏xx. .	18·36	20·0	♏xx. .	18·33	20·1	1·070	1·17
ʒiv. .	233·52	256·2	♏xxx. .	30·00	33·0	♏xxx. .	27·82	30·5	1·035	1·14
ʒv. . .	291·89	320·2	ʒj, . .	58·26	64·0				4·655	5·11
ʒvj. .	344·50	378·0	ʒiss. . .	87·27	95·8				4·530	4·97
℥j. . .	467·25	512·7	ʒij. . .	112·48	123·5				4·665	5·12
									4·765	5·23

The bottom of the meniscus was taken as the correct reading. The one ounce and two drachm measures being measures of capacity, a sufficient quantity of liquid was delivered into them from a carefully balanced Schuster's alkalimeter, the loss of weight of which was then ascertained. The half-drachm measure was itself balanced and the weighings taken direct. In the case of the tube measure the minims were delivered into a suitable vessel and then weighed. It will be seen that the errors are all in one direction, and may have arisen through the graduator taking some other part of the meniscus. When once the errors are known they are easily guarded against.

Dispensing Weights.

Denomination. Grain.	Stamped.						Unstamped.			
	No. 1 Set.		No. 2 Set.		No. 3 Set.		No. 4 Set.		No. 5 Set.	
	Grain error.	Per cent. error.	Grain error.	Per cent. error.	Grain error.	Per cent. error.	Grain error.	Per cent. error.	Grain error.	Per cent. error.
½	+·04	8·0	+·120	24·	+·015	3·0	+·045	9·0	+·27	54·0
1	-·07	7·0	+·025	2·5	+·015	1·5	-·340	34·0	+·07	7·0
2	+·06	3·0	+·045	2.2	+·095	4·7	+·070	3·5	+·005	
3	-·02	0·7	+·050	1·7	+·035	1·2	+·545	18·2	+·09	3·0
4	+·11	2·8	+·085	2·1	+·080	2·0	+·120	3·0	+·10	2·5
5	+·02	0·4.	+·020	·4	+·035	·7	-·360	7·2	—·01	·2
6	+·02	0·3	+·035	·6	+·100	1·6	+·120	2·0	+·08	1·3

Denomination.	Stamped				Unstamped					
	No. 6 Set.		No. 7 Set.		No. 8 Set.		No. 9 Set.		No. 10 Set.	
	Grain error.	Per cent. error.	Grain error.	Per cent. error.	Grain error.	Per cent. error.	Grain error.	Per cent. error.	Grain error.	Per cent. error.
℈ss.	0·345	3·4	+·02	·2	+2·35	23·5	-0·135	1·3	-·030	0·3
℈j	0·020	0·1	+·06	·3	-2·79	14·0	-0·175	·9	+·705	3·5
ʒss.	0·160	0·5	+·09	·3	+3·71	12·4	+0·075	·25	+·015	
℈ij.	0·550	1·4	+·04	·1	+1·19	3·0	-0·045	·1	+·220	0·5
ʒj.	0·600	1·0	+·08	·1	+4·19	7·0	+0·015		-·017	0·3
ʒij.	0·340	0·3	-·06		-0·34	0·3	-0·050		+·050	0·4

The balance used in these investigations was one of Oertling's best (a model of good workmanship); the standard weights were also of ascertained accuracy.

Ferri Arsenias.—Two samples recently purchased yielded respectively 6·5 and 5·47 per cent. of ferrous salt. A small quantity was made in my laboratory according to the Pharmacopœia directions, without special precautions, it being exposed to air during washing and drying, for forty-eight hours, in order to imitate as nearly as possible the supposed conditions of manufacture on large scale; it contained 27·2 per cent. ferrous arseniate. The Pharmacopœia standard is 37·91 per cent.

Ferri Phosphas.—Old stock contained 26·25 per cent. ferrous salt, some recently purchased 37 per cent. The Pharmacopœia standard is 44·75 per cent.

Ferri et Quiniæ Citras.—Fifty grains dissolved in 1 ounce of water, rendered alkaline with ammonia, and shaken with two separate half ounces of ether, yielded 7 grains of alkaloid, which when burnt left no perceptible residue. The same sample by B.P. process gave 6·75 grains alkaloid. Another sample from a different maker, shaken with three lots of chloroform (instead of the ether), yielded 8·3 grains total alkaloid, 7·8 grains being soluble in ether.

Ferrum Redactum.—Old stock contained 32 per cent. of an oxide of iron, some newly purchased only 27·5 per cent. The Pharmacopœia allows as much as 50 per cent.

Hydrargyrum cum Cretâ.—Three new samples examined, all contained traces of mercuric oxide.

Liquorice.—Two samples examined, both yielded 34 per cent. of matter insoluble in water, which under the microscope appeared little else but starch, more or less disorganized.

Linseed.—Several samples examined, all very good as far as freedom from admixture with foreign seeds was concerned, but invariably infested with "acarus farinæ," an extremely pretty object when viewed under a microscope, but most unwelcome among linseed. To stop the depredation all the dust should be sifted off, and with it most of the eggs of the mite. The linseed can then be placed in a tin with a sponge saturated with chloroform, all life is soon destroyed, and a few minutes' exposure to air suffices to remove the odour of chloroform.

Liquor Lithiæ Effervescens.—One trade sample examined from syphon showed 11 grains lithiæ carbonas to the pint.

Liquor Magnesiæ Carbonatis. (Sold in syphons with excess of carbonic acid).—Yielded magnesia equal to 9·8 grains $(MgCO_3)_3$, MgO, $5H_2O$, in each ounce. The Pharmacopœia informs us that it should contain "about 13 grains of carbonate of magnesia in a fluid ounce." A few lines below, under characters and tests, we are told "a fluid ounce evaporated to dryness, yields a white solid residue, which after being calcined weighs no less than 5 grains" of magnesia; this is equal to 11·94 grains of the official carbonate. It is, I believe, however, pretty well understood that 8 grains per fluid ounce is a fair average yield of a product made strictly according to the Pharmacopœia. Kept under pressure in syphons it is rendered available of constant strength.

Liquor Potassæ.—Mr. Woodland, in a paper read before the British Pharmaceutical Conference in 1880, points out the numerous impurities contained in this preparation as found in commerce. The most objectionable of these are chlorides (present to the extent of 0·2 per cent., if we accept the average of ten samples examined by Mr. Woodland) and sulphates. These impurities are generally due to the carbonate of potash, which, as met with in commerce, is always more or less contaminated with them. Bicarbonate of potash on the other hand is one of the purest salts met with in pharmacy; I therefore propose the use of a proportional quantity of this salt in lieu of the carbonate of potash at present used. The formula would read thus:—

Bicarbonate of potassium . . . . 20 ounces,
(or more correctly, 8520 grains).
Slaked lime (washed) . . . . . 12 ounces.
Distilled water . . . . 1 gallon.

Dissolve the bicarbonate of potash in one half the water, and heat the solution to the boiling point in a clean iron vessel, continue the ebullition for ten minutes, then add the lime previously mixed with the remainder of the water, etc.; or it may, where time is no object, be made by the cold process.

Liquor Potassæ Effervescens, B.P.—Various samples purchased at different times during the year. Half a pint of each sample was titrated with volumetric solution of oxalic acid, and the alkali indicated reckoned as $KHCO_3$.

Ten ounces of a sample of London water neutralized 180 grain measures of decinormal solution, equivalent to 0·9 grain $CaCO_3$, or 1·8 grains $KHCO_3$. All the samples examined had been made with hard water, but in the following statement of results no allowance has been made:—

Maker.	Sample.	Grains $KHCO_3$ per ½ pint.
A	1	8·3
A	2	7·5
A	3	8·1
B	1	5·2
B	2	5·0
B	3	5·0
B	4	14·4
C	1	10·5
C	2	10·8

As a rule observation with pocket spectroscope is sufficient to show when this preparation needs further examination, noticing the intensity and persistency of the spectrum. The pocket spectroscope is more convenient to use than a more complicated form of this apparatus. What the microscope is to drugs the spectroscope is to chemicals; each has its sphere of usefulness, and it would be difficult to say which is the more serviceable to the pharmacist.

Liquor Sodæ Chloratæ.—Old stock, 0·852 per cent. available chlorine. Freshly purchased, 1·13 per cent. Some bought a fortnight later from the same firm, evidently recently made, yielded 2·5 per cent., which is the official strength.

Liquor Sodæ Effervescens.—In the examination of these samples decinormal solution of oxalic acid was used. The chalk present in ordinary town water is equivalent to 1·5 grains $NaHCO_3$ per half pint. No allowance was made.

Maker.	Sample.	Grs. $NaHCO_3$ per ½ pint.
A	1	4·9
A	2	5·0
B	1, 2, 3 and 4 each	1·5
C	1	3·1
D	1 and 2	1·6
E	1	8·5
E	2	2·2
E	3	3·9
E	4	1·8
E	5	7·9

The last five samples were all purchased at one time; evidently the bicarbonate of sodium had been put in at hazard.

Soda water having been sold chiefly as a beverage, the absence of soda is certainly not "to the prejudice of the purchaser;" where an antacid is required, potash water should be recommended, as it generally contains alkali.

"*Peroxide of Hydrogen.* Ten volumes."—Four samples examined.

No. 1 contained chloride of barium and was not further tested. No. 2 had an acid reaction, and left on evaporation a notable quantity of sulphate of potassium. No. 3 contained 0·6 per cent. chloride of potassium. No. 4 left scarcely any residue. Five c.c. of Nos. 2, 3, 4, gave respectively, 30, 32 and 40·5 c.c. of gas when mixed in a suitable apparatus with 15 c.c. of volumetric solution of bichromate of potassium; hence they were 6, 6·4 and 8·1 volume preparations.

Potassium Carbonate.—Contained 1·5 per cent. chloride of potassium.

Potassium Nitrite.—Nitrous radicle estimated by means of solution of potassium permanganate.

Sample 1, old stock, deliquescent crystals, contained 86·2 per cent. KNO_2. Sample 2, recently purchased, in sticks slightly discoloured, 84·3 per cent. KNO_2.

Pumice Stone.—This, as is well known, is an impure silicate of aluminium not differing materially in composition from common fire-clay. As it is but slightly attacked, at normal temperature and pressure, by hydrochloric acid, losing but a small percentage of its weight and that chiefly iron, I generally submit the levigated powder, as purchased, to the action of this acid and content myself with that test. On treating a recently purchased sample in this way violent effervescence ensued. Further examination showed that the dried powder lost 12·3 per cent. on treating with dilute hydrochloric acid and that the loss was due chiefly to the solution of carbonate of calcium. The residue consisted of silica and aluminia in abundance, potash and lime in large traces, iron and manganese oxides in smaller traces. The carbonate of calcium was, I suppose, added to improve the colour.

Scammony.—A good article can generally be obtained for a fair price. A lot purchased as virgin scammony contained 83 per cent. resin of characteristic cheesy odour; a sample of a cheaper variety only 40 per cent. of resin, being heavily adulterated with starch.

Sodium Nitrite.—Sample 1, in flat light-brown coloured pieces contained only 6·6 per cent. $NaNO_2$. Sample 2, in small white crystals contained 96·5 per cent. $NaNO_2$.

Syrupus Ferri Phosphatis Co.—Three samples examined, all guaranteed to contain at least 2 grains of phosphate of iron and lime to each teaspoonful. One fluid drachm was mixed with a like quantity of stronger solution of ammonia, the precipitate thoroughly washed, dried and weighed. The wash water was collected and examined for calcium by oxalate of ammonium, iron by sulphide of ammonium, and chlorides by nitrate of silver in the presence of excess of nitric acid.

No. 1 gave 2·1 grains precipitate. The wash water showed traces of calcium, but no iron or chlorides.

No. 2 gave 2·2 grains precipitate. The wash water with the above mentioned tests did not show any traces of either calcium, iron or chlorides.

No. 3 (well known for its elegant appearance and pleasant taste) gave 0·35 grain precipitate. The wash water showed very slight traces of calcium (dried and weighed 0·18 grain $=$ ·15 grain Ca_32PO_4), and iron, also an abundance of chlorides. The reason it surpassed (?) the other samples is thus evident. It could be of very little value medicinally.

The above test is of course rather crude, but time did not permit of a more complete chemical analysis. As a ready means of distinguishing a good "chemical food" from a poor one, I would suggest mixing a sample of each with half its volume of the stronger solution of ammonia. A good specimen will yield a precipitate so copious as to render the whole almost solid; in a syrup containing only traces of phosphate the consistency is scarcely altered.

Zinci Oleas.—Forms a perfectly clear fluid at 81° C. 1·447 gram left on ignition 0·188 gram residue (wholly soluble without effervescence in hydrochloric acid), or 13 per cent. oxide of zinc. Theoretically oleate of zinc should yield 12·9 per cent. oxide of zinc.

In summarizing my results it is interesting to note that out of two hundred and fifty drugs and chemicals examined only one could be considered a case of serious adulteration, viz., creta præparata. The substitute for calamine has been in the market so long as to become recognized by some as calamine. Ferri arsenias, being seldom used, is generally old and oxidized, an improvement would doubtless be to keep it in small quantities in closed tubes freed from oxygen. As to chemical food, good keeping properties and pleasant taste are not the only qualities such an article should have to recommend it. In other cases the impurities were more or less accidental, but might be guarded against by pharmacists demanding analytical certificates with each lot of goods purchased, and not merely trusting to the payment of the best price as a sufficient security for obtaining the best article.

AMERICAN DRUGS.*

BY J. MOELLER,

Botanist and Microscopist of the Imperial Forest Institute, Mariabrunn, near Vienna.

(*Continued from page* 468.)

2. HERBA MICROMERIÆ DOUGLASII (YERBA BUENA).

The part of the plant growing above ground, without flowers. The leaves, oval-shaped, with short leaf-stalks, blunt-pointed and coarsely notched, with nervation running along the rim and with very few tertiary nerves, are given off opposite each other from a square-shaped stem. (Fig. 2.)

Fig 2.

On their upper surface they are nearly smooth, while on the under surface they are thickly dotted with small spots and are covered with hair similar to that on the stem. The largest leaves are 4 cm. long and 3 cm. in width, growing gradually narrower and pointed towards the top. In the axils of the leaf are usually found only thin flower stems, 7 mm. in length; occasionally, however, the calyces are also attached. The latter are usually found to have been torn off in the drug. They are elliptical in circumference, 4 mm. in length, 5 mm. wide, five-toothed, profusely ribbed, with compact skin, hairy externally and internally bare; they envelop four nuts. The plant has a slightly aromatic odour, and a spicy, somewhat bitter taste.

Microscopical Character.—The upper skin of the leaves is furnished on either side with a tough cuticle and has two forms of trichoma. The hair is firm, conical, generally with two cells (Fig. 3), and is sessile on the somewhat prominent enlarged base of the mother cell. The hair gland is disk-shaped with a simple pedicle cell

* Reprinted from the *Therapeutic Gazette* and translated from the *Pharmaceutische Centralhalle*, 1882, Nos. 28, 31 and 33. We are indebted to the courtesy of Messrs. Parke, Davies and Co., of Detroit, for *clichés* of the original engravings illustrating this series of articles.

(Fig. 4) sessile on a tray-shaped cavity on the upper skin of the lower side of the leaf. The cuticle, of very delicate

Fig. 3.

texture, is removed by a vesicle formed beneath it by the accumulation of an intensely yellow gum.

Fig. 4.

The plant from which the *yerba reuma* is derived is the Labiate *Micromeriæ Douglasii*, Benth. (*Thymus Douglasii*, Bth.), and is indigenous in the north-western states of the American Union and in Columbia. It was recently introduced as a drug in California where it is employed as an anthelmintic, emmenagogue and febrifuge.

3. FOLIA CHEKAN.

The dried leaves with a few fragments of leaf-stalks.

The leaves are stiff, although not very brittle; the majority, therefore, when received in good condition are very delicately wrinkled, of a bright green colour, with a yellowish streak, short stem, somewhat curled at rim, and bald on each side. On the superior surface, which to the unassisted eye appears finely granulated, the central nerve only is visible in the majority of leaves; it is only in the larger leaves that secondary nerves may be traced to the circumference. On the lower surface the nerves on all leaves are prominent. The leaves are dotted with transparent points, though in the smaller leaves these points are visible only under the glass.

The leaves are elliptical to oval in shape (Fig 5),

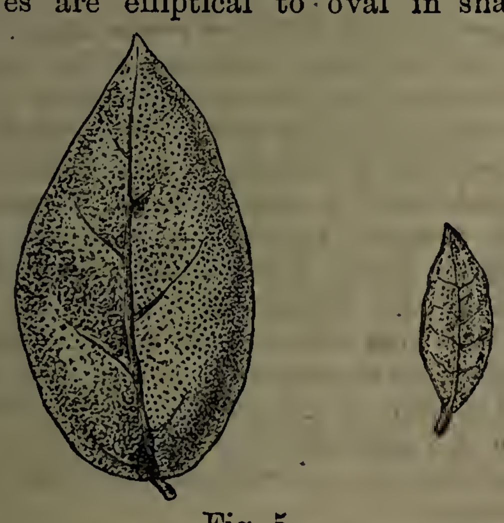

Fig. 5.

pointed at the top and narrowed at the base; they vary in size (from 1 to 4 cm. in length) although the proportion between the length and breadth is constant (1 : 2·5) The leaves are quite odourless; on being rubbed between the fingers they, however, emit an agreeable aromatic odour. Their taste is at first purely aromatic, but is afterwards strongly bitter.

Microscopic Characteristics.—The cuticle is particularly developed on the superior surface of the leaf; a double row of palisade cells constitutes scarcely a third of the thickness of the leaf; the mesophyll consists of irregularly branched cells in an ordinary loosely arranged parenchyma. Large crystal cells are occasionally found among the palisade cells, but seldom or never in the mesophyll. Globular oil cells (0·07 to 0·15 mm. in diameter) with yellowish contents, are disposed under the cuticle of both the upper and lower surfaces.

The plant (*Myrtus Chekan*) from which the chekan leaves are gathered, is an evergreen shrub about 2 m. high, found in the central province of Chili. It differs from *Myrtus communis*, L., chiefly in the fact that its leaves are shorter and broader. Its flowers, also, are composed of but four leaves, are hairy like the calycle leaves, and are rounder than those of the latter. The leaves somewhat resemble smaller buchu leaves, especially those of *Barosma crenulata*, Hook., but the edges of the latter are indentated and so are readily recognized.

The virtues of chekan leaves reside in the tannin and ethereal oil which they contain. Hutchinson has vainly sought to discover an alkaloid in them (*Pharm. Journ.* 1879, p. 653), He discovered tannin which would turn blue in the presence of iron salts, and an ethereal oil, volatile at the ordinary temperature, soluble in chloroform, ether, ethylic and amylic alcohol, insoluble in water, and burning with a bright, white flame.

This plant has long been used under the name of chekan, chequen or cheken, in Chili, where it is held to be powerful aromatic and astringent. The juice of its leaves and young wood, diluted with water has been especially recommended as a collyrium. Don reports remarkable cures of dysentery effected by the liquor in which its bark had been steeped.

Dr. Dessauer, of Valparaiso, has recently been making extensive clinical experiments with chekan leaves. He used an infusion (1 part leaves with 10 parts boiling water), or an extract (produced according to the method prescribed in the United States Pharmacopœia for extracts of cinchona bark), or a syrup (1 part leaves and 2 parts syrup), or finally by inhalation. The results which he has obtained in bronchitis, catarrh of the bladder, and other affections of the mucous membranes, have induced him to ascribe to these leaves tonic, expectorant, diuretic and antiseptic qualities. Linarix attributes these same properties to the oil of common myrtle.

(*To be continued.*)

SALT WORKING AT MIDDLESBOROUGH.*

Among the various works visited by the members of the Iron and Steel Institute during their recent meeting at Middlesborough, were those for raising and preparing salt, undertaken by Messrs. Bell Brothers, the whole process being explained by Mr. T. Hugh Bell.

Although salt has been obtained by evaporating sea-water on the north-east coast for centuries, and local names, such as Saltholme and Salt Beck, would appear to prove early knowledge of the presence of salt, the deposit was only discovered in 1862, when Mr. John Vaughan, of Bolckow and Vaughan, bored for water on the south bank of the Tees, for feeding his steam boilers, and struck the salt at a depth of 1200 feet. The firm subsequently endeavoured to work the deposit by means of a shaft, but soon abandoned it on account of the heavy cost. In 1874, Messrs. Bell Brothers sank a bore-hole on the north side of the river, and found the salt at a depth of 1127 feet, or 73 feet nearer the surface. This deposit exists in the palæozoic series overlying the coal measures, and is about 3000 feet lower, and considerably older,

* From the *Journal of the Society of Arts.*

geologically, than the Cheshire salt, which is found entirely in the triassic series of rocks. The theory of its formation is that the salt water, in isolated basins cut off from the sea or communicating with it by narrow entrances only, was gradually concentrated until it became saturated. The extent of the bed has not been ascertained; and all that is known at present is that it rises to the north, and dips to the south. The thickness, however, as proved by a second bore-hole put down by Messrs. Bell in 1881, is 65 feet, which warrants the estimate that salt is present under Middlesborough in the proportion of 200,000 tons to the acre, which is exactly equal to the annual consumption on the Tyne.

In Cheshire, the surface water trickles through the clay to the gypsum, and flows over the salt, which is thus converted into brine, and only requires being raised to the surface; but, in the Middlesborough deposit, the nature of the strata and the great depth preclude all chance of infiltration. It occurred, however, to Mr. Thomas Bell, that the salt might be raised by allowing fresh water to flow into the hole and become saturated with salt, and then pumping out the brine, without sinking a shaft. The suggestion was quite independent, although this method of working has long been adopted in the east of France. Accordingly, the bore-hole was put down successfully by the rotary diamond drill; and it so happened that a portion of the lowest core was left at the bottom of the hole, leaving an annular space, which has served to receive the lower end of the lining tube. This latter is perforated with holes where it passes through the salt; and the greater portion of its weight is carried by a ring resting on the surface. An inner tube, perforated for a short distance at the bottom, is supported partly by a plate at the bottom and partly by girders at the top. There is an annular space between the two tubes, into which fresh water is allowed to flow. This water makes its way out through the holes in the outer tube, becomes saturated with salt, and rises in the inner tube, but only to such a level that the two columns bear the proportion of ten to twelve, that being the relation of the specific gravities of brine and water. The pump is, however, placed below this level, so as to avoid the necessity for suction. The pump, worked by an engine at the rate of fourteen strokes a minute, lifts from 8 to 9 gallons of brine at each stroke. When the cavity in the salt bed at the bottom of the hole has attained a certain size, the following is supposed by Mr. T. Hugh Bell to be what takes place. A molecule of water, descending the annular space between the two tubes, reaches the upper cavity in the salt, and there finds saturated brine. It, therefore, no longer continues its downward course, but floats on the surface of the heavier fluid, having no tendency to sink until it becomes saturated by coming into contact with the undissolved rock salt. The cavity at the bottom is, therefore, filled with a solution of salt, saturated, or nearly so, with fresh water flowing along its surface, and which gradually becomes saturated in turn. The pump draws the saturated solution from the bottom of the hole, and makes room for fresh water on the surface, so that there is a tendency for the hole to become enlarged at the bottom, and assume the form of a very flat inverted funnel.

The brine is pumped into a reservoir containing 500,000 gallons, and, roughly, between 500 and 600 tons of salt, the salometer standing at about 23°. Thence it flows into twelve shallow evaporating pans, nine of which are heated with coal, and three by the waste gases of the blast-furnaces adjoining, the temperature of the brine being kept at 170°. The salt crystallizes in regular cubes, which float on the surface; and on each cube is formed others, until the whole mass becomes too heavy to float, and sinks to the bottom. Some difficulty was experienced in a thin pellicle forming on the surface, which prevented the crystals from falling, and also arrested evaporation. This was found, on investigation, to be due to gelatinous vegetable matter, which was present in the surface water used; but upon water from the Darlington Waterworks being substituted, the difficulty ceased. Salt is taken out every other day upon platforms, called "hurdles," between the pans, and conveyed in barrows to railway waggons. A scale of sulphate of lime forms on the bottom of the pan, which requires removing at intervals, and also necessitates the laying off and thorough cleaning of the pan every three or four weeks. The twelve pans produce 360 tons a-week of coarse salt, suitable for curing purposes and for chemical works, table salt requiring to be crystallized at a much higher temperature.

COLOURING AMBER.*

For colouring amber it is necessary to find a liquid in which the amber can be heated, and this liquid must fulfil, says Professor Ed. Hanausek, the following conditions:—Its boiling point must lie above 150° C., and it is better if it boils above 200°. The amber must not be attacked by the hot liquid, nor must its physical characters be changed. The liquid must be able to dissolve dyes and not decompose them, or at least not rapidly. It should also be mentioned that the dyestuffs employed must not decompose at 150° or 200° C. Many of the fatty or essential oils, and also solid fats and hydrocarbons which melt below 150°, may fulfil these conditions. The attempt to impart different shades of colour to amber was made with linseed oil. The following pigments dissolve in it without being entirely decomposed at 200° C., viz., dragon's blood, alizarine, purpurine and indigo. Of the aniline colours—fuchsin, aniline violet, methyl green and alkali blue, all refuse to dissolve in pure linseed oil. In carrying out the experiment a weighed quantity was stirred into linseed oil, and the piece of amber to be coloured suspended therein, and slowly heated to 190° or 200° C. The liquid was then kept for some minutes at the temperature of 180° or 200°, after which the source of heat was removed and the hot liquid allowed to cool. After taking the amber out of the oil and cleansing it, it was found to be dyed.

A light or dark reddish-brown can be made with dragon's blood, bright yellow with alizarine, an orange yellow with purpurine, light or dark green, dark blue, and black from indigo. The proportions of indigo that must be taken to obtain the shades mentioned are given as follows:—For light green, $\frac{1}{4}$th of a part of indigo to 100 parts of oil; for dark green, $\frac{1}{2}$ a part to 100; for dark blue, 1 part of indigo to 100; and finally, for black, 4 or 5 parts of indigo to 100 of oil; on heating the oil, the indigo dissolves in it and imparts to it a very beautiful reddish-purple.

By frequently heating these mixtures to 200° C., both the indigo and the linseed oil suffer some change. The oil gets thicker and turns brown, and when heated it no longer assumes such a fine purple colour. A mixture that has undergone this change from heating, colours amber brownish; hence, when it is desired to obtain pure shades of green and blue, it is necessary to frequently change the dye baths or renew them. In dyeing black it is not necessary to suspend the amber in the liquid, for it is coloured more quickly when it lies on the bottom in contact with any undissolved indigo.

If finely pulverized asphalt is put in linseed oil, and the oil heated until it almost boils, a portion of the asphalt will dissolve, forming a brownish liquid and have a distinct green fluorescence. Amber that has been heated in this liquid for a long time to 200° C. acquires a brownish colour and has a slight greenish fluorescence. This fluorescence is, however, much more distinct and striking if the amber is subsequently heated in a mixture of 1 part of indigo in 1000 of oil. All hydrocarbons which are fluorescent themselves can impart this quality to amber.

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The Pharmaceutical Journal.

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THE PHARMACIST AS A DISTRIBUTOR OF MEDICINES.

OUR pages this week contain two communications neither of them pretending to great importance in respect to the matter they contain, but both of them worthy of notice because of the spirit by which they are pervaded. They well illustrate the essential difference that should exist between the mode in which the pharmacist carries on his business and that adopted by the grocer or drysalter, and upon which he bases a claim for a higher social status and a more liberal remuneration for his services that are more or less accorded to him by all the thinking portion of the community. It is true it has been urged, and with some force, that in presence of the keen competition by which the pharmacist is beset on every side, he would do well to remember that he is a tradesman and a skilled operator, but not a professional man, and to be satisfied to do the trade part of his calling upon thorough trade principles. This is very good advice as far as it goes, and probably in proportion to the neglect of it by the pharmacist he will be a sufferer. But even the conducting of business on thorough trade principles requires that a man should have a clear perception of the true value of what he sells, and not be betrayed through the confusion evolved in the struggle into vending his wares at less than cost price because a neighbour is selling articles that resemble them at a low figure. And it will only be in so far as the qualified pharmacist remembers that he has something to sell that the unqualified grocer or huckster or keeper of a store has not, and demonstrates this capability to the public by the manner in which he conducts his business, that his experience *quâ* pharmacist will afford him satisfaction or answer to his expectations.

We are perfectly well aware that there is a large amount of business carried on in connection with the drug trade which it would be mere affectation to look upon in this light; business for the transaction of which the most important qualifications are to be able to buy well and to sell well, and the getting or retaining of which is often dependent upon a turn of a trifle in the prices. We have no intention of speaking slightingly of this class of business,—which, indeed, is an important source of income to many chemists and druggists,—but we do not consider that this should come into question as ruling the conditions under which the pharmaceutical part of the business is conducted. We are prepared, however to give the word "pharmacy" a very wide meaning, covering whatever pertains to the dispensing and retailing of medicines, and say in respect to it that the pharmacist cannot in justice to himself or his *confrères* afford to lose sight of the fact that for this service to the public he possesses qualifications that have cost him time, labour and money, which he should therefore neither leave unexercised nor undervalue. Of course, the extent to which the public is likely to recognize or be willing to pay for these qualifications will vary with the locality and other conditions; but care should be taken that if such recognition be not a constant quantity, it shall at least be a reality, since nothing will be so likely to lead to the value of the qualifications being ignored by the public as the light estimation of them by the pharmacist himself.

Mr. SYMONS in his "Laboratory Notes" well illustrates one of the peculiar services that the qualified pharmacist is capable of rendering and should conscientiously render to the public. Professor ATTFIELD was not one whit too stringent in his definition of the "pharmacist proper," as quoted by Mr. SYMONS, as "the man who can warrant the purity and efficiency of every drug he distributes, either because he has tested it or because he has made it himself from materials which his professional knowledge tells him to be trustworthy." So, in his "analyses of over two hundred and fifty drugs and chemicals purchased in the usual course of business" during the past year, Mr. SYMONS has not only been protecting himself, but he has been rendering a service to his customers for which he should, and no doubt will, eventually find remuneration in cash and reputation. A well-known pharmacist, in an able paper that contained many unpalatable truths smartly put and provoked much discussion some two years since, alleged that "the trouble and responsibility of selling an ounce of rhubarb or Gregory's mixture is just about equal to that of selling a quarter of a pound of tea or coffee;" and that "if the educated pharmacist, accustomed to the use of the microscope, can see what appears to him a great responsibility in the sale of such drugs, it is more than the public or the Government can do." With respect to the former opinion we think it is sufficiently disproved by Mr. SYMONS's paper, and if the latter opinion be accepted as correct it is difficult to understand the grounds upon which the enactment of the existing Pharmacy Acts was sought or effected or why it should now be desirable to seek for the establishment of a curriculum. But we entirely demur to the truth of these statements. We believe, on the contrary, that the feeling is rapidly gaining ground amongst the public, and the Government which is a reflex of it, that the distribution of drugs and medicines should, as far as possible, be in the hands of qualified pharmacists, capable of estimating and guaranteeing their identity and quality, and that very few persons, other things being equal, would think it immaterial whether their supplies of medicines were drawn from the chemist and druggist or the grocer. It seems to follow that the future of pharmacy in this country will depend very much upon the extent to which those who practise it succeed, by the judicious and continuous exercise of their special qualifications, in maintaining and intensifying this preference of the public for their services.

The question that is mooted by Mr. C. B. Allen, in his letter, is another that requires careful consideration at the present juncture. The sale of patent medicines, though once a profitable adjunct to was never looked upon as an ideal form of the practice of pharmacy. There are, indeed, a few among our ranks who would wash their hands entirely of the unclean thing; there are, however, more who look regretfully, if not resentfully, towards the portion of the trade that has in the course of the last few years drifted into the hands of grocers, oilmen, linen drapers, *et hoc genus omne.* As long as the pharmacist sells these articles as so many sealed packets, concerning the contents of which he, sometimes ostentatiously, professes to know nothing, he can hardly expect the public to acquiesce in paying a higher price for them to him than to his competitor. But should the exclusive right of dealing in patent medicines containing poisons be conceded to the registered chemist and druggist, as seems not impossible, the position will be very much altered. Then, at least, if not now, if he persists in retailing particular medicines which have supplied occasions for a coroner's jury, without a caution as to the uncertain nature of the compound, he will be incurring a very grave responsibility, and may become involved in unpleasant consequences.

The *St. James's Gazette* reports that at an inquest held in Eastbourne on Monday last, Mr. H. R. Brown, who had been summoned as a juror, but objected to serve on the ground that he was a pharmaceutical chemist in full practice, was told by the coroner that he could not claim exemption on such ground as that. After some discussion Mr. Brown was allowed to leave; but the coroner requested the police to summon him again for the next inquest, intimating that if he then declined to serve he would be fined forty shillings. According to the second section of the Juries Act, 1862, "All registered pharmaceutical chemists . . . . actually practising . . . . shall be and are hereby absolutely freed and exempted from being returned and from serving upon any juries or inquests whatsoever," and provided that care has been taken by the objector at the proper time to ensure that his name has not been improperly inserted on the register, "such ground," when brought within the cognizance of the coroner, would, presumably, be deemed sufficient for claiming and obtaining exemption.

* * *

The Eighteenth Chemists' Ball was held at Willis's Rooms on Wednesday last and was attended by nearly two hundred and fifty persons. The chair at the supper was taken by the President of the Pharmaceutical Society, who, in proposing the toast of "Success to the Chemists' Ball," referred to the circumstance that before the institution of the Ball eighteen years ago there had been no general social gathering of pharmacists at which ladies were present, and said that he considered these meetings did much for the *esprit de corps* by promoting good fellowship and mutual respect. It is needless to say that the music was excellent, as it was performed by Mr. Dan Godfrey's band, under the direction of that gentleman. The general arrangements were admirably carried out under the superintendence of Mr. F. W. Warrick, the Honorary Secretary.

* * *

On another page, Mr. Robert Cross, whose name is well known to readers of this Journal in connection with his botanical explorations in South America, gives an account of an interesting experiment made by him in respect to the influence of the electric light upon the development of chlorophyll in plants. We do not think, however, that the results altogether warrant the unqualified tone of his assertion that the electric light will not be found to influence in the remotest degree the development of vegetation. Certainly Mr. Cross's negative results cannot be accepted as sufficient to disprove the positive results obtained by the late Sir William Siemens in 1880, since the experiments do not appear to have been made under similar conditions, the electric light having been supplementary to sunlight in the one case, while in the other an interval of darkness took the place of the sunlight period. Moreover, exposure of the plants to the full glare of the electric light in an enclosed space was expressly stated by Sir William Siemens, in the paper read by him before the British Association in 1881, to influence them prejudicially and not beneficially.

* * *

The Legislature of Massachusetts having passed a law for the prevention of the adulteration of food and drugs, the State Board of Health has lost no time before trying to put it into force against the wholesale druggists. One charge was for selling tincture of opium that contained only 0·81 per cent., of morphine, whereas the morphia strength according to the new Pharmacopœia should be 1·2 per cent., and according to that of 1870 0·9 per cent. This case was not tried on its merits, it having been dismissed upon the curious quibble that there was no evidence that the person who sold the drug was an "authorized salesman," though it does not appear whether by this the Court meant that he had not been authorized to act as a salesman by a College of Pharmacy or that he had not been authorized to make the particular sale by his employer.

* * *

Another charge was for selling "citrate of iron and quinine" which did not meet the requirement of the U.S.P. in containing 12 per cent. of quinine. For the defence it was pleaded that the article was not sold as the official preparation, — from which it differed by being in green scales instead of red and being much more soluble,—but as a preparation made by the defendants for many years and marked "English style." On the other hand, the prosecutors urged that an article had been demanded in writing under a Pharmacopœia name and that none but the official article should have been supplied. The Court adopted this view and inflicted a slight fine, against which decision a notice of appeal was given.

* * *

The subject of the inconvenience arising from the large number of special preparations which are now prescribed in the United States was brought under the notice of the American Pharmaceutical Association at its last meeting and referred to a Committee. A suggestion has been made to meet the difficulty by adopting series of "unofficial formulæ," and requesting physicians to give them the preference in prescribing. The Committee appears to have decided to adopt this course, and invites co-operation in the compilation of formulæ for elixirs, proposing, eventually, to deal with fluid extracts, ointments containing petroleum products, wines, emulsions and pills.

* * *

According to the *Chemiker Zeitung* an article has been introduced into commerce, which on account of its low price, fine appearance and solubility has to a large extent been substituted for tartarated antimony in dyeing and printing operations. It proves to be an oxalate of antimony and potassium, which is said to be prepared by saturating a boiling solution of acid oxalate of potassium with freshly precipitated oxide of antimony, and filtering while at the boiling temperature, the salt being deposited as the liquid cools in fine crystals resembling those of the double tartrate. It would appear probable, however, that the same compound is sometimes used in a more questionable manner, since the *Moniteur de la Pharmacie* speaks of parcels of "tartar emetic" having been received by two Paris pharmaciens, containing oxalic acid. In a third sample the oxalic acid is said to have given place to phosphate of soda.

* * *

A Committee appointed at the Conference of Head Masters in 1882 to consider the subject of the inconvenience caused in many schools through the necessity of preparing pupils in the same term for various examinations in which different books are required has come to a decision that will very probably influence future university local and other similar examinations. In view of the fact that the examinations in languages, as at present conducted, often test little more than the knowledge of limited portions of set books, and after consulting a large number of teachers, the Committee recommends that in all public examinations a fair proportion of "unseen work" should be set; and that, whilst not excluding set books, the conditions of all public examinations in languages should be such as to admit the possibility of passing without set books. The desirability of this reform can hardly be disputed, since it would put an end to much unsound teaching which at present has for its object to "cram" the pupil in a certain book, rather than to teach him a language. An illustration of the result was met with not long ago, when one of the candidates in the "Preliminary" wrote out the English rendering of a passage in Cæsar which was not set. Even with considerable vocabulary help and comparative leniency in estimating results, an examination on a passage from an author not previously indicated would be far the more satisfactory test as to a general knowledge of a language.

* * *

The *British Medical Journal*, in an editorial review of the different opinions that have been expressed respecting kairin,—which, by the way, notwithstanding what has been published, it describes as oxychinoline-*methyl*-hydride,—sums up the present state of the question by saying:—"It must be admitted that the prospects of kairin are anything but promising. It has been tried in this country, but as yet has found little favour. It will probably have its day, and then die out, as many remedies of the same class have already done."

* * *

According to the *Times of India* the cinchona bark exported from Ceylon during the three months ending December 31 last, amounted to 1,448,845 pounds, consisting of 1,263,657 pounds of trunk bark and 185,188 pounds of branch bark. This quantity was 183,297 pounds in excess of the quantity exported during the same months in 1882. Nearly two-thirds of this bark (881,212 pounds) was sent to this country. Italy was the next best customer, 414,778 pounds having been shipped to Venice and Genoa. Other continental ports were to share 14,697 pounds between them, and American ports 6946 pounds.

* * *

Among the Bills introduced into Parliament during the coming session there will probably be one promoted by the Council of the Institute of Chemistry, and having for its principal object to effect the incorporation of that association, which is at present a company registered under the Limited Liability Act.

* * *

Our contemporary, *New Remedies*, which has attained a prominent position among the many pharmaceutical journals now published in the United States, has just undergone important modifications in name and style. Henceforth it is to be called the *American Druggist*, and the pages will be considerably increased in size. The latter alteration probably finds its explanation in the growing requirements for "bold advertisement," and there is evidence that there is no intention to neglect this—or, indeed, any other—part of the journal.

* * *

It has been decided by the Paris Municipal Council that a new street opened between the Rue du Faubourg Saint Antoine and the Rue de Montreuil, in the eleventh arondissement, shall bear the name of the veteran chemist Chevreul.

* * *

A meeting of the School of Pharmacy Students' Association will be held on Thursday, January 24, at 8 p.m., when a "Note on Cadmium Iodide" will be read by Mr. F. W. Short, and a Report upon Analytical Chemistry will be made by Mr. C. Thompson on "The Qualitative and Quantitative Separation of Chlorides, Bromides and Iodides."

* * *

The next meeting of the Chemists' Assistants' Association will be held on Wednesday, January 23, at 9 p.m., when a paper on "Unscientific Punishment" will be read by Mr. W. R. Dodd.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The sixth general meeting of the thirty-fifth session was held at the Royal Institution, on Thursday evening, December 20; the President, Mr. Edward Davies, in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations to the Library and Museum were announced:—The *Pharmaceutical Journal* (two numbers), from the Society, and the 'Proceedings of the Liverpool Geological Society,' from the Society.

The Hon. Secretary read a letter from Mr. H. A. Tobias, offering for the acceptance of the Association a complete set of the products of distillation of shale, from the works of the Young's Oil Co., Limited, Addiewell.

A vote of thanks to Mr. Tobias was carried, and the Secretary instructed to acknowledge the gift with thanks.

Mr. A. C. Abraham presented to the Museum a specimen of American bamboo brier root (*Smilax sarsaparilla*). He explained that this plant had at one time been considered, in error, to be the source of the hemidesmus root of commerce, and that probably this arose from its use among the North American Indians having given it a name (Indian sarsaparilla) which was also applied to the hemidesmus. It had come into use recently in combination with other herbs, as a remedy for syphilis, under the auspices of Dr. McDade, and subsequently of Dr. Marion Sims.

Mr. Davies then read a note on—

Alleged Metallic Impurities in Tinned Meats.

BY EDWARD DAVIES, F.C.S., F.I.C.

My attention was recently called to a case of poisoning from eating tinned salmon, the doctor who had charge of the case having attributed the same to *nitrate of tin*. Of course the chemistry of the medical gentleman was, to say the least, peculiar. Nitrate of tin, either stannic or stannous, can only be formed by the action of nitric acid, either on tin or stannous hydrate for stannous nitrate, or on stannic hydrate for stannic nitrate. But there is no nitric acid in the flesh of salmon, and the formation of nitric acid from its nitrogen in the absence of oxygen is a chemical impossibility. Indeed, nitrates of tin are such unstable salts that they could not have endured the heat of preparing the tinned salmon even if they had been purposely added. Whether tin can be taken up by the oil in which the salmon is cooked seemed, however, a possible thing, forming a fatty salt of tin. I have therefore analysed the oil from a tin of preserved salmon, using the cheapest kind. Three hundred grains gave ·03 grain of residue on igniting the precipitated sulphides, of which a part was lead and a trace of tin. This amount is quite insufficient to cause any effect at all. Whether tin in such a form is poisonous is not known. The only salts of tin which have been known to possess poisonous properties are the stannous and stannic chloride. Stannic chloride, as usually prepared, contains free acid, and its strongly irritant effects may be thus partly accounted for, but these salts are not present in tinned meats. Tin in the metallic form is not at all poisonous, and tinned vessels have been in such constant use for cooking purposes that some cases must have been met with, if they could impart deleterious properties to the food. The lead which is almost always present in the tin used for tinning may be supposed to be the active agent. I have analysed tinned beef for this metal and found on the whole of the outside of the meat in a 4-lb. tin ·07 of a grain. The interior of the meat was quite free from this metal.

Lead poisoning from small doses does not cause sudden symptoms. Paralysis is the usual result and not symptoms of irritant poisoning. The amount above stated is quite insufficient to produce any visible effect and the removal of the outside would remove any that might be present.

I also analysed a tin of tomatoes which had apparently suffered partial decomposition. Two ounces gave ·10 of residue when the sulphides were ignited. This was principally tin with a minute amount of lead. The tomatoes were, of course, acid, and I think acid substances should not be preserved in tinned vessels, but even this quantity is so small that I should hesitate to assume that it could be injurious. The bad effects which have in a few cases resulted from the use of tinned meats are, in my opinion, due to decomposition of the meat, owing to imperfect closing or faults in preparation.

The results of my examination are that lead should be carefully excluded in the preparation of the tin plate, and that acid liquids should not be kept in tinned vessels, but that no cases are known in which any injurious effects have been proved to have resulted from metallic impurities in tinned meats.

Mr. Conroy moved a vote of thanks to Mr. Davies, stating that the subject was one of much general interest and importance to the public, and that his own experiments quite confirmed the results arrived at by Mr. Davies.

Mr. A. H. Samuel said that the trade in these tinned provisions had assumed enormous proportions in recent years, and it was very satisfactory to learn on such reliable evidence that there was no foundation for the supposed poisonous effects produced by the metallic vessels employed in packing these meats.

The President then called on Mr. Edward Bevan to read the following paper on—

The Chemistry of Cellulose.

BY EDWARD BEVAN.

It is only fair to state at the outset, and I owe an apology for the fact, that I have but little original matter to communicate, as the work of which this paper is a brief record has already been published in the *Journal of the Chemical Society*, and elsewhere, by my friend Mr. C. F. Cross and myself.

The title of the paper is perhaps somewhat misleading, as I want to speak not so much of cellulose itself as of that peculiar modification known as lignose, examples of which are to be found in wood, various kinds of bast fibres, and in nearly all the different parts of plant structures.

Two distinct views are held by different biologists and chemists as to the nature of lignose: one being that it consists of cellulose, surrounded by what is termed encrusting matter; the other that it is a distinct compound produced by a peculiar modification of the cellulose itself.

In the course of our investigations we have been forced to the conclusion that the latter view is the only one that accords with the observed facts, and it shall be my endeavour to put before you this evening a sketch of the chief results we have arrived at.

Jute was selected as the most convenient type of *lignification*, on account of its great uniformity in character and composition, and its being moreover extremely simple biologically, as compared with wood, etc. Its uniformity is moreover shown by the following numbers, giving the percentage composition, and yield of cellulose of two samples of the same piece. (α) Extreme upper ends; (β) extreme root ends—18 inches from ground.

	α	β
C	47·7 per cent.	47·1 per cent.
H	5·9 per cent.	5·7 per cent.
Cellulose	80·6 per cent.	80·0 per cent.

It was at a very early stage of our investigations that we were led to reject the hypothesis that a lignified tissue consisted of cellulose encrusted with so-called lignin, and to adopt in its stead that by which the tissue was regarded as a true chemical whole. The probability of the correctness of the latter hypothesis, and inferentially, of the weakness of the former view is shown by a study of the action of various reagents on jute.

When jute is heated for some time with 10 per cent. sulphuric acid at about 95° C., a treatment that has but slight action upon cotton or even upon isolated jute cellulose, a large portion is dissolved away. If the residue be examined it will be found to yield practically the same percentage of cellulose as the original fibre, and moreover to possess the same percentage composition.

Now if the jute were simply a mixture of cellulose and encrusting matter, it may be presumed that the action of the sulphuric acid would have been selective, *i.e.*, either the cellulose or the encrusting matter would have been more completely attacked and thus the composition of the residue would have been altered.

Again, if jute be dissolved in ammonia-copper solution and the solution acidified, a precipitate is obtained possessing the properties of the original fibre; being in fact, merely an amorphous modification of it. If this be done fractionally, all the precipitates obtained are similar in character and composition.

The formation of homogeneous "nitro"-derivatives similiar to "nitro"-cellulose affords confirmatory evidence of a similar nature. If jute be treated with a nitrating mixture, such as is used in the manufacture of gun-cotton, explosive products are obtained, from which the original jute can be reproduced by means of certain reducing agents.

In order to obtain some idea of the nature of the body in such close chemical union with the cellulose we studied its behaviour towards various reagents.

The most important is chlorine.

If perfectly dry jute be exposed to dry chlorine gas no reaction occurs, even though the temperature be raised to 150° C. If, however, the jute be previously moistened and then exposed to chlorine a remarkable change takes place, the fibre, originally of a light grey colour, changing to a bright yellow. If this chlorinated jute be boiled in alcohol a large quantity of a bright yellow chlorine derivative passes into solution, from which it can be obtained as an amorphous precipitate on adding water. A large number of analyses of different preparations of this body point to the formula $C_{19}H_{13}Cl_4O_9$. The presence in the molecule of four atoms of chlorine and the resemblance in point of colour, smell and some of its reactions, to tetrachlorquinone seemed to suggest a relationship between the two bodies.

We were thus led at an early stage of the investigation to regard jute and similar substances as compounds of cellulose and a quinone or, as we then termed them, cellulo-quinones.

As our researches progressed we modified or rather extended this view.

If chlorinated jute be boiled in a dilute solution of caustic soda, it is entirely resolved, and a mass of pure cellulose remains. This forms the basis of a method for the rapid and accurate estimation of cellulose.

It is thus seen that by the action of moist chlorine jute is split up into cellulose on the one hand and a chlorinated derivative on the other. The aromatic nature of this body, suggested by its resemblance to tetrachlorquinone, is shown by the fact that on fusion with caustic potash it yields protocatechuic acid and phloroglucin. Though there can be but little doubt about the aromatic nature of the chlorinated derivative, it is somewhat difficult to regard the jute itself as aromatic, and for the following reasons. Dry chlorine has no action on jute, even when presented to it at as high a temperature as 150°; nor if jute be immersed in dry bromine does the least action take place. As we shall see later on, there is good reason to believe that the chlorinated derivative of jute has a very clear connection with the trihydric phenols; now, if the non-cellulose portion of jute were itself of that nature it is most probable that it would be acted upon by both dry chlorine and bromine, especially at elevated temperatures, in the same way that tannin, gallic acid and pyrogallic acid are acted upon.

This, however, is not so, and we were therefore led to regard jute as a compound of cellulose with, what we ventured to call, a potential aromatic body, which, by the action of moist chlorine, is resolved into an actual aromatic body.

The freshly prepared chlorinated jute, when immersed in a solution of sodium sulphite, develops a magnificent magenta colour, which has been of great value in the study of the constitution of this body and in the diagnosis of plant substances generally. By its means we have been able to demonstrate the very wide distribution in the plant world of substances allied to lignose. One rather striking example may be cited. If a thin section of a pear be exposed to the action of chlorine for some time and then treated with sodium sulphite solution, this coloration is produced in spots more or less regularly disposed in the flesh, showing very clearly the arrangement of the so-called stony concretions.

This magenta reaction is much more delicate, and, therefore, more reliable than the well-known one with aniline sulphate. It has been shown by Dr. Hugo Müller, that the latter reaction is not due to lignose itself, but to a body which always accompanies it, present in very small quantities. In confirmation of this we have found that if jute be boiled for a short time in a solution of sodium sulphite, this body is either removed or so altered that the fibre no longer gives the yellow coloration, but still possesses the power of giving the magenta reaction after chlorination. Therefore, lignose can be regarded quite apart from the aniline sulphate reaction.* We have found, moreover, that the reaction is given in a more or less striking degree by many aldehydes, such for example as vanillin and cinnamic aldehyde. If the latter be shaken up with a strong solution of aniline sulphate it presently solidifies to a mass of deep yellow crystals. At the time we were investigating the chlorine derivative from jute, we were led to examine the liquors obtained in the process of manufacturing paper pulp from esparto by boiling it in caustic soda solution. If these liquors be acidified with HCl and the resulting precipitate of resin be treated with $KClO_3$ and HCl, a bright yellow chlorinated derivative is obtained, which after purification yields on combustion numbers pointing to the formula $C_{22}H_{23}Cl_4O_{10}$, and which in most of its properties resembles that obtained from jute.

These bodies are very slightly soluble in water but freely so in a solution of sodium sulphite, and if these solutions be examined they will be found to be somewhat astringent to the taste and to possess the property of precipitating solutions of gelatin. If, moreover, freshly chlorinated jute or sections of pear be treated with a solution of ferric chloride after previous treatment with sodium sulphite, a distinct green coloration may be observed.

All these observations point to a relation of the original substances to the tannins. The original substances, however, do not give any such reactions, or only the very faintest, and these facts together with a consideration of certain theories as to the origin of tannins, led us to speak of the non-cellulose portion of jute and similar bodies as "potential tannins." Moreover, if tannin itself be exposed to chlorine, it is rapidly converted into an orange-coloured derivative, which gives with sodium sulphite the magenta reaction previously described.

This view of the constitution of the jute substance, which, as we have seen, was an amplification of our former views, has itself been extended by subsequent investigation. The well-known relations existing between tannin, gallic acid and pyrogallol, led us to examine the action of chlorine on the latter body. This work had already been done by Stenhouse and Groves, who found that by treating pyrogallol dissolved in glacial acetic acid with a current of dry chlorine, certain precautions being taken, it was converted into a mixture of bodies, the greater part of which were amorphous and very difficult to manipulate. They were able, however, to isolate a body in the form of brilliant crystals, to which they gave the name of mairogallol. We found that both mairogallol and the amorphous bodies that accompany it give the magenta reaction with great brilliancy. Although we have not yet been able to obtain mairogallol from jute, there can be no doubt that the similarity of the colour reaction, especially in view of the results of previous investigation, points to a close connection between the non-cellulose portion of jute and the trihydric phenols. Hitherto, we have been unable to obtain *any* crystalline bodies, excepting of course products of extreme resolution such as oxalic or protocatechuic acids, by any method of treatment; and this has of course added much to the difficulties of the work. Nor is it perhaps to be wondered at, that bodies which, forming as they do such an *essential* part of the plant structure, are of necessity amorphous, should yield only complicated amorphous derivatives.

The next most important point to consider is the action of sulphuric acid.

If jute be treated with a 10 per cent. acid, it first becomes disintegrated and then gradually dissolves. If the solution be distilled a product is obtained which is found to contain a large quantity of furfurol. In one case we obtained as much as 10 per cent. of the jute treated. The fact that so large quantity can be obtained by a somewhat simple treatment, indicates the aldehyde nature of the jute substance. In the light of this result we examined the stony concretions of pears which we had previously regarded as similar in constitution to jute. They very readily yielded a large quantity of furfurol. Erdmann, who had investigated these substances, came to the conclusion that they consisted of a body which he called glucodrupose, and stated that by the action of acids they yielded glucose and a substance call drupose; drupose itself being converted by the action of dilute nitric acid into cellulose.

In some modern text-books very symmetrical equations are given for the above decompositions, but it is clearly impossible to attach any importance to them, as they are constructed without any reference to such an important product as furfurol.

The aldehyde nature of lignified tissues has been of special interest to us in considering the theories involved in a process for the production of paper pulp from wood. The process consists in heating wood with a solution of bisulphite of magnesia at a pressure of about 90 lbs. to the square inch. We have had occasion to examine the liquors obtained as a bye-product by this process and have found that they consist chiefly of a solution of a complicated compound of the non-cellulose portion of the wood and magnesium sulphite. This compound is of very great stability and has, no doubt, an important bearing on both the theory and the practice of this process. The formation of such a compound is fully in accordance with the well-known property that aldehydes have, of forming compounds with the sulphites.

Of the exact nature of the change that cellulose undergoes during the process of lignification, but little is known with certainty, although a considerable amount of evidence exists of the conversion of cellulose and other carbohydrates into aromatic bodies and, therefore, incidentally of their conversion into lignose. For instance, it has been shown that by heating starch to a high temperature in presence of water pyrocatechin is formed. Under certain circumstances the "nitro"-celluloses, and even cellulose itself, may be converted into bodies of the pectic class, and metapectic acid has been proved to belong to the aromatic group, for it yields protocatechuic acid on fusion with potash. Perhaps the most convincing proof of the probability of such a change is shown by a study of the action of strong sulphuric acid on cellulose. By heating cellulose or dextrin, which is equivalent, for cellulose itself is first converted into dextrin, with strong H_2SO_4 at 70° C. it is converted into an insoluble black substance. The formation of this body has of course been frequently observed, but its nature does not appear to have been studied. Its *blackness* appears to have satisfied chemists that it was carbon, and the reaction has served for a very long time as a startling lecture experiment, the decomposition having been explained by a symmetrical equation showing how, by reason of the great affinity of strong H_2SO_4 for water, the carbohydrate was split up, carbon being left behind. As a matter of fact this black substance contains 60 to 70 per cent. of carbon only and that in combination with O and H. When acted upon by $KClO_3$ and HCl it is converted into a bright yellow chlorinated derivative perfectly soluble in alcohol and indistinguishable in appearance and general properties from that obtained from jute. The similarity in composition is also remarkable.

Dextrine.	Jute.
$C_{21}H_{18}Cl_4O_{10}$	$C_{19}H_{18}Cl_4O_9$.

When the original black substance is dried it forms a hard mass resembling coal. So close is the resemblance that we were led to examine coal from the stand-point of our previous work. We found that when treated in the same way with $KClO_3$ and HCl it was also converted, although with some reluctance owing to its compact nature, into a light brown chlorine compound soluble in alcohol. This ought to be sufficient to dispose of any lingering notions that coal is in any special sense carbonaceous. In many works coal is still spoken of as a form of carbon, but as we think with but little reason except its blackness.

There is another class of fibres to which I should like briefly to draw your attention.

Unlike jute they are not lignified, and therefore give no yellow coloration with aniline sulphate and no reaction with chlorine and sodium sulphite. They differ, moreover, in their percentage composition. Jute and fibres of that class contain a larger percentage of carbon than cellulose itself, whereas the class we are now considering contain less. We find, moreover, that on boiling with caustic soda solution a large quantity of the fibre substance is dissolved, and from the solution parapectic acid can be obtained as a gelatinous precipitate on adding an acid. This fact, together with the low carbon percentage, indicates that the cellulose has undergone a modification in the direction of the pectic group. Moreover, if such fibres be treated with a colourless solution of a so-called alkaline blue, which has but little dyeing action on jute, they very readily take on colour, showing that acid properties had been developed.

This observation has lately received a curious confirmation by an invention of a M. Witz, of Rouen. He has patented a process for so acting upon cellulose by means of oxidizing agents, that the portion treated shall possess the property of fixing certain colours.

We hope soon to be in a position to investigate some of the products M. Witz has thus obtained, and to which he gives the name oxycellulose. Before we knew of his patent, and, indeed, before it was published, we had published the result of an investigation of the action of oxidizing agents, chiefly nitric acid, on cellulose. We found if any form of cellulose is treated for some hours with 50 per cent. HNO_3, about 30 per cent. of it is converted into an amorphous body, which is perfectly soluble in solutions of alkali, from which it can be precipitated as a gelatinous mass, closely resembling pectic acid, and forming, when dry, a hard horny mass. To this body we had also given the name oxycellulose. It has invariably the same composition from whatever source it is obtained, and the results of the analyses point to the formula, $C_{18}H_{26}O_{16}$.

A comparison of the two bodies will be very interesting.

Such is a brief sketch of that particular branch of chemical investigation to which we have chiefly devoted our attention. The field is a very extensive one, and is as yet but little worked, but it promises a rich harvest of both theoretical and practical results to the investigator.

Mr. Davies, F.C.S., said he had listened to the paper with considerable interest, and had great pleasure in moving that the best thanks of the Association be accorded to Mr. Bevan for same, and he also thanked him for showing samples of the different chemical products—many of which were quite new—which had been produced in course of Mr. Bevan's experiments.

The discussion was continued by Mr. A. C. Abraham.

Mr. Smetham and Mr. Bevan having replied, the vote was carried by acclamation.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

An open meeting of this Association was held in the Pharmaceutical Society's Rooms, Edinburgh, on Wednesday, January 9, at 9.15 p.m. Mr. Claude F. Henry, President in the chair.

The minutes of the previous meeting having been read and confirmed, the President called upon Mr. Thomas Stephenson to read a paper.

The Shale Products Industry.

BY THOMAS STEPHENSON.

In an introductory portion of the paper the author briefly referred to the discovery of paraffin by Reichenbach, and the independent discoveries of Christison and Dumas. He then gave an interesting account of the work of the late Dr. James Young in establishing the industry, as recently noted in this Journal.*

The characteristics of shale were then described, the author stating that "there is no line of demarcation between shale and coal, as a series of minerals of an intermediate description is to be found, regarding which it would be difficult to say whether they were shale or coal; but the two minerals, although occasionally found associated, are, as a rule, found occupying different tracts of country. Coal yields on distillation tar or bituminous matter, which is used as fuel and for gas making. Shale, on the other hand, gives a distillate suitable for refining into burning and lubricating oils, these products constituting quite a different series of hydrocarbons from those obtained from coal."

The various products obtained from shale were then briefly described, specimens being shown in illustration. It was stated that different shales yield varying percentages of finished products, but the following are a fair average:—

Gasoline	0·25	per cent.
Naphtha	3·00	„
Burning oils	31·00	„
Lubricating oils	20·25	„
Solid paraffin	10·50	„
Loss	35·00	„
	100·00	

The skill or manner in which the process of refining is conducted considerably affects the yield.

He then proceeded to give the following account of the details of the process as it is carried on at the Oakbank Oil Works, near Midcalder, which he had an opportunity of visiting a short time ago.

"The shale is conveyed from the pits to the works by rail, a distance of about a mile. It is then passed through a breaker, which consists of two strong iron drums covered with strong iron teeth. These drums revolve against each other, the teeth passing through between each other. The shale falls between these drums and is consequently much broken up.

"After being broken it is conveyed in hutches, by means of a steam lift, to an elevated platform at the top of the retorts.

"These retorts are from two hundred and fifty to three hundred in number, and are arranged in sets of sixteen. They are charged by means of hoppers on the top, one hopper communicating with four retorts by means of a forked arrangement.

"The retorts used are known as 'Young and Beilby's.' Mr. Young, the manager of works at Pentland, and who, it may be mentioned, is no relation to the late Dr. James Young, the founder of the industry, and Mr. Beilby, the manager of Oakbank, each took out a patent about the same time for a new retort, and as both were very similar in construction and principle of working, it was arranged by mutual agreement that the patents should be conjoined, under the name of 'Young and Beilby's.'

"Each retort consists of a vertical cylinder, about 18 feet high, the upper part of which is made of iron and the lower part of fireclay. The lower ends of the retorts dip into a trough of water, which acts as a lute. Each set of sixteen retorts occupies one chamber, and is arranged on each side of the furnace in rows of four. The furnace does not reach higher than the fireclay portion of the retort, so that the upper part may not be exposed to too great a heat, the clay portion requiring a white heat.

"Besides the heat of the furnace a current of superheated steam is admitted to the fireclay part of the cylinder, and this helps to drive out the vapours as soon as they are formed, but it also serves another and more important purpose. The shale contains a quantity of nitrogen, which is held fast by the carbon. The purpose which the steam effects in the distillation is as follows:—It first of all enters the retort at the bottom of the clay portion, which, together with the shale contained in it, is exposed to a white heat. The steam is here decomposed. Its oxygen combines with the carbon of the spent shale (for the shale has been exhausted of oil before being permitted to enter the clay portion of the retort), forming carbon dioxide; while its hydrogen combines with the nitrogen previously held by the carbon, forming ammonia. This reaction takes place while the hydrogen and oxygen of the steam are in a nascent condition; but this chemical reaction, whereby we obtain the nitrogen as NH_3, must take place in the presence of a large excess of steam, which protects the ammonia as it is formed, and which, but for the presence of the excess of steam, would again be lost by decomposition. The excess of steam vapours now passes up into the iron part of the retort, and there greatly assists in the distillation of the oil from the shale, along with the ammonia obtained conjointly with the oil.

"The ammonia so produced has been found to be so valuable that it is in contemplation to recover it also from the ordinary coal used at present as fuel for heating the retorts, where, of course, the nitrogen is sacrificed. The plan to be shortly adopted, is to treat this coal in separate retorts, so as to produce coal gas, which is to be employed, along with the uncondensable gas from the shale, for the purpose of heating the shale retorts. The ammonia, of course, is secured in this process, and it is calculated that about 7*s.* 6*d.* worth of ammonium sulphate can be obtained from 3*s.* or 4*s.* worth of coal, so that the coal, instead of as formerly, being at the debit side of the account, will really prove a source of profit to the company.

"The shale is first heated to a low red heat in the iron part of the cylinders. In this way the oil is distilled. As the process goes on the shale subsides down towards the fireclay portion, where it is heated to a white heat by the naked flame of the furnace. It is here that it meets with the superheated steam which separates the nitrogen. By the time it reaches the water it has been thoroughly exhausted of all its value, and can be withdrawn from the bottom. The cylinders are charged from the top every three or four hours with raw shale, and on each occasion the fireclay portion is still full of partially or

* *Pharm. Journ.*, [3], vol. iv., p. 762; also present vol., p. 198.

entirely exhausted material. The advantages of this arrangement are mainly the adjustment of the degree of heat necessary to convert the whole of the shale into the desired products, instead of into gas, and in the production of ammonia, which, from a pecuniary point of view, is the most important product of all.

"Although the Henderson retort is not used at the Oakbank works, a description of it may not be out of place, as it is mentioned in all books on the subject as being the best and most widely used. It is, however, by this time entirely superseded by that of Young and Beilby. It consists of a vertical iron cylinder about 15 feet long Instead of a water-lute at the bottom, there is a door which opens into the furnace. The shale, after being exhausted of oil, is admitted, by means of this door, into the furnace, where it is utilized as fuel to a certain extent. The residual shale is different from all others, in that it has a reddish tinge and is very fragile. The great drawback of this retort is that in utilizing the carbon as fuel, the nitrogen, and, consequently, the ammonia, must be, in great measure, sacrificed.

"To return to the Oakbank process, the vapours, after leaving the retorts, are conveyed through a series of upright tubes fitted in a trough, where they are condensed and conveyed to a 'separator.' This is a tank with two exit pipes, one from the bottom and another from near the top. The oil, being lighter, floats on the surface and leaves by the upper opening, while the ammoniacal liquor leaves by the lower one.

"The gases, which have passed unaltered through the ordinary condensers, yield, on being subjected to pressure, or passed through a coke or spray tower, a very volatile liquid termed *gasoline.*

"The ammoniacal liquor, which is drawn off from below the oil, is led away to a separate house, where it is passed into a '*dephlegmating still,*' which consists of a vertical cylinder having a series of perforated transverse plates inside, which divide the ammoniacal liquor into small drops as it passes down. A current of stream is admitted into the still at the bottom. This lifts the ammonia, so to speak, and carries it away to the saturators, which are wooden boxes lined with lead, and containing sulphuric acid. The steam, carrying the ammonia with it, is passed through the sulphuric acid, which combines with the ammonia to form ammonium sulphate, the process being continued until the vapours begin to smell of ammonia.

"This liquid, which contains sulphate of ammonia, is removed to large vessels, where it is evaporated down by means of a coil of steam pipe extending throughout the liquid, the crystals being ladled out as they form. The sulphate is then removed to a drying shed, and, after remaining there for about a week, is ready for the market, and is sold at about £18 or £20 per ton, realizing a handsome profit.

"The *crude oil,* consisting of the solid distillate in the process I have detailed, is then distilled completely in stills which have cast iron pot-shaped bottoms, and which are capable of holding 1200 to 1400 gallons each. The distillation is effected by steam blown into the oil. The product is 'green oil,' a very fine pure coke remaining in the still.

"This green oil is subjected to treatment with sulphuric acid and caustic soda. In order that as little sulphuric acid as possible may be used, the oil must first be separated from water, as far as possible, as this would weaken the acid and thus cause more to be used. The oil is agitated with the sulphuric acid in cylindrical vessels furnished with paddles inside, the agitation being assisted by means of air blown up through the oil from a perforated coil of pipe in the bottom of the agitator. It is then run into other agitators of a similar construction, where it is treated with caustic soda. This treatment has the effect of reducing the specific gravity of the oil from ·860 to ·830–·845 ; and it also reduces its bulk about 15 per cent.

"It is then pumped into large cylindrical stills capable of holding 4000 gallons, and furnished with condensing worms, where it is subjected to fractional distillation.

"The *naphtha* first comes over, and is led away into a tank by itself. The *burning oil* next comes over and is also led away to a separate tank. The heavy *lubricating oil* is the last to distil over, and the residue in the stills again consists of *coke.*

"The naphtha is rectified by being first treated with acid and soda and then redistilled.

"The burning oil is also treated with acid and soda and redistilled, the first portion being mixed with the crude naphtha, and the last with lubricating oil, and they are both kept separate. The middle, or '*burning oil*' portion is removed to tanks where it is subjected to treatment with sodium carbonate. This has the effect of causing any solid matter held in suspension to fall to the bottom as a sediment, leaving the oil clear. In about twenty-four hours the bottom of the tank can be seen distinctly through the oil, which is then clear, bright and almost colourless.

"For the production of *paraffin,* the lubricating oil, obtained in the first fractional distillation, is allowed to cool, when the substance known as '*hard*' *paraffin scale* crystallizes out. This is separated by passing the oil through a series of sheets of canvas, stretched on iron frames, placed side by side in a long trough, forming an arrangement not unlike a toast-rack with the sides covered in. The scale is then placed between other sheets of canvas and subjected to hydraulic pressure, in order to separate as much oil as possible.

"The oil which is pressed from the scale is then led away to a refrigerator. This consists of a trough in which the oil is placed, and a drum which revolves in the oil, and which contains gasoline. The gasoline is evaporated by means of a powerful pump, and this evaporation so cools the oil, that all the paraffin it contains at once crystallizes out, and is scraped off by a fixed knife placed at the edge of the drum.

"This paraffin scale has a much lower melting point than the former, and is therefore called '*soft*' *paraffin scale.* It is separated from the oil in a manner similar to that employed for the hard scale.

"The oil which is separated from paraffin (called 'blue oil' from its colour) is then removed, and after treatment with acid and soda, and fractional distillation until the desired specific gravity is obtained, it constitutes '*lubricating oil.*'

"I have now only to allude to the further treatment of the paraffin scale.

"A quantity of the soft scale is mixed with the hard, to reduce its melting-point, but most of it is sold, to match manufacturers for saturating the wood in order to render it more inflammable. The scale is then washed repeatedly with naphtha, to dissolve out the oil, both naphtha and oil being afterwards recovered. After treatment with animal charcoal or some similar substance, it is melted and run into cakes, which constitute the well-known 'solid paraffin.'

"Vaseline has never been successfully manufactured from any of our shale products. It is got by a special process of filtration through animal charcoal, from the residue obtained after the distillation of the burning oil from American petroleum.

"The 'spent shale' consists principally of silica and alumina, with traces of iron, and has never been turned to any practical account. It accumulates in vast heaps close to the works. Perhaps these heaps, some of which weigh many millions of tons and tower to a height of several hundred feet, may prove a puzzle to our geologists a few centuries hence."

The paper was well illustrated by coloured sketches of working plant, tables of percentages and a full series of specimens, which those present had an opportunity of inspecting during an interval in the proceedings.

The President moved a vote of thanks to Mr. Stephenson, referring to the interesting manner in which the subject had beeen treated. The motion was seconded by Mr. Dunlop, and after several others had commented on the subject, Mr. Stephenson replied.

Mr. A. Robbie then read an exhaustive paper on "Cod Liver Oil," in the course of which he gave some interesting details of the cod fish industry as pursued in Newfoundland, Norway and the coast of Scotland. After referring to the various methods which had been employed from time to time for the extraction of the oil, he gave an account of the methods now adopted, and stated that the superior quality of Norwegian oil is rather due to better quality of fish livers than any superior method of manufacture. After commenting on the chemistry of the oil he noticed briefly its pharmacy and therapeutics and concluded with some remarks on the causes of the present small supplies of the oil.

The paper was fully illustrated by specimens.

A vote of thanks, moved by the President and seconded by Mr. Wood Ainslie, was heartily accorded to Mr. Robbie, and a discussion followed, in which Messrs. Crowden, Dunlop, MacEwan, and others took part.

This was all the business, and after the President had commented on the satisfactory manner in which two apprentice members had acquitted themselves that evening, he intimated that the next meeting would be held on the 30th instant, when a paper on the "Official Alkaloids: their Chemistry and Preparation" will be read by Mr. John R. Hill. The meeting then adjourned.

YORK CHEMISTS' ASSOCIATION.

The annual meeting was held on the 27th ult., at the rooms, High Ousegate. The proceedings were of a formal character. A resolution was passed expressing regret at the loss the Association has sustained by the death of the late President, Mr. Councillor Davison. The names of Messrs. Humphreys, Gubbetis and Boyes were added to the Committee. The following officers were elected for the current year:—President, Mr. J. Clark (of Messrs. Langton, Edden, Hicks and Clark, London); Treasurer. Mr. J. Sowray; Secretary, Mr. T. W. Hodges.

Parliamentary and Law Proceedings.

Poisoning by Hydrocyanic Acid.

Mr. S. Hacker held an inquest on Friday, January 11, at Newton Abbot, touching the death of Mrs. Jane Pinsent.

From the evidence it appeared that the deceased was found by her brother fully dressed, lying on her bed, unconcious and apparently dying. He gave her some brandy and applied a hot water jar to her feet, but she expired within ten minutes from the time he first saw her. On the mantelpiece he found a small dark bottle, with a glass stopper, labelled "poison." He inferred from that the bottle contained laudanum and that the deceased had poisoned herself. The bottle was here produced, and the label on it was as follows:—"Hydrocyanic acid (of Steele's strength), dose 1 to 4 minims. Layman and Umney London." Witness, continuing, said he believed the deceased was on the best terms with her husband and her mother; and although she had overdrawn her banker's account there was nothing for her to trouble about. In fact everything had been set right.

Mr. Scott, surgeon, said that he saw the deceased about six o'clock on the previous evening; life was then extinct, the deceased having to all appearances been dead for about an hour. Mr. May drew his attention to a bottle on the mantelpiece, which, on examining, he found to have contained prussic acid of twice the ordinary strength. and a small dose of which would be sufficient to cause death. He had no doubt, judging from the livid appearance of the body, that death had arisen from that cause. He subsequently made a *post-mortem* examination, which left no doubt in his mind that death was caused by prussic acid.

Mr. Bibbings, chemist, stated that the deceased had been a customer of his for about five years, and was consequently well known to him. On Wednesday morning, about 11.30, she entered his shop and purchased several articles. Among these she asked for some prussic acid, and said that she was going to poison a favourite dog which someone had given her, but which she did not wish to keep. He cautioned her, and told her not to let the poison go out of her hands on any account. She promised that she would be very careful with it, and he let her have about six drachms, just enough to kill a dog. He did not make an entry of the transaction in the book provided as he had known the deceased so long.

The Coroner here cautioned the witness as to future similar transactions, and witness promised to insist on the entries being signed by the applicants.

The Jury returned a verdict of "Suicide while in a temporary state of insanity."—*From the Western Morning News.*

Alleged Poisoning by Laudanum.—The Duty of Chemists in respect to Dirty Bottles.

On Saturday, December 12, an inquest was held at Maryport, before Mr. W. W. Lumb, Coroner, on the body of Mary McWilliams, aged ten weeks.

Elizabeth McWilliams, mother of the deceased, said the child had been ailing since birth. She got a pennyworth of mixture from Mr. Smith, chemist, Maryport, on Tuesday night. The bottle which she sent had contained laudanum, but nothing was in when she sent it. She gave the child the whole of the mixture at five times. It had the last dose nearly twenty-four hours before it died. She did not wash out the bottle which had contained laudanum, but drained it. She did not observe that there was any left in the bottle.

Dr. John Crerar said he was requested to visit the deceased on Thursday morning, about seven o'clock. His assistant went immediately, and from what was afterwards said to him he went himself in the forenoon. Dr. Crerar continued: I found the child very heavy and sleepy, skin pallid, pupils firmly contracted, and presenting the ordinary symptoms of opium poisoning. It had had convulsions, which are not infrequently present in cases of opium poisoning in infants, but it was denied that any laudanum had been given to the child. After some little time I elicited the fact that it had had something from a druggist. The bottle got at the druggist's was produced. It was empty, and labelled "Infant's Mixture." After directing the necessary treatment, though the case was apparently hopeless, I called at the druggist's, and found the stock bottle from which the mixture was supplied. It was quite innocuous. This was a little puzzling, but the fact that the child had had opium was clear. On partially removing the label from the bottle, a dark-red label was revealed underneath. This was marked "Laudanum—Poisonous," and was probably the source of the opium which had poisoned the child. The bottle belonged to the parties themselves, and had probably contained a portion of a previous purchase. The child undoubtedly died from opium poisoning. I could not, therefore, give a certificate. It should be well known to the public that opium, in all its forms, is a very dangerous and potent agent in the case of infants. Notwithstanding this, the administration of opium, generally as laudanum, to infants, prevails extensively. It is a favourite remedy with foolish mothers and ignorant nurses. Most of the soothing syrups and other remedies to quiet children contain laudanum as the active ingredient. They are very convenient and effective, but they are also a frequent cause of frightful mortality among infants. Some druggists wisely refuse to sell laudanum when the intention is declared to give it to young children. Others are not equally careful.

The Coroner said the jury ought to have the person who had served the mixture in the chemist's shop, and ascertain if there was anything like laudanum in the bottle at the time he put in the "Infant's Mixture."

The Jury agreed to this, and the inquiry was adjourned.

On resuming, Joseph Robert Comyns, of Furnace Cottage, Maryport, aged 17, who is apprentice to Mr. Smith, chemist and druggist, High Street, was called. He said he had been with Mr. Smith over three years. He did not remember a boy going to the shop on Tuesday night for a pennyworth of cough mixture, but he might remember the lad if he saw him. He did not recollect having seen the bottle produced before, although it had a label marked "Laudanum—Poison" on it.

The Coroner: Suppose you had seen a bottle with "laudanum" marked on it, what would you have done with it?

Witness: I should have seen there was no laudanum in before I put in the mixture.

I was just going to ask you that. Suppose the boy brought you the bottle and it was dirty, like this, would you have washed it out?—No, I should have simply seen that it was empty.

How many drops of this mixture are there in the bottle now?—Ten to fifteen drops.

And there might have been that quantity of laudanum in the bottle which you might not have noticed?—I should have seen that the bottle was perfectly empty. We never serve laudanum or any poisonous thing to children.

The boy, McWilliams, who purchased the mixture was called, but Comyns said he did not remember him. McWilliams said Comyns served him with the mixture out of a large bottle. In reply to the coroner the lad further stated that he was certain there was nothing in the bottle, because his mother had previously drained it into the grate.

The Coroner said they would all agree with him that Dr. Crerar was quite right in not giving a certificate under the circumstances. There was no doubt the child was poisoned, but so far as he could see there did not appear to be any blame attributable to anyone. Still it was clear there had been laudanum in the bottle when the mixture was put into it at Mr. Smith's. The fact that there was a laudanum label on the bottle should have put the young man on his guard, and all persons in druggists' shops should use the greatest care when such bottles were taken to them. They should either wash the bottle out before putting the stuff into it, or else take the dirty bottle and give a clean one, and afterwards wash the bottle at the shop. If there was blame in the case it was certainly on the young man Comyns, who should have washed out the bottle, or at least have taken greater care. Had he washed out the bottle or given a clean one, in all probability the child would have been living now. Dr. Crerar was perfectly right in withholding the certificate, as it was a proper case to be inquired into by a coroner and jury. He trusted that persons would read the evidence given in the case and act accordingly. They were all liable to make mistakes, but on that bottle there was a label which was sufficient to put any person on his guard and make him very careful. There was no culpable blame attached to anyone; it had only been carelessness. He thought the jury might make a recommendation, because there were many of those cases, that the greatest possible caution should be used, and that druggists and others should not put perfectly innocent mixtures into dirty bottles.

The Jury returned a verdict that the child died from poisoning by laudanum having been left in the bottle through the carelessness of both the mother and the druggist's assistant. They added a recommendation as suggested above by the coroner. They did not find anyone culpably negligent, but there had been a great deal of carelessness revealed, and druggists should be careful to either wash out the bottles when dirty or give new ones.

The Coroner said he thoroughly agreed with the remarks that had been made, and he hoped they would have a good effect on the public.—*West Cumberland Times.*

Reviews.

Plant Analysis: Qualitative and Quantitative. By G. Dragendorff, Ph.D. Translated from the German by Henry G. Greenish.*

This is a capital book, and one which we welcome as being a step forward in a much neglected branch of analysis. We have here a scheme of plant analysis which will be found of great assistance to students, who we fear have hitherto regarded plant analysis as quite beyond their border. The plan adopted by the author has been that of separating the constituents of the plant as far as possible by means of different solvents, thus following a method which is familiar to those conversant with plant analysis; but he has extended it so far as increasing the number of solvents and in varying the order in which the solvents are allowed to act on the substance under examination. In this way the plant constituents are separated, as it were, into six groups, which are obtained by the successive application on the plant material of the following solvents:—

1. Petroleum spirit (b. p. 45°), extracting ethereal and fatty oils, wax, etc., and, what is often overlooked, any chlcrophyll aud alkaloid dissolved in the fatty oil.
2. Ether: resins and their allies.
3. Absolute alcohol: resins, tannin, bitter principles, alkaloids, glucosides, etc.
4. Water: mucilage, acids, glucoses, saccharoses and other carbohydrates, albuminous substances, etc.
5. Dilute soda: metarabic acid, albuminous substances, phlobaphenes, etc.
6. Dilute hydrochloric acid: pararabin, calcium oxalate, and starch.

The material of the plant which remains may consist of lignin and allied substances and cellulose. Each extract is then exhaustively dealt with for the isolation of its several constituents.

In Part II. we find special methods for the estimation of certain constituents of the plant, it consisting, in fact, of supplementary notes to the first portion of the work. This part commences with a method for the estimation of fixed oils, and an account of their behaviour to reagents; then passes on to ethereal oils, resins, tannins, alkaloids, the sugars, amines, acids, albuminoids, starch, etc, and the work is completed by tables giving the percentage composition of the constituents of plants mentioned throughout the work, arranged in one case alphabetically and in the other according to percentage of carbon.

This, briefly, is the broad outline of the plan followed by Professor Dragendorff.

It is almost superfluous to say that the author has made the very best use of the material, insufficient as he deems it, at present available for the construction of a systematic process of analysis, and no one is more conscious than he of the necessity of sifting and improving the methods described. For this purpose the student will find copious references in foot notes to authorities or to papers; in fact, every page bristles with them.

To show the exhaustive character of the work, it may suffice to mention that for the determination of tannin

* London: Baillière, Tindall and Cox. Demy 8vo. Pp. i-xvi., 1-280. Price 7*s*. 6*d*.

in the absolute alcoholic extract there are no less than twelve methods passed in review.

It is to be desired that this redundancy of methods may not defeat its purpose and serve to perplex rather than to assist the student, and this it is very apt to do unless the student possesses more than ordinary discriminative ability. Where all is so satisfactory it would be supererogatory to particularize portions; but we may mention that the alkaloids are treated of very accurately and succinctly, and the methods for the separation of the cinchona alkaloids are, as far as they go, trustworthy, and leave no pitfalls for students.

The admirable manner in which Mr. Greenish has translated the work deserves more than a cursory notice. There is perhaps one hastily compiled sentence on page 63, where we read, "To the filtrate, together with 100 c.c. of wash alcohol, the results of two following extractions, each with 250 c.c. of spirit, and 100 c.c. washings are added." Again, China nova tannic acid is literally correct, but if chinovagerbsaüre be the word in the original, use has made us accustomed to quinovintannic acid in the same way as chinovasaüre gives quinovic acid. These, however, are only trifling blemishes that can easily be removed if the work reaches a second edition. Meanwhile we heartily congratulate Mr. Greenish upon the successful translation that he has furnished of a very valuable book.

Year-Book of Pharmacy: comprising Abstracts of Papers relating to Pharmacy, Materia Medica and Chemistry contributed to British and Foreign Journals from July 1, 1882, to June 30, 1883. With the Transactions of the British Pharmaceutical Conference at the Twentieth Annual Meeting, held at Southport, 1883.*

The "Year-Book" issued to the members of the British Pharmaceutical Conference is so well known and so fully described in its title, and has now been for so many years compiled by the same able editor, that little comment requires to be made upon the appearance of a new volume. If the one under notice varies in any respect from its predecessors, beyond being somewhat more bulky than usual, we think it is in containing a larger number of extracts, made more briefly than used to be the case, and in the chemical section covering a wider field. The comparative paucity of important communications upon the vegetable materia medica is noticeable, and quite confirms a remark made in our recent summary of the year 1883. The volume is prefaced by the usual sixteen pages of "Introduction," which, by the way, it is difficult to keep free from an appearance of cataloguing, and there are about the same number of pages devoted—rather wastefully—to the section of "Bibliography." The latter part of the volume, consisting of the report of the meeting at Southport, has already been published in this Journal. A few errors have crept in here and there, as indeed they will in spite of careful reading. Thus the quotation of an English abstract of a French paper through a German journal, on p. 92, has resulted in shortening the name of an author by a syllable; but he is more fortunate than Mr. Thiselton Dyer, quoted on p. 215, who is robbed of his surname altogether. Readers who are partial to symbolical conundrums will find a nut to crack on p. 553.

Notes and Statistics of Cinchona Bark. By John Hamilton, F.S.S. Second Edition.†

On the appearance of the first edition of Mr. Hamilton's pamphlet we took the opportunity of referring at length to some of the information contained in it. The statistics have now, in respect to the leading countries, been brought down to 1882, and in one or two cases to the middle of 1883, while the number of pages has been quadrupled by the addition of various interesting items of information concerning the cinchona plant, wild and cultivated. From the statistics it is seen that Great Britain continues to be the most important centre of the bark trade, the quantity imported into the United Kingdom having amounted to 15,599,920 pounds, or upwards of a million and a half pounds in excess of the imports of the previous year, this excess being equal to three-fifths of the total imports in 1871. Of this quantity the author estimates that as much as 6,638,352 pounds was reserved for home use. It is not quite clear how this figure has been arrived at, but by deducting the exports (8,961,568) from the imports (15,999,920) one exactly 400,000 higher is obtained. France is said to have imported during the same time 10,063,319 pounds and consumed 4,866,081. The other large consumers are Germany, which is credited with having used 5,674,680 pounds, and Italy with 6,150,000 pounds. The United States again shows a falling off of about half a million pounds in its import of bark, which in 1882 did not reach two-thirds of the quantity imported before the abolition of the protective duty on quinine.

In looking through these statistics it becomes evident that they can only be accepted as representing the facts approximately, and even for this result the author is entitled to considerable credit. They are, however, sufficient to show that—apart from such incidents as the advent of a new bark, like the cuprea, on the market—the demand is keeping place with the increased supply, and that there is not much probability that for several years to come the yield of wild and cultivated barks united will be in excess of what is required.

* London: J. and A. Churchill. 1883. Pp. i.–x., 1–672.

† London: J. W. Collings and E. W. Allen. 1883. Demy 8vo. Pp. 1–68. 3*s*. 6*d*.

Correspondence.

The Botany of Cinchona Ledgeriana.*

Sir,—On May 3, Mr. J. E. Howard read a paper on this subject before the Linnean Society, and within the four months following he has found it necessary to publish two additional papers† to endeavour to explain successive changes in his opinions. These changes have resulted from "new light" obtained in instalments from different sources and of varying brilliancy:—the specimens and publications of Mr. T. N. Christie, of Ceylon, the visit of Mr. Ledger to England, and the publication of Mr. Moens' 'Kina cultuur in Azië.' Now, at length, the first paper is published,‡ considerably shorn of whatever importance it may have originally had; but this also has an "addendum," undated, but apparently written in August. It may be regretted by some Fellows of the Society that the author did not refrain from printing views which he had so modified since he expressed them. I presume, at all events, that in endeavouring to ascertain what really are Mr. Howard's present ideas on the nature of *C. Ledgeriana* (no easy task), I shall be right to take the statements and suggestions contained in the paper latest in date, that, namely, which, under the rather sarcastic heading of a "Brief Note," he contributed to your columns. To assist the exegesis I shall, however, have to avail myself of the earlier papers also.

When in September, 1881, I prepared the description of *C. Ledgeriana*, Moens, MSS., which was printed in my

* This communication was written more than a month before Mr. Howard's lamented death, and two before the news of that sad event reached Ceylon. The delay in its publication has been due to the kindness of the Editor, who forwarded me a proof, thinking that under the circumstances I might wish to revise it. It is probable that I might have availed myself of the opportunity and made a few verbal alterations, were it not that, after having allowed sufficient time to elapse for, as I supposed, the appearance of the paper in this Journal, I forwarded a copy to the *Ceylon Observer*, and in this it was published on November 26 last. Under these circumstances I leave the paper unaltered as written.—H. T.

† *Planters' Gazette*, August 16, 1883, pp. 983-4; and *Pharmaceutical Journal*, September 1, 1883, pp. 178–180.

‡ *Journ. Linn. Soc.*, xx., p. 317 (issued Sept. 24, 1883).

Journal* for November, the only published botanical information was Weddell's description in Howard's 'Quinology.'† It does not appear whether Weddell saw any specimens, or whether he drew up his diagnosis merely from Fitch's three fine drawings made from dried plants from the Java plantations; he allows that the characters he gives are "not weighty ones," and, indeed, those plates would not be sufficient alone for discriminating *Ledgeriana* from Calisaya.‡ The plant thus remained as very probably merely one of the pseudo-varieties of the bark-dealers which might not possess any botanical characters sufficiently definite to be able to be distinguished in the field or in the herbarium. In Java no doubt they knew better even then, but that was the state of information prevailing in England and India when I came to Ceylon at the beginning of 1880; and to the frequent and urgent requests of the growers of bark-trees to say whether such were "*Ledgeriana*" or not I found it impossible to give any positive answer.

Mr. Moens visited Ceylon in September, 1880, and it is to him I am indebted for having first pointed out to me that the plant had good definite characters. These were familiar to him in Java as distinguishing all the best and most marked trees which had come from Ledger's seed,§ and so soon as I was satisfied that they held good in Ceylon I lost no time in making them public. My description was based on the examination and comparison of numerous fresh specimens; and it was an additional proof of the correctness of the name, that the plants yielding them have all without exception been traced back to Ledger's seed.

In making (after consultation with Mr. Moens) Weddell's variety into a *species*, I expressed some compunction for adding yet another specific name to this already overburdened genus, but I gave what I thought good reasons for the course followed and I may now add that further experience has justified it.‖ Mr. Moens' own description has now appeared;¶ it is much fuller than mine, but differs in no other respect from it.

Yet Mr. Howard asserts in his two earlier papers that my plant is not *Ledgeriana*, but a variety of *C. micrantha*. It is true that in his most recent paper he acknowledges he "may be mistaken" in this extraordinary determination; in making it one can only suppose that he could not have read my description with any care; but, looking only at the figures accompanying it and remembering a former error of his own,** at once accused me of a similar blunder. But having supplied a full definition I must be judged by that rather than the plates accompanying it. I expressed in the paper my regret that I should be forced to figure so poor and ill-grown a specimen, but it was the best I could get at the time, and the tree, apart from its stunted growth, was considered by Mr. Moens as a very characteristic example of the species. Mr. Howard, further, has matched these figures of mine with one published in August, 1873, in the *Bot. Magazine* (tab. 6052) under the name *C. calisaya*, var. *Josephiana*, Wedd. This figure was made from a plant which flowered in Mr. Howard's conservatory in 1872, having been received from Kew. In the text accompanying the plate, Dr. (now Sir) J. D. Hooker tells us that the plants were brought from South America, by Pearce, in 1866, and that several wardian cases of them were sent to India in that year. He also says that it seems to be "intermediate between *Calisaya* and *micrantha*," but that Mr. Howard, after first thinking it var. *calisayoides* of the latter species, afterwards agreed with Dr. Weddell in calling it *Josephiana*. Mr. Howard now says, "I should myself have preferred calling it *C. micrantha*, var. *calisayoides*;" but it is remarkable that in 1876, when he himself published another figure ('Quin. Ind. Plant,' t. 9) of identically the same plant in his green-house, he should still give it the name of "*Josephiana*, var. *glabra*." Nor in the accompanying text (p. 86), does he say a single word about it being more properly a variety of *micrantha*. Both these plates show a plant with large erect white flowers and clavate buds; and what resemblance Mr. Howard can have seen between them and the figures accompanying my paper I fail to understand. No wonder Mr. Ledger "rejected" this plant. Mr. Howard does not tell us why he prefers to put it under *micrantha*: so far as the leaves go, it seems more rightly put under "*Josephiana*," where I see Mr. Moens also places it.* Ripe fruit would help to determine this point.

Of the other (or the same?) recorded intermediates between *Calisaya* and *micrantha*, extremely little is known.† Of the one called *C. Calisaya*, var. *pallida*, Wedd., no description or figure has been published; of the other, called *C. micrantha*, var. *calisayoides*, a very brief diagnosis by Weddell is all that we have. They are allowed to approach one another extremely closely in foliage, and the bark of each seems to have been called "*Calisaya blanca*," but I have no means of determining whether they be identical.

The next point Mr. Howard remarks upon is that no analysis of the bark of the tree figured by me was given, and appears to think this a serious omission. Can he mention any other genus of plants where it is necessary to give such an analysis in describing a new species, and if not, why should it be required in *Cinchona*? However important it may be in other respects, I attach no value to chemical composition as defining species or varieties. We know, indeed from experience, that out of ten trees with the characters Mr. Moens and I have pointed out, probably nine will yield a large, though variable, percentage of quinine almost unmixed with the other alkaloids; but the other one may be as poor as an ordinary *Calisaya*. It is true that the bark of the actual tree figured was never analysed; but it was one of a row of several, all of precisely the same botanical type, and the analysis of the bark of some of these has been published by Mr. Agar, the proprietor.‡ The analysis, as it happens, was made by Mr. Howard, "who pronounced it to be *Ledgeriana* bark."

Now, as to the magnificent pictures illustrating or forming the basis of Weddell's diagnosis of var. *Ledgeriana*; they are no doubt fine examples of Fitch's work, and one cannot but admire the skill which can produce such restorations from the dried mummies in a herbarium. But it is risky work, and the botanist is but too familiar with the want of that sort of accuracy which he particularly needs, so often to be seen in the work of even the best botanical artists. In these plates none of the characteristics of the flower of *Ledgeriana* are accurately shown so as to be beyond dispute; the points missed are just such as would be likely to escape an artist unless his attention were drawn to them, and they were not then known to Mr. Howard himself. Nor has the artist caught the *facies* or habit of the plant any better than the details (as may very well be seen by comparison with the phototypes illustrating Mr. Moens' 'Kina cultuur'), whilst the gaudy and inaccurate colouring makes them still less like reality.

It is necessary to say thus much about these plates, because Mr. Howard seems to regard them as so accurate as to justify him in speaking of them as though they superseded type specimens of plants themselves. This appears when we endeavour to ascertain what, after all, he considers his var. *Ledgeriana* to really be botanically. It is, he says, to be restricted to "the *Rojo* bark of Ledger," which is "one of Dr. Weddell's second division of *C. Calisaya*;"§ further, it is Howard's "form A. (plate iv.),

* *Journ. Bot.*, xix., pp. 321–325.

† 'Quin. Ind. Plant.,' p. 85.

‡ Mr. Howard himself candidly avowed that, to him Ledgeriana's character was stamped "by its great productiveness in pure quinine" (*l.c.*). Dr. Weddell did *not*, however include this in his definition.

§ It is perfectly well known that this seed was not all the same. There were some very bad trees of quite another type among those from the original sowing.

‖ The dignity of "species" varies considerably in different genera, their characters being inevitably lighter in such very natural genera as *Cinchona*. In fact *C. Ledgeriana* is pretty much on a level with most of the other accepted species in the genus.

¶ 'Kina cultuur in Azië,' pp. 75–77.

** See his paper, *Jour. Linn. Soc.*, p. 319.

* 'Kina cultuur,' p. 84.

† This little is to be found in the introduction to Howard's 'Illustrations,' p. v., and in Weddell's 'Notes,' in *Ann. Sc. Nat.*, ser. 5, xi., 361, and xii., 51 and 57. Triana (*Nouv. Et.* pp. 62, 75) puts both under *C. micrantha*.

‡ *Ceylon Observer*, June 24, 1883. They gave 7 per cent. pure quinine and only a trace of other alkaloids, being then four and a half years from planting out.

§ That is of an amplification by Howard of *C. Calisaya*, var. *microcarpa*, Wedd., described in *Ann. Sc. Nat.*, *l.c.*, p. 54, with the vernacular names of "*Calisaya Zamba*" and "*Zambita*."

exclusive of B. and C." (plate v. and vi.), and therefore only in part the var. *Ledgeriana* of Weddell and the *C. Ledgeriana* of Moens. In fact it is a *picture* (plate iv.) merely, selected it would seem, by Mr. Ledger, as the most like what he remembers or supposes these "*Rojo*" trees to be; that is all. This plate represents a robust plant with large erect flowers.

But Mr. Howard's restricted *Ledgeriana* is still further narrowed down. Plate iv. happens to have been made from a short-styled plant, and it chances that Dr. Weddell's diagnosis was also drawn up from one. Mr. Howard prefers, with the natives, to call this form "macho," and really believes that it is *male* in some more especial manner than the long-styled form, which the untutored Indians and he term "hembra" or female. It seems scarcely credible that he can seriously propose to restrict his *Ledgeriana* to the short-styled state, but he distinctly says that "it is exclusively the *macho* form." Mr. Howard has been led to the *reductio ad absurdum* of giving a definite botanical name to a mere sexual condition probably incapable of self-fertilization, simply on the faith of Mr. Ledger's opinion as to plate iv. The latter gentleman (or rather his native servant) was also much struck with the *colour* of another plate (tab. x.) representing the hybrid, *C. anglica*. This reminded him of the colour of "Rojo," and Mr. Howard at once jumps to the conclusion that the two are "very nearly related;" but as this plate x. happens to be drawn from a long-styled form, or "is very decidedly *hembra*," as Mr. Howard puts it, it "cannot come under Weddell's diagnosis."

We may, however, feel very certain that Dr. Weddell, in 1875, when he drew up the definition in question, was not intentionally creating a variety on what was then well known to be a merely physiological condition; to support the position that he did so, Mr. Howard quotes remarks written by that excellent botanist in 1849 when the nature and relationships of dimorphic or heterostyled flowers (so frequent in *Rubiaceæ*) were not properly understood; it is noteworthy that in 1869 Dr. Weddell had deliberately dropped the bark-cutter's term "macho," which he then no doubt saw to be misleading.

One sees with regret throughout all these communications of Mr. Howard, a very remarkable neglect, or an intentional defiance of the accepted rules of botanical nomenclature. For instance, he makes the astounding remark that "it belongs to Mr. Ledger and to him alone to define what is the true *Ledgeriana*." Why? On what possible grounds? Mr. Howard has said a little before, and fairly enough, that "the privilege of naming a plant belongs to the botanist who first observes and properly describes it;" this may pass, but how in the world can it apply to Mr. Ledger?

In conclusion, a few words as to the Ceylon cinchonas spoken of by Mr. Howard. He has committed himself to the following identifications:—(1) the plant figured by me = *C. micrantha*, var. *calisayoides* (probably); (2) Mr. Christie's specimens (S. Andrew's Estate) = *C. Calisaya*, var. *microcarpa* (but probably hybridized with *C. officinalis*); (3) Mr. Laurie's (Yarrow Estate) = *C. Calisaya*, var. *Ledgeriana*. Now, I am familiar with these. They are all from the same small quantity of seed, and were raised in the same nursery beds at the same time, and I can state positively that they are *all botanically identical*. Further, they are also identical with what is and always has been known as *Ledgeriana* in Java, and as *Ledgeriana* (species or variety) was founded on the plants in Java and has never yet been applied to any wild South American tree, the Ceylon plant must of course bear the same name. I regret the amount of ink—shed over so simple a matter.

Peradeniya, Ceylon. HENRY TRIMEN, M.B., F.L.S.

THE SOLUBILITY OF CALCIC HYDRATE.

Sir,—In a valuable paper by Mr. Maben on the solubility of calcic hydrate, published in the Journal of December 29, that gentleman, whilst to some extent confirming the results which I communicated to the Liverpool Chemists' Association, in November, 1882, differs from them in some respects, and produces figures so contrary to what might be expected that I have thought it right to make some further experiments.

The most important and startling statement is as follows:—

"I have found that lime-water can be made of full strength with calcic hydrate mixed with 15 per cent. of carbonate; with equal parts of hydrate and carbonate I obtained ·5 grain CaO per fluid ounce; with 25 per cent. hydrate and 75 per cent. carbonate ·4 grain, and with 10 per cent. hydrate and 90 per cent. carbonate the amount dissolved was only ·1 grain."

On reading this it at once occurred to me that Mr. Maben had either used an insufficient quantity of lime, or had not given sufficient time for the saturation to take place with the smaller proportions of hydrate.

To test this I had some fresh hydrate of lime prepared, and mixed this with the various percentages of precipitated chalk indicated by Mr. Maben. These mixtures were taken in such quantity that in every case the same proportion (viz. 100 grains) of the hydrate should be present with each pint of distilled water; practically the proportions of the Pharmacopœia.

These mixtures were shaken occasionally during an hour or two and then set aside for twenty-four hours, after which 2000 fluid grains were drawn from each with a pipette and estimated. The results are shown in the table.

No. of sample.	Percenrage of $CaCO_3$ present	Constituents used with 1 pint of distilled water. $CaOH_2O$.	Constituents used with 1 pint of distilled water. $CaCO_3$.	Fluid grains of $\frac{1}{2}$ strength. Vol. sol. oxalic acid required for 2000 fluid grains.	Redueed to terms of B. P. standard, viz., 200 fluid grains for 10 fluid ounces.	Temperature.
1	15	100	17½	195	213·28	62°
2	50	100	100	198	216·56	62°
3	75	100	300	195	213·28	62°
4	90	100	900	195	213·28	62°
5	Obtained by filtering from No. 1. and 2.			188	205·62	62°
6	Sample taken from lime in use one or two years; at least the former.			182	199·06	61°

These results would appear to show—

1st. That Mr. Maben's figures, taken without qualification, are not correct, and

2nd. That the Pharmacopœia standard is a fair one.

As to the first conclusion, I would not, for a moment, deny the possibility, or even probability, of calcium hydrate being so kept (especially if in coarse powder) as to become so covered upon the surface with carbonate, or converted perhaps into the hydro-carbonate, as to yield little to water. Mr. Maben does not, however, state that his hydrate had become deteriorated in this way, and we are, therefore, left to assume that he expected to get an equally saturated solution, either with an insufficient quantity of hydrate or that he did not allow sufficient time.

With regard to the second conclusion, I may say that the lime water drawn off with a pipette, although it had been allowed to stand for double the time directed by the Pharmacopœia, was not bright, and I impute the difference between No. 5 and those above (especially No. 2) to the presence of suspended matter. Even, however, with this deduction the figures would appear, at first sight, to confirm the B.P. standard, but I believe they do no such thing, except in so far as an impure lime water is concerned. I have before found that lime water from fresh lime was stronger than that made from well washed lime, and I have no doubt that this is due to the presence of hydrate of potash or soda formed during the burning of the lime from the sulphates or chlorides of these bases no doubt present.

Mr. Maben's method of filtration at different temperatures is not unexceptionable and a consideration of the difference in the parts of water required at temperatures differing by 5° C. will, I think, show that there is some discrepancy; commencing with the difference between 0°—5° they are as follow:—5, 6, 9, 12, 40, 31, 47, 23, 53, 34, 85, 32, 72, 27, 78, 49, 26, 191, 71, 0. These figures would produce a very erratic curve of solubility.

I see no reason to prefer the decinormal nitric acid to the half strength oxalic acid, the precipitate found by the latter rather increasing than diminishing the facility of use. Moreover to standardize the former is a troublesome operation. I trust that Mr. Maben will not suppose that I underrate the value of his paper, on the contrary, the interest which it conveyed prompted me to repeat, perhaps in a different form, the experiments which he mentions. The fact that he practically confirms Dalton's solubility, 1 in 778 (at 60° F. not 15° C.), confirms my results, and the fact that the sample (6) in the above table was taken from lime from which probably quite 100 gallons of lime water had been made shows that such an arrangement as I described in November, 1882, admirably answers its purpose.

My original statement that "at 70° the solubility is reduced not far from 10 per cent." was, no doubt, putting the difference rather high, although I consider that a standard 10 per cent. below the Pharmacopœia is not too low to adapt as a minimum.

In conclusion, sir, I would beg to point out that I did not, as would be inferred from your retrospective remarks upon the year 1883, suppose that temperature was the cause of the deficiencies in the strength of lime water for which prosecutions had been instituted.

Nor do I think that Mr. Maben would say that the temperature of a shop rarely rises above the point at which the official strength of lime water can be maintained, for his own figures show that at 86° F. (30° C.) the strength would be only ·51 grs. in the ounce.

From my own experiments I should be inclined to think that the presence of magnesium or silicate of calcium in commercial lime (which is indicated by the Pharmacopœia description) is the greatest source of the deficiencies which have been shown in Court.

Liverpool. A. C. Abraham.

Influence of the Electric Light on Plants.

Sir,—More than a year ago, on observing in several newspapers and journals notices relating to the growth of wheat by means of the electric light (also lately alluded to), I resolved to make some investigation into the matter, as I doubted the statements which had been recorded on the subject.

Our first experiment was made with some good sized potatoes. A few of these were placed in a position where they were exposed to the full glare of an electric light during the whole of the night, though in the daytime the place which they occupied was kept quite dark. The remaining portion of the potatoes was laid down in a continually dark place, but enjoying a similar amount of space for air circulation and exactly the same temperature as those on which the electric light flared.

When the potatoes had pushed growths about 5 inches in length they were removed and examined in broad daylight. The growths of both lots equal in length bore the same general appearance, and completely resembled the growths of potatoes which had lain for some time in a dark cellar or in the bottom of a stowed-away barrel.

I examined with great care those which had vegetated under the influence of the electric light to see if the growths possessed any green colouring matter (chlorophyll). But not the faintest stain or tinge of this could be seen, so that the great principle which either directly or indirectly builds up, nourishes and develops all the higher forms of plants and trees and ripens and colours fruits and seed pods was found to be absent. Chemists may analyse and identify the electric light with the rays of the sun in whatever way they please, but it is quite evident that the latter is something altogether different. I venture to assert that the electric light, even if perfected to a far higher degree than it at present is, will not be found to influence in the most remote way the development of even any of the lowest forms of vegetation. The opinion, therefore, which has been expressed of its value in accelerating and assisting the growth of plants and ripening of fruits is simply a delusion.

Anyone can satisfy himself of the matter by making a trial such as I have described. Large rapid growing seeds planted in loam and watered will answer the purpose just as well as potatoes, only that the latter can be laid about anywhere and demand no special attention.

Cramond Village, by Edinburgh. Robert Cross.

Patent Medicines containing Poison.

Sir,—When one remembers how numerous have been the letters which have appeared upon this matter in your Journal during the past two or three years from correspondents in all parts of the country, and the frequent articles which you have devoted to the same subject, together with many discussions upon certain clauses of a proposed amendment to the Pharmacy Act, in which an important alteration is proposed in the sale of all patent medicines containing scheduled poisons, and in the matter of defining a responsibility with regard to such sale, it may perhaps be excusable to remind Dr. Connell that with such evidence before him it will be impossible to charge the pharmaceutical body with any want of interest in this direction or with any laxity in their determination to effect a revolution if possible.

Dispensing chemists generally will be only too ready to co-operate with the medical profession in the endeavour to carry out any reform which would operate for the public good; and Dr. Connell may feel perfectly assured that there is no class of men more earnestly desirous of an expurgation of, this and other flagrant abuses than pharmacists, and not one which suffers so much from the uncertainty of being responsible for that to which no legal responsibility is accorded,

Although it still remains possible for "grocers, oilmen and others to sell medicines of which they know absolutely nothing," it has always been a serious question to me as to how far a qualified chemist is justified in sheltering himself behind the patent medicine exemption clause of the Pharmacy Act, for whilst through ignorance the grocer or the oilman has absolutely no responsibility, the chemist has morally, at the present moment, as much as he will ever have, except that it remains legally undefined. If therefore, the chemist should persist in retailing particular medicines (so-called patent) which have in his experience supplied the occasion for a coroner's inquiry, without a printed caution as to the uncertain nature of the compound, it appears to me that he accepts unreservedly the possibilities of a humiliating interrogatory, from the results of which no patent medicine clauses could shield him.

Kilburn, N.W. Charles B. Allen.

The late Dr. Carruthers.

Sir,—There are probably many in this neighbourhood, who, like myself, have vainly looked for some obituary notice of the death of poor Dr. Carruthers. But I suppose that beyond his immediate neighbourhood the highly interesting facts of his career in pharmacy, as well as the extraordinary circumstances in relation to his fatal accident, have not penetrated. From an obscure market town in Cumberland, where he had creditably served the usual term of apprenticeship, he came up to London, and duly passed the Minor examination about ten years ago. Then advancing still he received another well deserved honour in the shape of the membership of the Royal College of Surgeons.

It should be remembered, however, that for a time he was in business as a chemist and druggist, at Moss Side, Manchester, whence he succeeded in qualifying himself for the medical profession. And just when he was entering the threshold of an apparently prosperous career, and whilst administering professional assistance to some of the sufferers during the late great storm, a further downfall of chimneys took place, when he was struck down with injuries which resulted fatally after a brief period. His friends here are practically carrying out their appreciation of his heroic and Christian career by raising a fund for the benefit of his young wife and family, and they hope to realize, at least, £2000.

Reddish Post Office. J. T. Robinson.

W. R. J. White.—By consulting the official Register of Trade Marks.

"*Cam.*"—Apply to the Clerk of the Army Medical Department, Whitehall Yard, S.W.

Xenophon.—Glycerine is a very good excipient for pepsine pills. See Dispensing Memorandum, No. 438 (*Pharm. Journ.* [3], xi., 167, 253).

W. Fingland.—Dr. MacAlister delivered his lecture at the London Institution, not at the Royal Institution. We are not aware that it has been published.

Communications, Letters, etc., have been received from Messrs. Liversege, Hesse, Robinson, Student, Alpha, Maryland.

THE SALTS OF NARCOTINE.*

BY DAVID BROWN DOTT, F.R.S.E.,

Pharmaceutical Chemist.

The subject I have chosen for discussion in this short paper has not, at first sight, a very obvious interest for pharmacists, but, I think, further consideration will show that it has a bearing on pharmacy in two ways. These are, firstly, the importance of narcotine on account of its presence in nearly all the Pharmacopœia preparations of opium; and, secondly, the possibility of its salts passing into therapeutical use.

No one can have studied, ever so slightly, the literature of opium and its assay, and have failed to observe how frequently narcotine has been to the chemist a stumbling block and source of trouble. We need not now discuss in what various ways this has arisen. Although it is now many years since Regnault and Robiquet prepared and analysed the muriate of narcotine, there is still a prevalent idea that narcotine is not an alkaloid at all, or, at any rate, that it does not form well-defined salts. In support of this statement it would be easy to select suitable quotations from several writers, but I shall take as my text the following from Professor Flückiger: †—"The narcotine is present chiefly in the free state, as it is not really an alkaloid; it is, therefore, not, or not entirely, removed by water. With acetic acid, as well as with other acids, narcotine forms not well-defined salts; the acids are simply solvents from which it again separates as soon as the acid is neutralized." This is for the most part erroneous, as we shall very soon see. Let us first consider the various salts and their properties, so far as our knowledge goes.

Meconate.—This salt first engages our attention, as it is almost certainly the form in which narcotine exists naturally in opium. When narcotine and meconic acid are dissolved together in water, in molecular proportions, *i.e.*, two molecules of the base to one of the acid (which is di-basic), a syrupy solution is obtained which refuses to yield crystals. If evaporated, the salt dries as a varnish. Unlike most amorphous salts this is not readily taken up by water. When the proportions for the acid meconate are used, a clear viscous solution is obtained. This ultimately becomes filled with crystals, but I have not yet ascertained whether they are really a crystalline acid salt, or only the neutral salt with separated acid. "The books" give no information about these meconates.

Acetate.—This is one of the only two crystalline salts mentioned by the older authorities. According to Berzelius, it is prepared by "dissolving narcotine in concentrated acetic acid, and evaporating *in vacuo* in presence of lime." We prepared a quantity of acetate according to these directions (leaving out the lime). Narcotine will not dissolve in an equivalent of glacial acid; indeed, a clear solution was only obtained by warming with several times that amount. On cooling, the solution before long became filled with crystals, which were strongly pressed, first in calico and then between blotting paper. The crystals were immediately bottled, and two portions weighed off as quickly as possible. One of these was mixed with ten times its weight of calcic hydroxide, and exposed in the water-bath, while in the other the narcotine was determined by precipitation with ammonia.

23·04 grs. lost in w.-b. 0·36 gr. = 1·56 per cent.

26·45 grs. treated with cold water left undissolved 24·28 grs. By NH_3 0·66 gr. was obtained in addition, making the total narcotine = 94·29 per cent.

		Calculated.	Found.
$(C_{22}H_{23}NO_7)_3.C_2H_4O_3.H_2O$	$\overset{+}{N}$	94·07	94·29
	H_2O	1·36	1·56

Whence it is probable that the salt obtained as just described has the above composition. In any case, it is of no value on account of its insolubility in water, or (what amounts practically to the same thing) its immediate decomposition by water.

Hydrochloride.—The dry salt was correctly described by Regnault and by Robiquet, but they make no mention of water of crystallization. Dr. Wright was the first who fully investigated this salt, and our analysis leads to the same conclusion, that the normal hydrochloride has the composition $C_{22}H_{23}NO_7.HCl.H_2O$. Strong solutions of this salt show a curious tendency to gelatinize, like the salts of cryptopia. The muriate of narcotine may be regarded as its most important salt, being easily prepared and fully soluble.

Sulphate.—I have not been able to find any published reference to this salt, which is readily obtained by dissolving narcotine with the theoretical proportion of sulphuric acid and allowing to crystallize. Some of these crystals were dried by exposure to the air, and a weighed quantity of the air-dry salt placed in the water-bath.

14·55 grs. lost 0·10 gr. = 0·68 per cent.

Two portions of same salt dissolved in water, excess of ammonia added, and the precipitates collected and weighed.

17·200 grs. gave 14·30 grs. = 83·13 per cent.

6·555 grs. gave 5·45 grs. = 83·14 per cent.

14·55 grs. dried at 130° C. gave only 78·35 per cent., indicating decomposition at that temperature.

The salt dried in water-bath lost weight further in the air-bath at 120°. 9·74 grs. lost 0·675 gr. = a loss in weight of 6·93 per cent. on the air-dry salt.

From the results obtained it was suspected that the sulphate used in these experiments had been over dried by too long exposure to the air. A quantity of it was therefore moistened with water, and when apparently just dry was transferred to the water-bath.

9·740 grs. lost 1·48 grs. = 1·48 per cent.

It would, therefore, appear that narcotine sulphate has the composition $(C_{22}H_{23}NO_7)_2.H_2SO_4.4H_2O$, and that it loses one molecule of its water below 100° C., the remainder at a higher temperature.

		Calculated.	Found.
$\overset{+}{N}_2H_2SO_4.4H_2O$	H_2O	7·22	6·93
$\overset{+}{N}_2H_2SO_43H_2O.H_2O$	H_2O	1·71	1·48
"	$\overset{+}{N}$	82·93	83·13

We have not prepared any other salts besides these, and it is indeed unnecessary to do so. The meconate, muriate and sulphate dissolve completely in water, and their solutions remain clear even when largely diluted. Not so the acetate. By adding hot water to a solution of narcotine in dilute acetic acid, the greater part of the alkaloid is precipitated. One thing is noticeable regarding all salts of narcotine, that their solutions are *acid*, *i.e.*, they behave

* Read at an Evening Meeting of the North British Branch of the Pharmaceutical Society, January 16, 1884.

† 'Year-Book of Pharmacy,' 1879, 543.

as if they contained free acid. This I have no doubt they do, in common probably with all acid solutions of salts. When such a solution is shaken up with a solvent capable of dissolving the base, some of the base is taken up; as when a solution of narcotine muriate is agitated with ether. The process may perhaps be expressed in this way:—Narcotine, hydrochloric acid, and water have each an affinity or attraction for the others. When narcotine muriate is dissolved in water, the latter attracts the acid so as to cause a certain amount of decomposition in the salt, the affinity between the base and acid not being strong enough to resist the action of the water. Yet this affinity is sufficient to prevent any great decomposition, such as we have in the case of the acetate, where the addition of water causes an almost complete precipitation of the alkaloid. A kind of equilibrium is established, depending, no doubt, on the relative masses of the different components. When a portion of one of these is removed, as narcotine by benzine, the equilibrium is disturbed and rights itself by a little more decomposition, and so on. But it is not necessary to have the salt in solution in order to remove the base by an appropriate solvent. So weak an alkaloid is narcotine that its salts are decomposed, to some extent, by such compounds as ether and "benzine," so that by simply rubbing up the dry salts with one of these solvents, an amount of the alkaloid is dissolved out. Having regard to all these facts, and to what is known otherwise of narcotine and of opium, we are led to the conclusion that narcotine is undoubtedly an alkaloid, that it readily forms salts, and that it exists in opium as meconate (at least for the most part). It is no uncommon occurrence for alkaloidal salts to crystallize with varying proportions of combined water according to circumstances. I have observed this in the case of narcotine hydrochloride, one sample giving numbers indicating three molecules of water. According to Beckett and Wright, the hydrochloride of narcotine forms a series of basic salts by successive crystallizations from hot water. Their experiments I have not repeated, but the muriate certainly stands one recrystallization without decomposition.

Gmelin* states, on the authority of Bouchardat, that the molecular rotatory power of narcotine is $-130{\cdot}6°$ or $-151{\cdot}4°$ for the red ray, but that it is not ascertainable with exactness on account of the slight solubility of the alkaloid in alcohol and ether. "On addition of acids it acquires a rotatory power towards the right, the original rotatory power being brought back by neutralization with ammonia." The rotatory power of acid solutions of narcotine was found by Bouchardat to vary according to the quantity and nature of the acid. More recently Hesse has determined the specific rotatory power of narcotine with the following results†:—

		Alcohol.	Chloroform and alcohol.	Chloroform.
C	=	0·74	2	2 and 5
$[\alpha]_D$	=	−185·0	−191·5	−207·3

It may be thought that these numbers do not agree very well, but it is now understood that the "specific rotatory power" may vary according to the nature and proportion of the solvent used; even although that solvent has no action by itself on polarized light. All that we obtain in such cases is an apparent rotatory power which may differ widely from that of the pure substance. It is, therefore, necessary to state the solvent and the percentage of substance dissolved therein, as the angle of rotation does not vary directly as the amount of substance, when the latter is in solution.

Before knowing of Hesse's work on the subject, I determined the specific rotatory power of narcotine dissolved in "benzine," the solution containing 1·59 per cent. My friend Mr. W. Peddie, Assistant to the Professor of Natural Philosophy in the University, kindly made a duplicate determination for me, he using a Duboscq's polariscope with compensator, and I using a Jellet. Our results are practically identical and give the value $[\alpha]_D = -229°$. It was, of course, ascertained in the first place that the benzine did not affect appreciably the polarized light. I can confirm Bouchardat's observation that acids change the polarization from left to right, a solution of narcotine in dilute oxalic acid giving $[\alpha]_D = +62$.

* 'Handbook,' xvi., 137.

† Watts' 'Dict.,' viii., 1223.

PREPARATION OF GALAZYME OR ARTIFICIAL KOUMISS.*

BY ADAM GIBSON.

Much has been written regarding this medico-dietetic preparation, and having personally had some experience in the manufacture of it during the past few years, I have had opportunity of testing the various methods which have been proposed for its production.

It may be explained at the outset that the koumiss of the Tartars is prepared from mare's milk, fermentation being set up at the beginning of the season with kefir (dried koumiss of the preceding year), and, subsequently, its manufacture is effected with koumiss of a previous operation, fermentation being in all cases accelerated by agitation in a sheepskin bag.

It is unnecessary to notice here the physiological effects of the preparation, it being sufficient to state that medical practitioners have found it a valuable aid in the treatment of many wasting diseases.

The difficulty of obtaining mare's milk in this and other countries has led to experiments with other milks, and it has been found that cow's milk with some little adaptation sufficiently meets the requirements of the case. Koumiss prepared from this source has been termed "galazyme."

Various processes have been proposed, and the following classification contains the principal of them:—

1. Fresh cow's milk, containing added cane sugar, fermented with yeast or old koumiss.
2. Skimmed cow's milk, containing added cane sugar, fermented with yeast or old koumiss.
3. Skimmed and fresh cow's milk, containing added cane and milk sugars, fermented with yeast or old koumiss.

Before stating the results of my experience of these general methods, I may state that the objects aimed at are (1) formation of alcohol, carbonic and lactic acids, and (2) a preparation of homogeneous consistency.

In the first method, vinous fermentation proceeds so rapidly, with formation of acetic acid and subsequent curdling of the caseine, that the product is practically useless. Butyric fermentation also sets in after a few days, the accompanying odour entirely precluding the use of the preparation, this being due

* Read at an Evening Meeting of the North British Branch of the Pharmaceutical Society, January 16, 1884.

to the large amount of fat present in the fresh cow's milk.

In the second method the same objectionable curdling of caseine takes place and alcohol is produced in too large a quantity (I have found as much as 3 per cent., on the twelfth day). The product remains, no doubt, longer free from curd and there is less tendency to butyric fermentation, but on the whole the method does not give satisfactory results.

It would, therefore, appear that the use of fresh cow's milk fails to yield a satisfactory preparation, and that the use of cane sugar alone tends to defeat the objects in view. Coagulation or curdling of the caseine is certainly the principal difficulty to overcome, and to obviate this, it has been proposed to churn the mixture at hourly intervals for ten or fifteen minutes at a time during the course of twenty-four hours before bottling. It is claimed for this method that minute division of the caseine is assured. I have found that it certainly accomplishes this object, but the product is butter-milk and not galazyme, owing to the destruction of the ferment by long churning, so that the adoption of the long-continued agitation-process cannot be considered at all suitable.

The plan which I have found most practicable is to use skimmed milk, starting the fermentation with a small proportion of cane sugar, and subsequently adding a larger proportion of milk sugar according to the details which I give further on. Skimmed milk may appear to be objectionable on account of its poorer quality, but the following analysis by Hartier of mare's milk compared with an average analysis of cow's milk shows that the latter contains more caseine and fat, and less sugar than the former.

	Mare's milk.	Cow's milk.
Caseine and nitrogenous substances	1·4 per cent.	4·3 per cent.
Fat	2·1 per cent.	3·8 per cent.
Lactose	7·3 per cent.	4·5 per cent.

In using skimmed cow's milk we get rid of a quantity of fatty matter which tends under certain circumstances to favour butyric fermentation; by diluting with water we may reduce the proportion of caseine, and by adding sugar we increase the saccharine constituent, thus bringing the composition of the fluid to nearly that of mare's milk. The fatty constituent in the product is undoubtedly in less proportion than in koumiss;* but it is believed by authorities that this is not an objectionable feature, and, as will afterwards be shown, the product prepared as I propose compares very favourably with galazyme supplied to pharmacists in this country.

Formula and method of procedure :—

Take of—

Skimmed cow's milk	150 ounces.
Water	50 ,,
Brewer's yeast	1 ounce.
Cane sugar	3 ounces.
Milk sugar	5 ,,

Dissolve the cane sugar in 20 ounces of water, mix it with 75 ounces of the milk, and add the yeast; the mixture is now to be well stirred and set aside in a warm place (temperature 75° to 80 F.) for nearly six hours or until small bubbles appear on the surface of the liquid; the remaining 75 ounces of milk along with the 30 ounces of water (in which the milk sugar has been dissolved) should now be added to the fermenting milk and the whole thoroughly mixed up, strained and bottled, the corks being well tied down. It should then be kept at a temperature below 55° F. if not required for early use, or if so required it may be ripened in two or three days by keeping it at 70° F.

This method yields a preparation of a perfectly homogeneous consistency, having a sweet and acidulous taste up till the fifteenth day, after which it acquires to a slight degree the taste of butter-milk, which flavour gradually increases as it grows older. It also begins to thicken after the fifteenth day, but even at the thirtieth day the caseine remains finely divided after shaking.

It seemed to me to be of some importance to determine the composition of the galazyme so prepared, before contributing this communication, and several analyses were accordingly made at different stages.

A quantity was prepared on November 10, 1883, and a number of bottles each containing 250 c.c. were reserved for analysis.

In determining the percentage of the constituents the following methods were adopted.

For Alcohol.—250 c.c. of galazyme were submitted to distillation. The first 100 c.c. which distilled were found to contain all the alcohol present, and this quantity was diluted with distilled water to 250 c.c. and the percentage of alcohol calculated from its specific gravity.

Total solids and other milk constituents were determined by Wanklyn's methods, briefly given as follows:—

Total Solids.—5·430 grams contained in a platinum dish were evaporated to dryness on a water-bath (time taken three hours), then cooled and weighed.

For Ash.—The total solids were simply ignited, cooled and weighed.

For Fat, Caseine, Lactose and Lactic Acid.—13·181 grams were evaporated on a water-bath (time taken one hour), and the residue obtained moistened with a little alcohol, then boiled with successive portions of ether; the washings filtered, evaporated and weighed, indicated the fat present.

For Caseine.—The residue from the fat determination was digested and repeatedly washed with alcohol, then with alcohol to which a few drops of boiling water had been added, the whole being thrown on a filter and further washed with alcohol; the residue being dried as usual and weighed, it was ignited, cooled and weighed, and the ash subtracted from the amount of caseine found.

For Lactose and Lactic Acid.—The washings from the caseine residue were evaporated to dryness, ignited and weighed as in caseine, lactic acid being separately determined with normal sodium carbonate solution, 100 c.c. of galazyme being used for this purpose.

In determining carbonic acid, the gas from 250 c.c was passed into ammonia solution, which was then treated with calcium chloride solution and boiled, the precipitated calcium carbonate collected on a paper filter and carefully washed with boiling water. The filter and precipitate were afterwards trans

* According to Hartier, koumiss (*i.e.*, from mare's milk) has the following composition:—

Alcohol	1·65 per cent.
Fat	2·05 ,,
Milk sugar	2·20 ,,
Lactic acid	1·15 ,,
Caseine and albumen	1·12 ,,
Ash or salts	0·28 ,,
Carbonic acid	0·785 ,,

erred to a beaker and treated with a known volume of normal nitric acid, excess of the latter being finally determined with normal sodium carbonate solution. The amount of calcium carbonate found indicated carbonic acid present.

The following table indicates results of analyses according to these methods, and specific gravities at the different stages. It may be noted that the specific gravity at the time of bottling was 1·040 at 60° F.

Table showing Composition of Galazyme on November 14, 18 and 22

Constituents.	4th day, sp. gr. 1·0386.	8th day, sp. gr. 1·0382.	12th day, sp. gr. 1·038.
Water	88·66	88·52	88·36
Alcohol	0·60	0·80	1·00
Carbonic acid . .	0·44	0·52	0·59
Total solids . .	10·30	10·16	10·05
	100·00	100·00	100·00
Solids consisting of—			
Lactose . .	6·185	5·974	5·688
Lactic acid .	0·225	0·360	0·540
Caseine . .	2·693	2·670	2·655
Fat	0·455	0·447	0·440
Ash	0·552	0·534	0·521
Loss. . . .	0·190	0·175	0·206
	10·300	10·160	10·050

In comparison with these results, I may quote the following analysis by Wanklyn of full koumiss, forty-eight hours old, prepared in London:—

Sp. gr. 1·032 at 67°F.		Total Solids contained.	
Water	87·32	Caseine	2·84
Alcohol	1·00	Lactose and lactic acid	6·60
Carbonic acid . .	0·90	Fat	0·68
Solids	10·78	Ash	0·66
	100·00		10·78

It would appear from this comparison that the variation is no greater than we would expect to find in working with different samples of milk.

In entering so much into detail, my intention has been to show that a good artificial koumiss, equal to that found in the market, can be prepared in the pharmacist's own laboratory; and knowing the difficulty which the provincial pharmacist has in supplying a rather erratic demand for the article, I believe it is as well that we should be able to make a supply when a medical practitioner indicates his intention of using it in his practice.

[*The discussion on this paper is printed at p.* 593.]

SOME AFRICAN KOLAS,

In their Botanical, Chemical and Therapeutical Aspects.*

BY E. HECKEL AND F. SCHLAGDENHAUFFEN.

Among the vegetable products of the African soil, there is perhaps none more interesting and valuable than those which under the various names of "kola," "gourou," "ombéné," "nangoué," and "kokkorokou," are used as articles of consumption throughout tropical and equatorial Africa, as equivalent to tea, coffee, maté and cocoa. Used under the form of seeds, probably from time immemorial, by the native tribes, these products are of varying botanic origin, and their history has been up to the present time imperfectly known; but the authors have been able to avail themselves of the observations of some recent travellers to clear up some obscure points.

The products which are included by the authors under the name "kola" (the various synonyms quoted being special to particular countries) consist of seeds, yielded by two families of plants and differing very much in appearance. The kind most widely distributed, the "true kola," which by some of the natives is called the "female kola," comes from the Sterculiaceæ; another variety, called by the author "false kola," is known among the negroes as simply "kola," or "male kola." Before the authors' researches only the "true" or "female" kola was known, and it had been ascertained to be yielded by the *Sterculia acuminata*, P. de Beauv. (*Cola acuminata*, R. Br.). To this Messrs. Heckel and Schlagdenhauffen are able now to add information concerning the "male" kola, hitherto unknown, and to give reasons for believing that various other species of *Sterculia*, besides *S. acuminata*, yield kola seeds.

Dealing first with "female" kola, the authors describe at length *Sterculia acuminata* from specimens, the description agreeing with Oliver's description of var. *a* (Fl. Trop. Af., i., 220). According to the best information, the tree—which is from 30 to 60 feet high, and in general aspect resembles the chestnut—grows wild upon the western coast of Africa comprised between Sierra Leone and the Congo or Lower Guinea, reaching into the interior about five or six hundred miles, where it appears to follow the limits of the palm. Upon the eastern coast it appears to be unknown in places where it has not been introduced by the English. Dr. Schweinfurth, speaking of the country of the Nyams-Nyams, near lake Nyanza, says that among the imposing forms of vegetation a *Sterculia* of the kola kind predominates and is called locally "kokkorokou." In the country of the Momboutous (24° E. long., 3° N. lat.), too, upon asking for kola he was supplied with the fruit in its rose-coloured envelope; but the only information he could obtain there concerning it was that the nuts were found in the country in the wild state and were called "nangoué" by the natives, who chewed slices of it whilst smoking. Karsten, in his 'Flore de Colombie,' describes the plant as growing wild in the moist hot woods near the southern coast of Venezuela, but the authors believe it was probably introduced there about the same time as it was introduced into Martinique, and that it was sown by African negroes, who brought it into those countries in the same manner as they are known to have introduced *S. cordifolia* for the sake of its delicious fruit. It has also been introduced successfully by the English into the East Indies, the Seychelles, Ceylon, Demerara, Dominica, Mauritius, Sydney and Zanzibar, and by the French recently at Guadeloupe, Cayenne, Cochin China and the Gaboon. In all these stations the kola tree flourishes best in moist lands at the sea-level, or a little above. At Sierra Leone some fine trees are found at an elevation of 200 or 300 metres, but not higher than that.

The kola tree commences to yield a crop about its fourth or fifth year, but it is not until about its tenth year that it is in full bearing. A single tree will then yield an average of 120 lbs. of seed annually. The flowering is nearly continuous after the tree reaches maturity, so that a large tree bears flowers and fruit at the same time. There are two collections; the June flowering yielding the fruit in October and November and that of November and December in May and June. When the fruit is ripe it takes a browish yellow colour. In this condition dehiscence of the capsule commences along the ventral suture, exposing red and white seeds in the same shell. It is at this period that they are gathered. It has been stated that there exist two varieties of kola, one yielding exclusively red seeds and

* Abstract of a lengthy memoir read before the Union Scientifique des Pharmaciens de France (*Journ. Pharm. et de Chimie*, [5], vii., p. 553; viii., 81, 177.

the other white; but the authors have been repeatedly assured that this is not the case, and that one and the same capsule may contain fifteen seeds varying considerably in size, white and red together, without the white being considered less ripe than the red. The carpels are from 6 to 9 centimetres long and 3 to 5 thick and the spongy pericarp is about 2 or 3 millimetres thick. As many as five or six ripe carpels may result from a single flower, and these may each contain from five to fifteen seeds; but sometimes carpels are met with containing only a single seed. The seeds removed from their envelope weigh, according to their development, from 5 to 25 or 28 grams. The epiderm is the principal site of the colouring matter, and beneath it the cotyledonary tissue consists of a mass of cells gorged with large starch granules comparable to potato starch. It is in these that the alkaloids caffeine and theobromine are found in the free state.

The collection is conducted with great care and is made by women. The seeds are removed from the husk and freed from the episperm. In order to maintain their value among the negroes it is necessary to keep them in a fit state and in good condition. They are, therefore, carefully picked over, all damaged and worm-eaten seeds being removed, and the sound seeds are then placed in large baskets, made of bark and lined with "bal" leaves (*Sterculia acuminata*, Car., or *S. heterophylla*, Beauv.?); the seeds are heaped up and then covered over with more "bal" leaves which, by their thickness, resistance and dimensions, contribute not a little to the preservation of the seeds by keeping them from contact with dry air. Packed in this manner the seeds can be transported considerable distances, remaining free from mould for about a month, during which time it is not necessary to submit them to any treatment in order to preserve them fresh beyond keeping the "bal" leaves moist. But if it be desired to keep them beyond that time the operations of picking and re-packing have to be repeated about every thirty days; the seeds being washed in fresh water and fresh "bal" leaves placed in the baskets. The baskets usually contain about 3 cwts. of seeds. It is in this condition that "kola" is sent into Gambia and Goree, where the principal dealings in the seeds are carried on. In Gambia they are sold in the fresh state to merchants travelling with caravans into the interior, who dry them in the sun and reduce them to a fine powder, which is used, mixed with milk and honey, by the tribes of the interior to make a very agreeable, stimulating and nourishing beverage. It most frequently arrives at Sokota and Kouka in the Soudan and Timbuctoo, where large sales of the seeds are made, in the fresh condition; from the Soudan markets it is carried by caravans to Tripoli, and from Timbuctoo into Morocco. As might be expected the value of the kola increases as it makes its way into the interior of Africa, and the authors state that some of the tribes furthest removed from the sea pay for the dry powder with an equal weight of gold dust.

Kola plays an important part in the social life of many of the African tribes, and the authors mention some of the occasions upon which it is used in terms almost identical with those in a paper read at an evening meeting of the Pharmaceutical Society eighteen years ago (*Pharm. Journ.*, [2], vi., 450). An interchange of white kola between two chiefs is indicative of friendship and peace, whilst the sending of red kola is an act of defiance. An offer of marriage is accompanied by a present of white kola for the mother of the lady; the return of white kola is equivalent to acceptance of the suit, whilst red means rejection. The absence of a supply of kola from among the marriage presents would endanger the whole arrangement. All the oaths are administered in the presence of kola seeds; the negro stretches out his hand over them whilst he swears and eats them afterwards.

Fresh kola is used as a masticatory, as is also the dried powder, by the tribes in the interior. When fresh the taste of the seeds is first sweet, then astringent and finally bitter. When the seeds become dry the bitterness diminishes, giving place to a sweeter flavour; but upon steeping them in water for a couple of days the original bitterness is nearly restored. Preference is given for mastication to seeds containing only two cotyledonary segments, it being asserted that they are less rough than those with four to six segments; but the authors did not find anything in their chemical examination to explain this preference. The practice of kola mastication, which is always accompanied by the swallowing of the saliva, does not injuriously affect the teeth, as is the case with the betel nut, but tends to render the gums firm and exercises a tonic influence on the digestive organs. The seeds are reputed to clarify and render healthy the most foul waters, and to render tainted meat edible, and when chewed, either fresh or as a dry powder, and the saliva swallowed, to be a sure preventive against dysentery. They are also said, like *Erythroxylon Coca*, to possess the physiological property of enabling persons eating them to undergo prolonged exertion without fatigue, which is probably to be attributed to the caffeine they contain. Further it is said that kola exercises a favourable influence upon the liver, and that white people, living in those regions, who chew a small quantity before meals escape constitutional changes due to affections of that organ. They are also believed by the negroes to have aphrodisiac properties. With respect to the assertion that the pulp or powder of the seeds thrown into foul water has the property of cleaning it, an experiment made by the authors would appear to show that any action in this direction would be due to the formation of a kind of mucilage, which would act mechanically like the white of egg.

It has been pointed out that the name "kola" is applied in Africa indifferently to several Sterculaceous seeds other than those of the two varieties of *Cola acuminata*, although these are the most valued in the native markets. It is probable that the African plants capable of yielding seeds resembling the true kola are *Cola Duparquetiana*, Baill., *C. ficifolia*, Mast., *C. heterophylla*, Mast., *C. cordifolia*, Cax., and perhaps *Sterculia tomentosa*, Hend. But the authors think it doubtful whether these seeds contain caffeine, otherwise they would be as much sought after as the true kola.

In order to determine chemically the composition of kola seeds, the authors made a large number of experiments; the details fill many pages in the original paper. The dry seeds were first operated upon, and the process which appeared to give the best results was to exhaust the dried powder successively with chloroform and alcohol. The chloroform percolate was a yellowish liquid; this was evaporated to dryness, and the residue treated with water, which separated a fatty substance with an odour recalling that of cacao butter and entirely saponifiable by caustic potash. The yellow liquid upon concentration after filtration, deposited silky needles of caffeine, but when the solution was rapidly evaporated and the residue treated with water, ether or chloroform it no longer completely dissolved without using a considerable quantity and boiling, and upon such a solution cooling a small quantity of a compound crystallized out in microscopic prisms and octahedra which proved to be theobromine. The substances separated by chloroform from the dry nuts, were—caffeine, 2·348 per cent.; theobromine, 0·023 per cent.; tannin, 0·027 per cent.; fat, 0·583 per cent.

The kola powder was then dried and exhausted with alcohol. A mahogany coloured extract was obtained which when treated with boiling water dissolved entirely, but the solution on cooling deposited a large quantity of colouring matter. The aqueous solution was precipitated with triplumbic acetate, the precipitate decomposed with sulphuretted hydrogen, and a liquid obtained, free from bitterness, containing a considerable quantity of a tannin giving an intense green colour with persalts of iron, and a soluble colouring matter that formed lakes in contact with metallic solutions; the residue of the aqueous solution, after removal of excess of lead, was found to contain only glucose and a small quantity of fixed salts. The colouring matter deposited upon the cooling of the boiling water used in dissolving the alcoholic extract differed in its nature from the soluble colouring matter. It appeared to be an oxidation product from the tannin and presented considerable analogy to cinchona red; in order to distinguish it, therefore, the authors have named it "kola red."

The composition of the alcoholic extract from the dry nuts (5·826 per cent.) was found to be—tannin, 1·591 per cent.; kola red, 1·290 per cent.; glucose, 2·875 per cent.; fixed salts 0·070 per cent.

The entire composition of the kola nut is compared by the authors with that of tea, coffee and cacao as follows:

	Cacao (Mitscherlich).	Coffee (Payen).	Tea Green (Peligot).	Tea Black (Peligot).	Kola (Authors').
Fat	53 00	13·00	0·28	—	0·585
Proteid Matters	13·00	13·00	3·00	2·80	6·761
Theobromine	1·50	—	—	—	0·023
Caffeine	—	2·25	0·43	0·46	2·348
Essential Oil	0·04	0·003	0·79	0·60	undet.
Resin	—	—	2·22	3·64	—
Sugar	0·5 }	15·50	—	— {	2·875
Starch	— }				33·754
Gum	—	—	8·58	7·28	3·040
Cellulose	--	34 00	17·08	26·18	29·831
Colouring Matters	—	—	17·24	19·20	2·561
Ditto	5·00*	—	2·22†	1·84†	1·290‡
Extractive	—	—	22·80	19·88	—
Tannin	—	—	17·80	12·88	1·618
Ash	3·60	6·697	5·56	5·24	3·395
Water	6·00	12·00	—	—	11·909
	100·00	100·00	100·00	100·00	100·00

These results, it is pointed out, differ somewhat from those obtained by Attfield (*Pharm. Journ.*, [2], vi., 457), especially in the recognition of the presence of a second alkaloid and of tannin. The proportion of caffeine is higher than that observed in any coffee or, except in rare instances, in tea, and exceeds that of theobromine in cacao. The alkaloid exists in kola, as in tea, uncombined, but in coffee, according to Payen, it is present as chlorogenate of potassium and caffeine. It is worth mentioning that the authors report the presence of a considerable proportion of caffeine and some theobromine in the pericarp, but the material at their disposal was too scanty for an exhaustive investigation in this direction. The leaves, wood and bark were also examined for alkaloid, but gave negative results. As in the case of coffee, kola undergoes a considerable loss of caffeine (three-fourths) during roasting, while the quantity of essential oil present is augmented.

Some experiments have been made with this kind of kola in the treatment of the atonic diarrhœa to which Europeans are frequently liable in tropical countries. The results have been fairly satisfactory, and through the efforts of M. Heckel the medicine has been supplied to some French colonial stations for a systematic trial. The preparations used are an aqueous extract, an alcoholic extract and a wine. The alcoholic extract is made by exhausting fresh kola with 5 parts of 60° alcohol and the wine by macerating the same proportions of kola in a sweet white wine during a fortnight. Neither of these preparations, however, completely exhaust the kola, at last as far as the caffeine is concerned. The preparation of an aqueous extract presents considerable difficulty in consequence of the quantity of starch, which forms an unmanageable magma.

Concerning the "male kola" or "kola bitter," as before stated, nothing definite was known, and as recently as the year 1882 it was referred erroneously to a species of *Sterculia*. In the 'Flora of Tropical Africa' Oliver says: "The kola-bitter of Fernando-Po is the product of trees belonging to the Guttiferæ." The authors were led by this remark to attempt to obtain from various parts of the eastern coast specimens of the plant yielding "kola bitter," and although the flowers did not reach them they received specimens of the branches, leaves and fruits, together with a sufficient quantity of seeds to allow of a complete analysis being made. All the specimens received from various places corresponded in their characters, and showed that the kola bitter is the produce of a single Guttiferous species and not of several. From the material at their disposal the authors refer it to a new species, *Garcinia Kola*, Heckel. The plant is described as a tree of variable aspect, 10 to 20 feet in height, bearing towards the base of the branches large opposite leaves (12 in. long by 7 in. broad), with short petioles, whilst at the extremity of the branches the leaves are much smaller (5 in. by 2 in.). The leaves are oval, slightly dilated at the base, mucronate at the apex, without stipules, full green on the upper surface and greyish underneath. The fruit is a berry the size of an apple, with a rugose epiderm covered entirely with rough hairs. It presents three or four divisions, each containing a large oval cuneiform seed, rounded on the external and angular on the internal face; the seeds are covered with an abundant sourish yellowish pulp, constituting a true arillus. The fruit has at the base the persistent calyx still adherent to the peduncle, and sometimes the persistent corolla, and at the apex the persistent stigma. The plant is reported to occur all along the eastern coast of Africa and of Senegal, intermixed with the *Sterculia acuminata*, flourishing under the same conditions, but less widely distributed. In its known characters the plant would appear to be closely allied with *Garcinia Morella*, which, however, is essentially an Asiatic species. The seeds present one convex and two plane surfaces, the former being towards the circumference of the fruit. They are covered by an apricot-yellow episperm, below which is a large yellowish-white macropodous embryo, devoid of cotyledons, and with numerous depressions on its surface. The tissue is denser and closer than that of true kola and crackles under the teeth; it consists of a compact mass of very homogeneous cellular tissue, interspersed here and there with laticiferous vessels of varying size containing resin, the cells constituting which are filled with starch granules larger than those occurring in true kola.

Upon chewing these seeds a strongly bitter, astringent and yet aromatic taste is perceptible, which is quite different from that of true kola, and approaches in its aromatic flavour that of green coffee; it is this aromatic flavour that is esteemed by the negroes. It is worthy of remark that although the use of these seeds does not produce any notable stimulant effects or ward off fatigue, they are as much sought after and fetch nearly as high a price on the eastern coast as the true kola. In the interior, however, they are unknown. The authors are of opinion that these seeds owe their properties to the resin they contain, which is slightly stimulant. By the negroes they are thought to exercise an aphrodisiac action, which the authors consider doubtful, and as a masticatory, they are said to be a valuable remedy for colds.

An examination of fresh male kola nuts for caffeine gave negative results, the chloroform, ether and alcoholic percolates being all free from alkaloid. Besides colouring matter, tannin and glucose, two resins were separated. One of these was brown, hygrometric and soluble in ether and melted at the temperature of the water-bath; the other was yellowish-white, soluble in ether, alcohol, acetone and acetic acid, insoluble in carbon bisulphide or petroleum spirit, and had a high melting point.

A large proportion of the paper is devoted to a study of the constitution of caffeine and several of its derivatives, in reference to the identification of the alkaloidal substances obtained by the authors from the female kola.

MARSALA WINE.*

The English were the first to establish factories in Sicily for the making of the wine known by the name of Marsala. Wine of that sort was indeed made in the country previously; but it was not appreciated in foreign countries until it began to be prepared by the English, who took care to choose the best grapes for the purpose, which are those known in the country under the names of "cateratti" and "trebbiano," and which grow principally in the districts of Castelvetrano, Campobello, and Mazzara, situated in the south-western part of the island. These qualities of grapes, and more particularly the first mentioned, are rich in saccharine matter, tender-skinned, and juicy.

To secure the choicest fruit the English manufacturers make contracts with growers and advance them money, to be returned in fruit, or must of a superior quality. They reserve to themselves the right of inspecting the vines and seeing that they are properly attended to, and they fix the date of the vintage, which usually takes place in that part of the island towards the latter end of September, never earlier. If the crop is an abundant one the manufacturers willingly accept whatever may have been produced over and above the contracted quantity at the market price. On the other hand, if the crop is a poor one, they do not insist on getting the full amount of fruit they ought to receive, which would force the growers to procure the deficit at ruinous prices from other sources, but they agree to receive their due the following year. As the quality of the crop cannot be ascertained in advance, the growers, having full confidence in the honesty and uprightness of the manufacturers, accept the rates fixed by the latter, and it is in the interest of the manufacturers to act loyally towards the growers. Under no circumstance do the English manufacturers allow bad fruit to be pressed for their use, nor will they accept must that does not contain the required quantity of alcohol-producing matter.

The labours of the vintage having been brought to a close those of the factory begin; that is, the choice and trial of the wine. When the new wine is brought in it is placed in casks of about 12 hectolitres. For the English market Marsala wine requires to be highly alcoholized, so as to be able to stand the voyage and to keep. This is not necessary for the Italian market, hence the necessity of choosing the strong wines for the former. Alcohol is added to wine made for exportation, both after racking and at the time of exportation, increasing its volume by 7 per cent. The strength of the Italian wines is from 16° to 18°, while that for the English market comes to 20° and 22°. The alcohol is produced from the inferior qualities of wine, but latterly, owing to the heavy taxes levied upon spirits manufactured in Italy, other means have been resorted to to replace alcohol or to produce it naturally. With this object in view the must is boiled until its volume is reduced by two-thirds, and it is then added to new wine in lieu of alcohol. At first the manufacturers added this cooked wine at the first racking, but they found that the results were not good, so they altered their practice, and they now add it to the new wine as it is being casked, in the proportion of from 5 to 10 per cent. It is well to add the cooked wine before the must begins to ferment, as then the whole mixes up well and produces a stronger wine; after this it is allowed to clarify. A couple of months prior to casking a preliminary trial is made, which consists in examining each cask to see if the wine has the required qualities of the well-known Marsala: those that have not are marked and put aside for distilling; those of doubtful quality are set apart for further trial.

Great experience is required to appreciate the quality of the wine contained in each cask by sight, smell and taste.

Towards the end of March and the beginning of April a further trial is made on the wines put aside as doubtful. Then the racking begins, the wine being put into casks containing about 12 hectolitres. If any wine is not up to the mark it is alcoholized, and is put by for the rest of the season. In the English manufactories pumps and tubes are not used, as they prefer pouring the wine into cans, so that it may be seen when it begins to run thick.

During the ensuing year, before the time of the vintage, a fresh trial is made, after which those wines that require it are cleared. This is done by dissolving a certain quantity of isinglass, so as to produce enough froth to cover the surface of the wine contained in the cask. This froth is poured in through the bung-hole; and with a short stick, flattened at the end, the surface of the wine is moved to and fro so as to spread the froth over the entire surface. It is then left alone, and the isinglass gradually finds its way to the bottom, carrying with it every foreign substance, and leaving the wine clear. The English manufacturers used formerly white of egg and blood to clarify their wines, but they now find it more advantageous to employ isinglass. The wine, once clarified, is drawn and put into casks, care being taken to add alcohol to those that require it. Two months after this operation the wine is subjected to a further trial, when all that is not condemned to be distilled is poured into large vats containing as much as 800 hectolitres each. Smaller ones, from 130 to 180 hectolitres, are also used; and in order to get an unvarying type of wine, care is taken never to empty these vats except when absolutely necessary for repairs, but to add the new wine to the old.

These huge vats are in the shape of two truncated cones set one against the other at the large ends. Those of average capacity are laid down on their sides, and by never emptying them, they get so impregnated with alcohol that for repairs it is not only necessary to empty them completely, but to leave them open for some time in order to get rid of the alcoholic vapours, that would be enough to kill the coopers employed if sent in too soon.

In these large vats the wine gets matured, and previous to exportation it is alcoholized according to its being for the English or the Italian market.

The making of the casks requires a few words. They are called pipes, of 400 litres, quarter casks, or octaves, according to their capacity. When made they are filled with boiling water, so as to close up all the pores of the wood, and after a month they are emptied and filled with a poor wine for two or three months, after which a better sort of wine is poured into them for the same period. When required for exportation, they are emptied and cleaned by the use of chains. When filled, they are put into an outer cask for better protection.

* From a Report on the Trade and Commerce of Palermo and Sicily by Mr. Consul Churchill.

MICROSCOPICAL CHARACTERISTICS OF VEGETABLE FIBRES.

In a paper on this subject in the *Zeitschrift für Warenkunde*, Dr. V. Berthold classifies the more important vegetable fibres, according to the action upon them of iodine and sulphuric acid, as follows:—

A. Coloured blue, violet, or green by iodine and sulphuric acid:—Flax, Chinese grass and ramie (*Boehmeria nivea*), roa (*Pipturus argenteus*), cotton, hemp, and sunn-hemp (*Crotalaria juncea*).

I. Transverse sections coloured blue or violet, but showing no yellow middle lamella; cell-cavity usually filled with a yellow mass.

a. Flax.—Transverse sections occur either isolated or a small number grouped together; the separate transverse sections are not contiguous; they are polygonal, bounded by straight lines, and have sharp edges. Lamination evident, blue or yellow cell-cavity, yellow dot. Longitudinal distortions of the striæ are indicated by darker lines, which usually cross.

b. Chinese Grass and *Ramie.*—Transverse sections isolated or a small number in a group; their connection very loose; they are polygonal or irregular, and very large. Lamination very evident; cell-cavity large and irregular, often filled with dark yellow masses; sometimes striated radially. The breadth of the fibres is very variable, in the longitudinal aspect some appear very broad; distortions evident; the ends thickly rounded.

c. Roa-fibre.—Transverse sections not many in a group, polyhedral, usually with straight or slightly curved sides and rounded edge; cell-cavity narrowly oblong, regular; contents sometimes yellow. Some transverse sections are surrounded by a thin greenish lamella, and show well-marked radial striæ or fissures, and concentric lamination; the separate lamellæ vary in depth of colour.

d. Cotton.—Transverse sections always isolated, rounded, of various forms, usually kidney-shaped; cell-cavity narrow, linear; contents usually yellow. No lamination.

II. Transverse sections blue or violet, polyhedral, rounded or irregular, always surrounded by a yellow middle lamella.

a. Hemp.—Transverse sections always in groups, contiguous, with rounded edge, surrounded by a thin yellow middle lamella, beautifully laminated concentrically; cell-cavity linear, simple or branched, irregular, sometimes broad, without contents.

b. Sunn-hemp. — Transverse sections numerous in a group, closely contiguous, resembling those of hemp, often sickle-shaped, either polyhedral or oval, with a small round cell-cavity; often with yellow contents. Surrounded by a broad yellow middle lamella, from which the inner laminæ are often detached.

B. Coloured yellow by iodine and sulphuric acid.

I. Dicotyledons. No vessels besides the bast-fibres; cell-cavity with constrictions.

1. Transverse sections in groups, polygonal, bounded by straight lines, with sharp edges; cell-cavity round or oval, smooth, empty; surrounded by a narrow middle lamella of the same colour.

a. Jute. — Cell-cavity large, roundish, oval; middle lamella very narrow; no lamination; the ends always rounded, and almost always strongly thickened.

b. Abelmoschus.—Transverse sections larger than in *a*, bounded by straight lines, sharp-edged; cell-cavity a dot or line, oval, rarely angular, smaller than in *a*. Fibres of uniform thickness, ends broad, rounded, often thickened; cell-cavity variable, often reduced to a line.

2. Transverse sections always in groups, polygonal, bounded by straight lines, with sharp or slightly rounded edges; cell-cavity empty. Middle lamella broad and decidedly darker than the transverse section; cell-cavity with constrictions, locally entirely absent.

a. Hibiscus.—Edges sharp or rounded; in the first case the cell-cavity small, in the latter case broader and oval; middle lamella sometimes wanting; transverse sections only slightly and inconspicuously laminated. Fibres of very various thickness, not usually striated longitudinally; ends blunt and almost always thickened.

b. Urena sinuata.—Edges sharp; cell-cavity very small, a dot or narrow short line; middle lamella broad and very distinct; transverse section not laminated. Fibres of uniform thickness, rarely striated longitudinally; ends rounded, rarely somewhat thickened.

II. Monocotyledons. Vessels in addition to bast-fibres; cell-cavity without constrictions.

1. Transverse section usually rounded, rarely polyhedral; cell-cavity always round; no middle lamella.

a. New Zealand Flax (*Phormium tenax*).—Transverse sections small, usually round, closely contiguous, polygonal, with rounded edges; cell-cavity empty. Fibres thin, uniform, smooth, rigid; cell-cavity small, of uniform breadth, without striation or distortion; ends sharp.

c. Manila Hemp. (*Musa textilis*).—Transverse sections polygonal, with rounded edges or roundish; cell-cavity large, roundish, sometimes with yellow contents. Fibres of uniform thickness, smooth, not striated, with thin walls; ends sharp or slightly rounded. After combustion of the fibre siliceous skeletons remain behind in the form of strings.

2. Transverse section evidently polygonal; cell-cavity polygonal, with one or more sharp edges, moderately large; no middle lamella.

a. African Hemp (*Senseviera*).—Transverse sections closely contiguous, not laminated. Fibres thin, smooth, with sharp ends.

b. Aloe.—Transverse sections not very numerous in a group; edges slightly rounded; cell-cavity not very large, polygonal, often with rounded ends; large spiral vessels. Fibres of uniform thickness, without structure; ends sharp or rounded.

c. Agave.—Transverse sections polygonal, bounded by straight lines, closely contiguous; cell-cavity large, polygonal; its edges less sharp. Fibres rigid, considerably broader towards the middle; ends broad, thickened, sometimes split.

3. *Yucca.*—Transverse sections polygonal, closely contiguous, small, bounded by straight lines; edges very sharp; cell-cavity small, round or linear; middle lamella very evident. Fibres narrow, striated, with sharp ends.

THE DETERMINATION OF TANNIN IN VEGETABLE CELLS.

In the 'Proceedings' of the Cambridge Philosophical Society Mr. W. Gardiner assigns reasons for objecting to all the microchemical reagents hitherto used for the detection of tannin. Iron sulphate he finds convenient when the products are blue and not green. He prefers to use a solution of ammonium molybdate in concentrated ammonium chloride; this gives with tannins a copious yellow precipitate. It can also be used for determining the presence of digallic acid, with which it produces only a red colour; the compound with gallic acid is soluble in ammonium chloride, while that with tannin is not.

The determination of tannin in tissues preserved in alcohol is facilitated by the fact that dead protoplasm gives a permanent precipitate with tannins.

The author regards tannins as secondary products of metastasis, especially when this process is very active, and thinks that they have no further use in the vegetable economy. In the old leaves of a cutting of the cherry laurel which had already put out roots and shoots, the quantity of tannin had considerably increased.

THE POSITION OF PHARMACISTS IN RELATION TO THE PHARMACOPŒIA.

The following is a complete list of the petitions, together with the number of signatures to each, presented in the House of Commons between the 18th and the 25th of August inclusive, in favour of an alteration of the Medical Bill in the direction desired by the Council of the Pharmaceutical Society:—

August 18.

Pharmaceutical chemists and chemists and druggists, Ryde (*Mr. Ashley*)	14
— West Bromwich (*Mr. Brogden*)	16
— Wednesbury (*Mr. Brogden*)	7
Medical practitioners of West Bromwich (*Mr. Brogden*)	7
Pharmaceutical chemists and chemists and druggists, Edinburgh (*Mr. Buchanan*)	27
— Edinburgh (*Mr. Buchanan*)	77
— Kirkaldy, N.B. (*Sir George Campbell*)	17
— Birmingham (*Mr. Chamberlain*)	23
— — (*Mr. Chamberlain*)	42
— Chiswick and other places (*Sir Charles Dilke*)	30

F. M. Rimmington and others (*Mr. Forster*)	23
Pharmaceutical chemists and chemists and druggists, Cambridge (*Mr. William Fowler*)	18
— Clifton and other places (*Mr. Lewis Fry*)	70
— Southampton (*Mr. Giles*)	14
— City of Worcester (*Mr. Rowley Hill*)	20
— Taunton (*Sir Henry James*)	12
Hamilton Kinglake, M.D., Taunton (*Sir Henry James*)	1
Medical practitioners of Penrith and Appleby (*Mr. William Lowther*)	13
Pharmaceutical chemists and chemists and druggists in London and other places (*Sir William M'Arthur*)	22
— Grantham (*Mr. Mellor*)	16
— High Wycombe (*Lieut.-Col. Gerard Smith*)	7
— Newton, Monmouth (*Mr. Hanbury-Tracy*)	6
— Selkirk and other places (*Mr. Trevelyan*)	10
— Liverpool (*Mr. Whitley*)	56
— — (*Mr. Whitley*)	94
— — (*Mr. Whitley*)	80

August 20.

Pharmaceutical chemists and chemists and druggists, Fenton, and other places (*Mr. Broadhurst*)	21
— Dunfermline (*Mr. Campbell-Bannerman*)	6
— Colchester (*Mr. Causton*)	9
— Maldon (*Mr. Courtauld*)	5
— James Hart, and others (*Mr. Cross*)	24
— Neath (*Mr. Dillwyn*)	7
— Aberdeen (*Dr. Farquharson*)	17
— Dumfries (*Dr. Farquharson*)	20
— Forfar (*Dr. Farquharson*)	3
— Inverness (*Dr. Farquharson*)	8
Medical practitioners of Axmouth and other places (*Dr. Farquharson*)	5
— Stockport (*Dr. Farquharson*)	6
Pharmaceutical chemists and chemists and druggists, Bodmin (*Mr. Leveson Gower*)	3
— Abergele (*Lord Richard Grosvenor*)	3
— Bridgnorth (*Lord Richard Grosvenor*)	4
— Carmarthen (*Lord Richard Grosvenor*)	8
— Oswestry (*Lord Richard Grosvenor*)	7
— Hyde (*Lord Richard Grosvenor*)	7
— Carnarvon (*Lord Richard Grosvenor*)	5
— R. D. Commans and others (*Sir Arthur Hayter*)	19
— Gateshead (*Sir Farrer Herschell*)	10
— Carlisle (*Sir Farrer Herschell*)	20
— North Shields (*Sir Farrer Herschell*)	17
— Whitehaven (*Sir Farrer Herschell*)	18
— Darlington (*Sir Farrer Herschell*)	17
— Morpeth (*Sir Farrer Herschell*)	2
— Hexham (*Sir Farrer Herschell*)	3
— Bishop Auckland (*Sir Farrer Herschell*)	7
— Wigton, in the county of Cumberland (*Sir Farrer Herschell*)	4
— Peckham and neighbourhood (*Sir William M'Arthur*)	18
— Barnstaple and other places (*Sir Stafford Northcote*)	22
— Lincoln (*Mr. Hinde Palmer*)	25
— Kingston-on-Thames and neighbourhood (*Sir Henry Peek*)	15
Medical practitioners of Edinburgh (*Sir Lyon Playfair*)	18
Pharmaceutical chemists and chemists and druggists of Devonport (*Mr. Puleston*)	13
— Cardiff (*Sir Edward Reed*)	30
— Maidstone (*Mr. Alexander Henry Ross*)	12
— Dudley (*Mr. Sheridan*)	9
— Stalybridge (*Mr. Summers*)	5
— Ipswich (*Mr. Thornhill*)	14
— Bury Saint Edmunds (*Mr. Thornhill*)	13
— Harwich (*Mr. Thornhill*)	4
Pharmaceutical chemists and chemists and druggists, Macclesfield (*Mr. Henry Tollemache*)	12
— Stockport (*Mr. Henry Tollemache*)	16
— Chester (*Mr. Henry Tollemache*)	25
— Tottenham and neighbourhood (*Mr. Torrens*)	10
— London (*Mr. Torrens*)	32
— — (*Mr. Torrens*)	16
— — (*Mr. Torrens*)	6
— — (*Mr. Torrens*)	6
— — (*Mr. Torrens*)	11
— — (*Mr. Torrens*)	24
— — (*Mr. Torrens*)	14
— — (*Mr. Torrens*)	8
— — (*Mr. Torrens*)	35
— — (*Mr. Torrens*)	87
President and Council of the Pharmaceutical Society of Great Britain (*Mr. Torrens*)	Seal.1
Pharmaceutical chemists and chemists and druggists of Hackney (*Sir J. Eardley Wilmot*)	6
— Spalding (*Mr. Rowland Winn*)	8
— Stamford (*Mr. Rowland Winn*)	5
— Boston (*Mr. Rowland Winn*)	15
— Petersfield	3

August 21.

Medical practitioners of Elgin (*Mr. Asher*)	6
Pharmaceutical chemists and chemists and druggists of Elgin and other places (*Mr. Asher*)	10
— Cirencester and other places (*Sir Michael Hicks-Beach*)	13
— Brighton (*Sir Thomas Brassey*)	52
— Hastings and Saint Leonards (*Sir Thomas Brassey*)	21
— Worthing (*Sir Thomas Brassey*)	5
— Hastings (*Sir Thomas Brassey*)	29
— Chichester (*Sir Thomas Brassey*)	9
— Saint Austell (*Mr. Brett*)	5
— Saint Ives (*Mr. Brett*)	3
— Falmouth (*Mr. Brett*)	5
— Helston (*Mr. Brett*)	2
— Peterborough (*Mr. Sydney Buxton*)	17
— Montrose (*Mr. Charles Cameron*)	5
— Paisley (*Mr. Charles Cameron*)	21
— Huntly, N.B., and other places (*Mr. Charles Cameron*)	11
Medical practitioners of Harwich (*Mr. Charles Cameron*)	2
— Great Marlow (*Mr. Charles Cameron*)	4
— Leek, in the county of Stafford (*Mr. Charles Cameron*)	7
Pharmaceutical chemists and chemists and druggists of Ludlow (*Colonel Windsor Clive*)	5
— London (*Mr. Cohen*)	18
— Croydon (*Mr. Cohen*)	13
— London (*Mr. Cohen*)	31
— — (*Mr. Cohen*)	6
— — (*Mr. Cohen*)	9
— — (*Mr. Cohen*)	10
— — (*Mr. Cohen*)	41
— Albert W. Waring and others (*Mr. Cohen*)	16
— Greenwich (*Mr. Cohen*)	16
— London (*Mr. Cohen*)	13
— — (*Mr. Cohen*)	12
— — (*Mr. Cohen*)	21
— Norwich and other places (*Mr. Cohen*)	15
— London (*Mr. Cohen*)	22
— Redruth and other places (*Mr. Cohen*)	8
— Wandsworth (*Mr. Cohen*)	5
— Clapham and neighbourhood (*Mr. Cohen*)	16
— New Cross and neighbourhood (*Mr. Cohen*)	12
— Norwich (*Mr. Colman*)	18
— Liskeard (*Mr. Courteney*)	4
— Newcastle (*Mr. Cowen*)	52
Medical practitioners of Newcastle-on-Tyne (*Mr. Cowen*)	16

Pharmaceutical chemists and chemists and druggists of Southport (*Sir Richard Cross*)	11
— Rochdale (*Sir Richard Cross*)	15
— Blackburn (*Sir Richard Cross*)	21
— Ashton-under-Lyne (*Sir Richard Cross*)	13
— Evesham (*Mr. Dixon-Hartland*)	5
— Calne (*Lord Edmond Fitzmaurice*)	3
— Richmond, in the connty of York (*Mr. Forster*).	5
— Ripon (*Mr. Forster*)	6
— Grimsby (*Mr. Forster*)	27
— Middlesborough (*Mr. Forster*)	10
— Malton (*Mr. Forster*)	6
— York (*Mr. Forster*)	31
— Selby (*Mr. Forster*)	5
— Windsor (*Mr. Richardson-Gardner*)	14
— Dalkeith (*Mr. William Ewart Gladstone*)	3
— Whitby (*Mr. Herbert Gladstone*)	5
— Pontefract (*Mr. Herbert Gladstone*)	5
— Bridlington (*Mr. Herbert Gladstone*)	12
— Doncaster (*Mr. Herbert Gladstone*)	11
— Harrogate (*Mr. Herbert Gladstone*)	14
— Dewsbury and other places (*Mr. Herbert Gladstone*)	15
— Leeds (*Mr. Herbert Gladstone*)	30
— — (*Mr. Herbert Gladstone*)	30
— Brentwood and other places (*Mr. Grantham*) ...	3
— Oldham (*Mr. Hibbert*)	28
— Rye (*Mr. Inderwick*)	2
— Dorking (*Sir Trevor Lawrence*)	5
— Guildford (*Sir Trevor Lawrence*)	7
Medical practitioners of London (*Sir Trevor Lawrence*)	12
— — — (*Sir Trevor Lawrence*)	19
— Hampstead (*Mr. Lyons*)	18
— Chesterfield (*Mr. Lyons*)	10
— Wakefield (*Mr. Mackie*)	16
Pharmaceutical chemists and chemists and druggists of Nuneaton and other places (*Mr. Newdegate*)	11
— Leamington (*Mr. Newdegate*)	20
— Northampton (*Mr. Newdegate*)	10
— Rugby (*Mr. Newdegate*)	7
— Warwick (*Mr. Newdegate*)	11
— Plymouth (*Sir Stafford Northcote*)	37
— Totnes (*Sir Stafford Northcote*)	7
— Torquay (*Sir Stafford Northcote*)	15
— Plymouth (*Sir Stafford Northcote*)	2
— Tiverton and other places (*Sir Stafford Northcote*)	9
— Kilmarnock (*Mr. Dick Peddie*)	3
— Manchester (*Sir Lyon Playfair*)	84
— — (*Sir Lyon Playfair*)	51
— — (*Sir Lyon Playfair*)	66
— Leominster (*Mr. Rankin*)	5
— Llandudno (*Mr. Rathbone*)	7
— Halifax (*Mr. Thomas Shaw*)	13
— London (*Mr. Torrens*)	8
— Knaresborough (*Mr. Torrens*)	3
— — (*Mr. Torrens*)	4
— Thirsk (*Mr. Torrens*)	5
— Brecon (*Mr. Torrens*)	4
— Lewes, in the county of Suffolk (*Mr. Torrens*) ...	7
— R. D. Commans and others (*Mr. Wodehouse*) ...	18
— Burslem (*Mr. Woodall*)	12
— Sheffield (*Mr. Stuart-Wortley*)	30
— Lyme Regis	3
— Fareham and Titchfield	4
— Landport and other places	18
— Poole	5
— Salisbury	11
— Andover	8
— Gosport	8
— Weston-super-Mare	8
— Bournemouth	18
Pharmaceutical chemists and chemists and druggists of Bridport	3
— Lymington	2
Pharmaceutical chemists and chemists and druggists, Devizes	7
— Southsea	18
— Winchester	8

August 22.

Pharmaceutical chemists and chemists and druggists, Lynn (*Mr. Bourke*)	17
— Leith and Newhaven (*Mr. Buchanan*)	13
— Haddington (*Mr. Buchanan*)	2
— Slough (*Mr. Carington*)	4
— Abingdon (*Mr. Carington*)	5
— Leighton Buzzard (*Mr. Carington*)	7
— Marlow (*Mr. Carington*)	4
— Bedford (*Mr. Carington*)	11
H. C. Webb, Market Square, Buckingham, pharmaceutical chemist (*Mr. Carington*)	1
Pharmaceutical chemists and chemists and druggists of Buxton (*Lord Edward Cavendish*)	7
— Banff, Macduff and Portsoy (*Mr. Duff*)	10
— Coventry (*Mr. Eaton*)	22
— Congleton (*Mr. Alan de Tatton Egerton*)	8
— Horsham and Crawley (*Sir Henry Fletcher*)	5
— Gloucester (*Mr. Lewis Fry*)	15
— Tewkesbury (*Mr. Lewis Fry*)	6
— Chippenham (*Sir Gabriel Goldney*)	4
— London (*Mr. Daniel Grant*)	9
— — (*Mr. Daniel Grant*)	24
— — (*Mr. Daniel Grant*)	34
— — (*Mr. Daniel Grant*)	20
— — (*Mr. Daniel Grant*)	3
— — (*Mr. Daniel Grant*)	12
— — (*Mr. Daniel Grant*)	30
— Hampstead, Hendon and Finchley (*Mr. Daniel Grant*)	19
— Uttoxeter (*Secretary Sir William Harcourt*)	6
— Nottingham (*Secretary Sir William Harcourt*) ...	23
— Leicester (*Secretary Sir William Harcourt*)	26
— Watford (*Secretary Sir William Harcourt*)	6
— Nottingham (*Secretary Sir William Harcourt*)...	34
— Chesterfield (*Secretary Sir William Harcourt*) ...	13
— Derby (*Secretary Sir William Harcourt*)	22
— Leek (*Secretary Sir William Harcourt*)	5
— Newcastle-under-Lyme (*Secretary Sir William Harcourt*)	5
— London (*Sir Andrew Lusk*)	20
— — (*Sir Andrew Lusk*)	14
— — (*Sir Andrew Lusk*)	22
— — (*Sir Andrew Lusk*)	21
— — (*Sir Andrew Lusk*)	22
— Warrington (*Mr. M'Minnies*)	11
— Weymouth (*Sir Stafford Northcote*)	10
— Teignmouth (*Sir Stafford Northcote*)	4
— Exeter (*Sir Stafford Northcote*)	22
— Cheltenham (*Sir Stafford Northcote*)	21
— Bury (*Mr. Phillips*)	20
— Hartlepool (*Mr. Thomas Richardson*)	15
— London	20

August 23.

Pharmaceutical Chemists and Chemists and Druggists of Scarborough (*Mr. Dodson*)	23
— Stafford (*Mr. M'Laren*)	9
— Sunderland (*Mr. Storey*)	27

August 25.

Pharmaceutical Chemists and Chemists and Druggists of Shrewsbury (*Mr. Cotes*)	15
— Leeds and neighbourhood (*Mr. William Ewart Gladstone*)	10
— Eastbourne (*Mr. Gregory*)	15
— Wareham (*Mr. Guest*)	3
— Burnley (*Marquis of Hartington*)	16
— Longton (*Mr. Woodall*)	8

The Pharmaceutical Journal.

SATURDAY, JANUARY 26, 1884.

MATERIALS FOR SURGICAL DRESSINGS.

THE peaceful revolution which the art of surgery in so far as the treatment of wounds is concerned has undergone since Mr.—now Sir JOSEPH—LISTER first broached his views respecting septic poisoning has brought in its train a whole army of antiseptic solutions and dressings concerning which previous generations of pharmacists knew little or nothing. Some time ago several pages in this Journal were devoted to an article on the subject of antiseptic pharmacy and since then every effort has been made to keep our readers *au courant* with the literature devoted to the subject. In doing this we have had occasion to mention a number of substances that have been recommended from time to time as suitable materials for surgic al ressings, amongst them peat, moss, wood-wool, jute, oakum, absorbent cotton, etc. It has not always been evident upon what special properties the recommendation of a particular substance has been based, and probably the *raison d'être* has been usually to be found closely associated with the pecuniary interests of the promoter. ut in respect to one substance which has been recommended—sphagnum moss—it may be assumed that it is hardly open to that reproach, if reproach be, since an ample supply of it is available to any person choosing to seek for it. Moreover, it presents one advantage in that its supposed merits have been intelligently discussed in comparison with other materials in a pamphlet by Dr. H. LEISRINK.

The antiputrescent property of peat-moss has long been known, though probably the only account to which it has yet been turned by pharmacists has been in the preservation of leeches. This preservative property has been attributed to the humic and allied acids resulting from the slow oxidation of the wet cellulose, and therefore the older the peat, and consequently the further the oxidation has proceeded, the more powerful is this action found to be. But this change is accompanied by other physical alterations that affect the capability of the peat for absorbing liquids, which indeed it loses entirely after it has been once dried. Even in this condition, however, it appears to be not without its surgical uses, for Dr. NEUBER, of Kiel, says that he has found that a wound dressed with a paste made by triturating dried black peat with water to heal without formation of pus. These considerations appear to have turned the attention of Dr. MIELCK and Dr. LEISRINK to the "bog moss" which forms so important a constituent of peat, with the result that they came to the conclusion that in the widely distributed different species of *Sphagnum* the surgeon has at his command an unlimited supply of a material which from its elasticity and especially its capability of sucking up liquids,—absorbing is hardly a sufficiently strong word,—makes an unsurpassed dressing for receiving the discharge from open wounds. It does not appear, however, that the unaltered sphagnum possesses any antiseptic properties; on the other hand, it is not thought likely to set up any septic action, though for safety it may be submitted before use to the action of a jet of steam or moistened with a weak solution of corrosive sublimate. Its chief value appears to lie in its extraordinary avidity for liquids, which allows of it receiving a discharge until it has been increased to as much as eight times its original weight, without showing a sign of supersaturation. The explanation of this property is to be found in the known peculiarity of structure of the sphagnum, upon which indeed its capability of performing its very useful part in the economy of nature is dependent. According to SACHS, as the development of the young leaf progresses the cells of the veinless lamina become differentiated into large broad lozenge-shaped cells and narrow tubular cells running between and bounding them, the latter forming chlorophyll granules and constituting the functional tissue of the leaf. The larger cells, however, lose the whole of their contents, and hence appear colourless; whilst in their walls are large dots, with thickened edges, the part of the cell-wall enclosed by the dot becoming absorbed, and forming large usually circular holes. The epidermal tissue of the stem and branches also consists of from one to four layers of broad thin-walled empty cells, which in *S. cymbifolium* possess spiral thickenings and round holes similar to those of the leaves. It is these colourless cells, both of the leaf and the stem and branches, that serve as a capillary apparatus for the plant, through which the water of the bogs in which sphagnum grows is raised and carried to the upper parts, penetrating to the very summits as in a sponge, even when the tufts stand high above the water-level. The capillary action which the sphagnum exercises is therefore widely spread throughout the plant, whilst in jute and similar substances this is limited to the interstices between the individual fibres. The whole of this mechanism of imbibition is admirably explained and figured in the pamphlet 'Der Torfmoos-Verband,' to which reference has been already made.

It was not to be expected, however, that the superiority of sphagnum, even in this respect, would remain unchallenged by the advocates of rival substances. But in a number of comparative experiments, the results of which are published, sphagnum appears at least to have held its own, and quite justified Dr. LEISRINK's claim that when carefully collected, dried and made into pads or pillows, it forms a surgical dressing which, whilst extremely elastic and hence adapting itself closely to the surface to which it is applied, possesses the property of imbibing secretions to a remarkable degree. It would appear, however, that its value may be seriously affected by submitting it to too high a temperature during the operation of drying, by which indeed the structure of the moss, upon which its most characteristic property depends, is more or less extensively modified.

With commendable promptitude the Calendar of the Pharmaceutical Society of Great Britain for 1884 has been already printed and is now ready for delivery. To those who in previous years have made acquaintance with the useful volume which, under this name, the Society places annually at the disposal of chemists and druggists at a nominal sum nothing beyond the simple announcement is necessary; but it may be doing others a service to refer them to an advertisement of the Calendar that appears upon another page, from which they will see that, besides the lists of members and associates, as well as information respecting the examinations, the Benevolent Fund, and other matters more or less connected with the Society's operations, it contains a digest of a number of Acts of Parliament, Inland Revenue orders, etc., that have a bearing upon the business of a chemist and druggist.

* * *

After a delay of five months, the part of the official report on Public Petitions referring to the closing days of the last session has been delivered. On another page will be found an extract from it consisting of a list of the petitions that were presented in favour of an amendment of the late Medical Bill, in which provision should be made for the authoritative representation of pharmacists in any future committee that may be engaged in compiling a national Pharmacopœia. The total number of petitions in the list is 259, signed by 4118 petitioners, and it will be seen that among them are several proceeding from medical practitioners.

* * *

The Special Board for Medicine of the University of Cambridge has just issued, for the guidance of students proceeding to medical and surgical degrees, a Schedule defining the range of the examination in Pharmacy and Pharmaceutical Chemistry. From this it appears that the subjects that the questions will have reference to are the weights and measures of the British Pharmacopœia and of the Metric System and their mutual relations; the nature and use of the pharmaceutical processes of infusion, decoction, distillation, percolation, and solution; the chief steps in the preparation of quinine, morphine, carbolic acid, salicylic acid, hydrocyanic acid, ether, chloroform, and the chlorides of mercury; the more important impurities or adulterations which may be associated with quinine, morphine, opium, ether, chloroform, iodide of potassium, subchloride of mercury, mercury with chalk, and sulphuric acid, together with the tests by which they may be detected; the chief instances of chemical incompatibility between drugs which are in common use; the proportions of the essential ingredients contained in the pharmacopœial preparations (for internal use) of arsenic, antimony, opium, atropine, morphine, quinine, and strychnine, and the chief ingredients of the more important compound preparations; and the common or popular names of the more important drugs and preparations. The student will moreover be expected to recognize ordinary specimens of the more important crude drugs and of the more characteristic preparations.

* * *

The *Lancet*, in an editorial article, enlarges upon the mischief caused by the unrestricted traffic in patent medicines, and remarks that it says little for our national morality that in order to keep up the dignity and discharge the obligations of the State it is found necessary or expedient to resort to such a questionable measure as the levying an impost on these articles. Our contemporary is of opinion that "Her Majesty's ministers ought to stamp out at once such a crying abuse, immoral in principle and fatal in practice." Incidentally, the article illustrates the remark we made recently as to the imperfect acquaintance with the actual facts possessed, as a rule, by those who discuss the subject. After mentioning approvingly the practice in France of stating the ingredients of a proprietary medicine on the label, the writer says, "Here, in England, if a chemist ventures in open honesty to state the composition of the medicines he sells he is in danger of being accused of contravening the patents law."

* * *

The *British Medical Journal* for the 19th inst. contains an account of an outbreak of trichinosis at Emersleben, in Prussian Saxony, which vividly illustrates the danger attending the eating of pig's flesh in the uncooked condition. After the selling of the flesh of a single pig in this village in September last, 250 persons out of a population of 700 were attacked with trichinosis and 42 died. Four persons on a visit to the village were attacked on their return home, and two died, and there were also nine fatal cases in a neighbouring village where some of the flesh was sold. The flesh appeared to exercise the most fatal effects when eaten before the salt or condiments had had time to act upon the trichinæ. In one instance a servant was attacked after eating a raw sausage made from the flesh, but other members of the household who ate some of the same lot of sausages which had been plunged in boiling soup for a few minutes escaped. In another case, a man who was known to have eaten three-quarters of a pound of the raw flesh enjoyed similar immunity, but, *pace* Sir Wilfrid, he had washed it down with a quart of brandy.

* * *

The resolution passed at a meeting held during the visit of the British Medical Association to Liverpool, in July last, appears to be now taking practical shape. A provisional Committee has issued a prospectus of a Medical Sickness Annuity and Life Assurance Society, including tables of the premiums for securing the payment during sickness incapacitating from professional duty of two, three or four guineas per week; the provision of annuities commencing at the age of 65; and the assurance of sums payable at death. The draft rules are published in the current number of the *British Medical Journal*, from which it appears that membership is to be confined strictly to registered medical practitioners.

* * *

The Asclepiad is the title of a new quarterly periodical issued by Dr. B. W. Richardson, which is intended to be a "book of original research in the science, art and literature of medicine, preventive and curative." The first number opens with a paper on "Morphia Habitués and their Treatment," in which Dr. Richardson discusses the causes that usually tend to the formation of the morphia habit and the methods for its treatment. When it is desirable to attempt to break off this habit,—which, however, he does not do without taking into account the circumstances that led to its contraction,—he appears to prefer the plan of a systematic, firm and gradual withdrawal of the morphia extending over a period varying from seven to twenty-one days "unaided by any surreptitious alliances with substitutes." Nearly a third of the number is devoted to a characteristic paper entitled "Felicity as a Sanitary Research.

* * *

At a meeting of the Royal Society of Edinburgh, held on January 21, Mr. John Aitken contributed a very interesting paper on "The Effect of Heat on the Atmospheric Dust." The paper, which was illustrated by some brilliant experiments, was mostly of purely physical interest, but the following facts may be of interest to pharmacists. Mr. Aitken demonstrated that dust of all kinds is much more readily deposited on a cold than on a hot surface, and that moisture hinders the precipitation. These facts may explain why the membrane of the lungs is preserved so free from air impurities. It was also shown that a disturbed electrical condition of the atmosphere greatly favours the deposition of dust. Mr. Aitken suggests that this may be the explanation of the popular observation that milk more readily turns sour, and that other fermentive processes are more rapidly induced in thundery weather, the electrical conditions increasing the number of bacteria and other germs deposited in a given time.

* * *

In a review of the state of planting enterprise in Ceylon at the beginning of December, the *Ceylon Observer* puts forward a return of twenty-two millions as a "moderate" estimate of the number of cinchona trees two years old and upwards in the island. Our contemporary states that the quantity of bark that will be harvested depends upon the state of the home market, but that if prices improve there is no doubt an annual export of eight to ten million pounds of cinchona bark from Ceylon could be kept up for a long period to come. At the same time we learn from trustworthy sources of information here that there are signs of a very considerable falling off in the yield of bark, and that on many estates the cinchona plantations are rapidly dying out.

* * *

At the next meeting of the Chemists' Assistants' Association, to be held on Wednesday, January 30th, a paper on "Turpentine" will be read by Mr. F. H. Alcock.

* * *

The next meeting of the Manchester Pharmaceutical Association will be held at the Owens College (Medical Theatre, Coupland Street entrance), on Tuesday evening next, January 29, at 7.30 p.m., when a paper on "Cinchona Barks" will be read by Mr. William Elborne.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

EVENING MEETING.

The third meeting of the present session was held in the Society's Rooms, 119A, George Street, Edinburgh, on Wednesday, January 16, at half-past eight o'clock.

Mr. John Nesbit, President of the Branch, in the chair.

The minutes of the former meeting were read and confirmed.

The following donations were laid on the table, and thanks voted to the donors:—

To the Library—

Canadian Pharmaceutical Journal, 1883.

From the ONTARIO COLLEGE OF PHARMACY.

To the Museum—

Series of specimens in illustration of a paper on "The Shale Products Industry."*

From Mr. THOMAS STEPHENSON.

The President then called upon Mr. Dott to read a paper on—

THE SALTS OF NARCOTINE.

BY DAVID BROWN DOTT, F.R.S.E.,

The paper is printed on p. 581.

The President moved a vote of thanks to Mr. Dott, which was heartily accorded, and there being no discussion, the next paper, on—

THE PREPARATION OF GALAZYME OR ARTIFICIAL KOUMISS.

BY ADAM GIBSON,

was read by Mr. MacEwan.

The paper is printed on p. 582, and gave rise to the following discussion:—

The President, in moving a vote of thanks to Mr. Gibson, said that the process which he communicated appeared to be a very practical one, and judging from the analytical results it compared most favourably with that mentioned by Mr. Wanklyn. He thought, however, that cow's milk could never yield such a koumiss as that prepared from mare's milk; because the caseins contained in them, though chemically identical, differed physically, cow's milk giving a hard, and mare's milk a soft and easily digested curd. He believed that the superiority of true Russian koumiss was due to this property of mare's milk casein. It should not be forgotten that the koumiss used in this country was only a substitute for true koumiss (which it was impossible to import from Russia) and in these circumstances Mr. Gibson's paper could not fail to be of interest and value to those who had a demand for the article.

Mr. Gilmour seconded the motion and corroborated the President's remarks on the superiority of mare's milk koumiss. His experience of koumiss as supplied in this country led him to believe that it was an unsatisfactory article to deal with. He had recently heard of a case in which the first few bottles of a supply were admirable and were appreciated, but one bottle was so bad that it caused extreme gastric irritation, from which the patient was not likely to recover. It was possible that by adopting the process which had been communicated such unhappy results might be prevented, because the retailer could always know the age of the preparation; but he thought it necessary to point out that most scrupulous care should be taken to ensure thorough cleanliness of bottles and other vessels used, otherwise fermentation might be unduly accelerated and good and bad results be obtained from one brewing.

Mr. MacEwan returned thanks on behalf of Mr.

* *Pharm. Journ.*, January 19, 1884.

Gibson. He wished to emphasize the remarks made by the President, regarding the difference between Tartar koumiss and the artificial variety; no doubt the latter could not be so readily assimilated, but it was claimed for it that during the progress of fermentation, the casein was rendered more digestible. It had occurred to him that instead of skimmed milk the first portions of milk drawn during milking might be employed. It had recently been shown that these portions contained less than 1 per cent. of fat, while the last portions contained nearly 6 per cent. If, therefore, a supply of the former could be had, he thought that it would have an advantage over skimmed milk so far as freshness was concerned.

Mr. Gilmour said that it was well known that the last portions of milk (called "afterings" by country people) were extremely rich in fatty matter, and were much used by invalids. The first portions were correspondingly weak and would, he thought, be very suitable for koumiss.

A paper was then read on—

Aqueous Mixtures containing Powdered Chlorate of Potash.

BY JOHN RUTHERFORD HILL,

Pharmaceutical Chemist.

It is a common practice to prescribe gargles, mouthwashes and mixtures containing a much larger proportion of chlorate of potash than the aqueous menstruum is capable of dissolving and the object of the following note is to point out some objections to this practice and to suggest a more excellent way.

It not unfrequently happens that such gargles, etc., are ordered to be made with boiling water, but no discreet dispenser would be so foolish as to follow the directions of the prescriber in such a case, because, although the whole of the chlorate might thereby be dissolved, it would, of course, be deposited in a crystalline form as the solution cooled.

It sometimes happens, however, that the proportion of chlorate is very near the quantity which the menstruum is understood to be capable of holding in solution at the normal temperature; and in such cases, I believe, many dispensers do not hesitate to facilitate solution by the application of heat. Even in these instances there is always a risk that separation of crystals may ensue, either from an erroneous calculation as to the degree of solubility, or from the normal temperature falling considerably below that at which the solubility estimations were made; and consequently this process is not altogether free from objection.

The least objectionable method is generally understood to be that of reducing the chlorate of potash to very fine powder, using in all cases cold water only and attaching a "shake the bottle" label.

If the chlorate remained in the condition of fine powder this might meet the first difficulty, because, though not in solution, it would be in the next best condition for application to inflamed and ulcerated surfaces. Unfortunately, however, this is not the case, and chlorate of potash gargles, etc., so dispensed soon become unfit for use, owing to the rapidity with which finely powdered chlorate resumes the crystalline condition.

My attention had been frequently directed to this circumstance by observing that when such gargles, etc., had to be repeated there were very often present, in the bottle which had previously contained them, a few pretty large crystals of chlorate of potash. A short time since the subject was again brought very forcibly under my notice in the following manner.

About twelve months ago I dispensed a gargle containing ʒiv chlorate of potash in 8 ounces of water. About one half had been used at the time and the remainder set aside until about two months ago; at which time circumstances arose calling for the use of a similar remedy. The half empty bottle was brought to me to see if the same gargle would be suitable for this case, and I found that the whole of the undissolved chlorate of potash had, in the interval, passed from a condition of fine powder to that of pretty large tabular crystals, and the gargle was therefore, in a state quite unfit for use.

It occurred to me that it might be possible to prevent the chlorate resuming the crystalline form, at least for a reasonable length of time, by adding to the gargle some substance likely to interfere with crystallization. To determine this point the following mixtures were prepared:—

No. 1. Chlorate of potash ʒj. water to ℥j.
No. 2. Chlorate of potash ʒj. glycerine ʒj. water to ℥j.
No. 3. Chlorate of potash ʒj. simple syrup ʒij. water to ℥j.
No. 4. Chlorate of potash ʒj. gum arabic gr. x. water to ℥j.
No. 5. Chlorate of potash ʒj. gum tragacanth gr. iij. water to ℥j.
No. 6. Chlorate of potash ʒj. honey ʒj. water to ℥j.
No. 7. Chlorate of potash ʒj. treacle ʒj. water to ℥j.

The chlorate of potash was in each case reduced to very fine powder, and the mixtures were all equally exposed to the variable temperature of an ordinary sitting-room.

On examining the specimens about twenty-four hours after they had been so exposed I found that in every one of them a portion of the chlorate had passed into the condition of very thin, sharp-edged tabular crystals, exhibiting in many cases the iridescent properties of thin transparent plates. The time of examination was on the morning of the second day when the temperature of the room was several degrees less than it had been in the course of the previous night; a circumstance which, I believe, has a good deal to do with the rapid change of the chlorate from a state of fine powder to that of sharp crystals.

When the temperature of the room rises a quantity of the chlorate passes into solution and is deposited in the crystalline condition as soon as the temperature falls. This accounts for the change so far as a portion of the chlorate is concerned, but does not explain how the whole becomes ultimately so altered. This, I think, is brought about in the following manner. When the temperature rises a portion of the chlorate dissolves and when the temperature falls it is deposited as crystals. On the temperature again rising a fresh portion of the powdered chlorate is dissolved, because the powder dissolves more readily than the crystals, and this second portion is in turn deposited, either as a fresh crop of crystals, or, more probably, as an addition to those already formed. In this way, with each day's variations in temperature, the process goes on until, as already stated, the whole of the chlorate takes the form of pretty large tabular crystals.

The theory that this change is at least very much accelerated by the variable temperature of an ordinary bedroom or sitting-room was confirmed in the following manner. A mixture containing 1 drachm of finely powdered chlorate in 1 ounce of water was kept for a month in a place where the temperature did not vary more than two or three degrees. At the end of that time it was found that the chlorate had passed into a state of small, somewhat granular crystals, showing only a slight tendency to form crystalline plates. In this condition, I believe, it would be less objectionable for use as a gargle than in the other case where a number of sharp-edged plates were formed; but, nevertheless, it appears that, even under the most favourable conditions, it is impossible to retain chlorate of potash in a state of fine powder in presence of water.

From what has been stated it will be apparent that none of the substances employed had the effect of preventing crystallization, and that a single day's exposure to the variable temperature of a sitting-room was sufficient to produce such an alteration of the chlorate as to render the gargle, etc., unfit for use. Treacle, tragacanth and honey seemed to have a slight influence in retarding the process of crystallization; the crystals formed in these mixtures being of somewhat smaller size. They failed, however, to accomplish the object in view, which was not simply retardation but prevention. Thus, then, we have shown that the practice of prescribing such mixtures is open to a serious objection; but there is still another clause to the indictment.

Such gargles or mixtures are frequently directed to be taken in regular specified quantities; the intention being that each quantity should contain a definite dose of chlorate. In the case of a heavy salt like chlorate of potash, however, subsidence takes place so rapidly that, even though the bottle be vigorously shaken immediately before measuring out a dose, it is practically impossible to obtain a reasonable approach to uniformity, and, therefore, the intention of the prescriber cannot be attained.

The practice to which this note is meant to call attention is then, to say the least of it, shown to be undesirable; I believe it to be also unnecessary.

It is the province of the pharmacist to carry out, with strict fidelity, the directions of the physician, and he may not presume to dictate. While this is so, however, we believe that it is not only his province but his duty to draw attention to defects in prevailing methods and to devise improvements.

Believing this to be so, I venture to suggest that the practice referred to might be advantageously departed from, and that chlorate of potash for such purposes should always be prescribed in the form of powders. The patient could be directed to add the requisite quantity of water at the time of using; there would be no risk from crystallization; and the dose would be uniform. By this means both difficulties would be completely disposed of, and it would be, in every respect, a more excellent way.

The following discussion took place:—

Mr. Gilmour asked if the bottles had been shaken during the progress of the experiments.

Mr. Hill said that he had shaken them repeatedly so as to simulate, as far as possible, the ordinary conditions.

Mr. Gilmour then said that the formation of large crystals in these circumstances was contrary to his experience, large crystals of chemicals being obtained when the solutions were at perfect rest. The subject of crystallization was at all times an interesting one, and was particularly so in cases allied to the everyday work of the pharmacist. The explanation which had been given seemed to be correct, but he might point out that although the chlorate was practically in fine powder, still, in that condition, the crystalline form was merely minimized, and the minute crystals would form points of growth. He had much pleasure in moving a vote of thanks to Mr. Hill and complimented him on the practical manner in which he had treated a subject of general interest.

Mr. Stephenson seconded the motion and remarked that he was somewhat surprised to hear of the circumstance. It was of importance that such matters should be brought under their notice, for they had a serious aspect. He had hitherto acted upon the general opinion regarding such mixtures, namely, not to use hot water, but rather to reduce the chlorate to very fine powder. Mr. Hill's experiments sufficiently proved that crystallization could not be prevented by ordinary means, and he would suggest as a way out of the difficulty, that solutions under the saturation point should be prescribed.

Mr. Dott said that Mr. Hill's explanation of the matter was correct. The powdered chlorate was undoubtedly in the same crystalline condition as the unpowdered chlorate; still the former gave a larger surface than the latter and would pass more quickly into solution on the least rise of temperature, and when the temperature decreased it would necessarily be deposited as explained.

The President conveyed the thanks of the meeting to Mr. Hill, and remarked that he could not agree with the proposal to prescribe the chlorate in powder form. Powders were not good pharmacy, because the patient required to do what the pharmacist should do, namely, bring the remedy into a state suitable for administration. Apart from that, powders led up to a demand for the medicine in bulk, and in this demand the income of the pharmacist disappeared.

Mr. Mackenzie hoped that Mr. Hill would determine the solubility of the chlorate at different temperatures. Such solubilities would be of great use at the dispensing-counter, and would form a guide to the prescriber.

Mr. Gilmour now remarked that he was under the impression that when crystallization began the crystals continued to grow even after the solution was under the saturation point.

The President said that he also had that idea, and had seen it stated in some text-books that in the crystallization of carbonate of soda the mother liquor was not a saturated solution of carbonate.

Mr. MacEwan: Perhaps the mother liquor contained caustic soda, which would prevent the full proportion of carbonate remaining in solution.

The President, continuing, said that he thought the case referred to was that of recrystallization. Some time ago Mr. Dott, in a paper on Salicin, had stated that the mother liquor was always a saturated solution. Perhaps he might give his reasons for that statement.

Mr. Dott said that there was not the least ground for stating that crystallization would proceed indefinitely. Provided the temperature and volume were constant and the solution in presence of the deposited crystals, the solution would necessarily remain at the saturation point.

Mr. Hill then said that the interesting discussion which had arisen from his paper was a sufficient reward for any little trouble he had taken in the matter. He explained that it was the intention of the prescriber to order excess of the chlorate, and his suggestion was based on that fact. It had occurred to him that a determination of solubilities would be useful, and he would keep it in view, but there were certain circumstances which would negative the results in such cases as that under notice; thus tinctures (particularly tr. ferri perchlor.) were often prescribed along with the chlorate, so that the solvent power of the vehicle was diminished thereby. He might state that the solubility given by Squire (an authority often consulted by pharmacists) was 1 in 12, while Attfield gave it as 1 in 16. The latter was the better basis to work upon, but even that proportion is dangerous, seeing that it is so at 60° F., a temperature which is not at all constant.

Before the meeting adjourned, the President called attention to a herbarium exhibited by Mr. Thomas Stephenson, and for which he had been awarded a bronze medal by the Council of the Society. He hoped that other apprentices would turn their attention to field botany and form collections for the annual competition. The Society had other honours open to young pharmacists, particularly the Jacob Bell Scholarships, which, apart from their mere pecuniary value, gave their holders opportunity for advancement which could scarcely be obtained by other means. For these Scotchmen had equal rights with their friends on the other side of Tweed, and he hoped that some would ere long be successful in this competition.

Provincial Transactions.

ANNUAL DINNER OF THE NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

Last week about sixty members of the above Society dined together at the George Hotel, under the Presidency of Mr. Councillor Fitzhugh, F.C.S., the vice-chairs being occupied by Mr. J. Wilford and Mr. T. B. Fletcher.

The Hon. Secretary (Mr. C. A. Bolton) read several letters of apology, and announced donations from the following, towards the funds of the Society:—Mr. E. Harvey (Barron, Harvey and Co.), £5 5*s.*; Messrs. Hearon and Co. (per Mr. Rogerson), £5 5*s.*; Mr. R. Gibson, Manchester, £1 1*s.*; Mr. Ald. Witty, Hull, £1 1*s.*; Mr. J. S. Osborne, £1 1*s.*; Messrs. Burgoyne and Co., £1 1*s.*; Mr. Councillor Lees, £1 1*s.*; Mr. H. C. Mason, 5*s.*

After the usual loyal toasts had been duly honoured,

Professor Clowes proposed "Success to the Nottingham and Notts Chemists' Association." He said he was pleased to meet the members that night, and he had no doubt they had taken some interest in his endeavours at the University College to impart useful chemical instruction to those engaged in pharmacy in Nottingham. He hoped they would not think him too personal when he said that he was determined to make his department in the college very useful in that respect, and therefore, he had given a course of lectures which he thought were suited to the requirements of those attending the lectures. They represented such an important industry in the town that he considered that course of lectures necessary, and he thought he was justified in producing them. The numbers that had attended them and the course of instruction he had attempted had encouraged him to continue the lectures, which up to the present time had been eminently successful. They, as chemists, had to look upon themselves as the children of pharmacists. Early chemistry, no doubt, was concerned in the preparation of medicine, and the study of chemistry was pursued with the object of improving the preparation of existing ingredients, and the discovery of fresh ones. In the course of further remarks, Professor Clowes said he thought they did quite right in resenting the attempt which was made some time ago when the Institute of Chemists wanted to call themselves chemists *par excellence*, and oust them (his hearers) from the name of chemists. He (the speaker) considered that they had a perfect right to retain the name to which they had a special claim. Professor Attfield, who represented scientific chemistry perhaps more fully than anyone else, in a recent discourse had aimed at nothing less than making it a profession. Their President (Mr. Fitzhugh) considered that that aim was too lofty, but he (the speaker) disagreed with him on that point. Proceeding, Professor Clowes said chemists dealt in articles which ought to be pure, and it was extremely desirable that they should possess the confidence of the public. It was necessary that they should have some special education in order to perform their duties properly, and therefore he thought it was absolutely necessary that education should be given at the University College which would be of practical importance. He would be glad to receive any suggestions from the chemists regarding the instruction given in his own department. Being a public college it was necessary that it should do the work of the town. He thought the time had arrived when young men should be able gradually to receive such an education in Nottingham as would qualify them to pass at least their Minor examinations. That would be an attempt to introduce a system of gradual education in the place of the high pressure system. He would be glad to see a chemical association in Nottingham which would represent everyone engaged in chemistry. He was satisfied that the number of strictly scientific chemists was far too small, and, therefore, anyone engaged in chemical pursuits could not do better than take advantage of that admirable Association.

The Chairman, whose name was coupled with the toast, said he thought that meeting augured well for the future prosperity of the Society, the object of which, he took it, was to advance pharmaceutical chemistry. He quite agreed with the remarks of Professor Clowes, but, being a Conservative, he believed in advancing by degrees. The Chairman expressed the hope that they would get an amended Act of Parliament making Nottingham a centre, so that young men would not have to go to London to pass their Minor examinations. He thanked the company for the kind manner in which they had received the toast.

Mr. W. H. Parker also responded, and said the University College was an excellent institution, but it would not be much use without they had popular professors. He thought the young men of Nottingham owed Professor Clowes a debt of gratitude for the course of lectures he had given.

Mr. Holgate briefly proposed "The Pharmaceutical Society," to which Mr. Bolton felicitously responded, after which the annual collection was made on behalf of the Benevolent Fund, which amounted to £5 5*s.*

Mr. Beilby proposed "The President, Vice-President, and Officers of the Association," to which Mr. John Wilford and Mr. C. A. Bolton responded in appropriate terms.

The remaining toasts included "The Visitors," proposed by Mr. Warriner, and responded to by Mr. Harvey and Mr. Spencer; "The Chairman and Vice-Chairmen," proposed by Mr. Rogerson, and "The Ladies," proposed by Mr. R. H. Beverley, and responded to by Mr. Fred. Cobb.

Proceedings of Scientific Societies.

ROYAL INSTITUTION.

Professor Tyndall on Rainbows.

In a lecture delivered at the Royal Institution on Friday, the 18th inst., Professor Tyndall gave some interesting information concerning "Rainbows," and accompanied some of his statements by experiments. He commenced the subject by giving a detailed account of the history of the knowledge acquired concerning this phenomenon, stating that the most important discovery made in relation to it for a long period was the fact that the angle formed by the intersection of a line drawn from the observer to the rainbow with a line drawn from the sun to the rainbow always measured 41°. Taking this observation as a basis, Descartes explained theoretically the formation of the rainbow, and his theory was proved by Newton to be correct. The lecturer, after referring to the caustic curve, formed by aberration, then proceeded to show by means of diagrams the refraction and reflection which occur when a ray from the sun impinges upon a raindrop, and pointed out that these are the cause of the formation of the rainbow. He further showed that the phenomenon can only be seen when the observer and the sun are in the same relation as had been before noticed. In the continuation of his historical narrative, he designated Descartes and Newton as the discoverers of the formation of the "geometrical" rainbow, whilst he gave to Dr. Thomas Young the place of the first discoverer of the formation of the coloured zones or belts in the rainbow, adding that Sir George Biddle Airy had greatly contributed to prove the correctness of Dr. Young's statements.

Passing from the historical to the more general portion of the subject, Professor Tyndall explained the formation of the secondary rainbow, and the relations which its coloured zones bear to those of the primary rainbow. He then gave the particulars of a phenomenon noticed by himself, whilst residing in a hut on the Alps. Upon going to the door one foggy night, he saw his shadow thrown upon the fog by a small lamp hanging in the rear. This, in itself, was no new experience, but his attention was drawn to a well-defined white halo around the head of the shadow, a circumstance he had never observed before. He further mentioned that he had afterwards been able to reproduce this effect upon a small scale, and had arrived at the conclusion that this halo was really a rainbow, the formation of which was caused by the doorway allowing the light of the lamp to be thrown upon only a limited area of the fog. The fact that the halo was white Professor Tyndall considered to be due to the particles of moisture being in such a fine state of division that they were not able to form the prismatic colours; in support of this latter theory, he stated that he had passed a ray of electric light through an atmosphere of steam, with the result of obtaining a white halo. The formation of a white rainbow by the sun's rays, though rare, has been seen in foggy weather; indeed, one had been observed shortly before last Christmas. By means of the electric light, an artificially produced fine spray and jets of steam, this and other points were illustrated and it was shown that when the spray consisted of a liquid having a higher refractive index than water, such as spirit of turpentine or petroleum, a more circumscribed bow was formed than with water spray, whilst when both were used at the same time two bows were formed, one within the other, and each with its corresponding secondary bow. From the conditions of the experiments these results were not all witnessed by the company present, but Professor Tyndall met the difficulty as far as possible by entering the artificial mist, clad in a waterproof, and describing what he saw.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, January 17. Dr. W. H. Perkin, President, in the chair.

The following gentlemen were declared by the scrutators, Dr. Thorn and Mr. D. A Louis, duly elected Fellows of the Society:—B. H. Brough, G. Daubeney, C. C. Hutchinson, W. S. Kilpatrick, E. Matthey, H. Peile, J. W. Pallister, R. Romanis. S. G. Rawson, F. M. Rogers, W. Robinson, T. Stenhouse, W. O. Senier, J. A. Voelcker.

The following certificates were read for the first time:—L. Archbutt, W. H. Barr, D. Bain, P. S. Chantrell, H. C. Draper, A. F. Damon, V. Edwards, W. T. H. Elsley, T. Hilditch, R. E. Moyle, P. Morton, W. J. Orsman, F. R. Power, H. G. Shaw, E. F. Smith, A. E. Simpson, A. Tarn.

The President then called on Mr. C. T. Kingzett to read a paper—

On Camphoric Peroxide and Camphorate of Barium.—Brodie states (*Phil. Trans.*, 1863, 407) that when anhydrous camphoric acid is triturated with an equivalent quantity of hydrated barium peroxide in the presence of ice-cold water and the mixture filtered, there is obtained a solution which is slightly alkaline and which when rendered acid has the following properties: it bleaches indigo, oxidizes potassium ferrocyanide, decomposes hydriodic acid, and evolves oxygen when heated, but fails to give a blue coloration with chromic acid and does not discolour potassium permanganate. Brodie concluded from his analysis, etc., that a new substance was formed which was a barium salt of camphoric peroxide $C_{10}H_{14}BaO_5$, and not a camphorate of barium peroxide. The author believes that Brodie's experiments admit of another explanation, which is probably correct, viz., that when camphoric anhydride is triturated with water and barium peroxide, the anhydride is first resolved by the addition of a molecule of water into camphoric acid, which, in its turn, decomposes barium peroxide, forming camphorate of barium and peroxide of hydrogen. The author then gives a detailed account of his repetition, with some slight variations, of Brodie's experiments, and he concludes that barium peroxide only acts upon camphoric anhydride in the presence of water, and that the action is of a secondary character, the anhydride first becoming camphoric acid, which decomposes the peroxide of barium and yields camphorate of barium. He also incidentally proves the existence of a crystalline hydrate of camphorate of barium containing one molecule of water—

$$C_{10}H_{14}O_3 + H_2O = C_{10}H_{16}O_4$$
$$C_{10}H_{16}O_4 + BaO_2 = C_{10}H_{14}BaO_4 + H_2O_2.$$

Dr. Armstrong said that no doubt some organic peroxides, as acetic peroxide, did exist. In Mr. Kingzett's communication he had called attention to the results of one of his previous papers, in which he claimed to have shown that by the air-oxidation of turpentine camphoric peroxide was formed, which was the source of the peroxide of hydrogen: no doubt some peroxide was formed, but that this should be camphoric peroxide appeared to him very doubtful, as there seemed to be no relation between the terpenes and camphor.

Mr. Kingzett, in reply, said it was principally from Brodie's experiments that he had concluded that camphoric peroxide was formed in the oxidation of turpentine; although peroxides of monobasic acids were known, if camphoric peroxide did not exist he did not think any peroxides of bibasic acids had yet been discovered.

The Secretary then read the following communications:—

Supplementary Note on Liebig's Production of Fulminating Silver without the use of Nitric Acid. By E. Divers and Michitada Kawakita.—The authors have succeeded in obtaining a very small quantity of fulminate by the action of nitrous acid, but under conditions which deprive its production of all significance. The fulminate was only produced when the temperature rose to about 60° and the liquid contained nitric acid.

On the Decomposition of Silver Fulminate. By E. Divers and Michitada Kawakita.—Silver fulminate, when treated with hydrochloric acid, yields as is the case with mercury fulminate, formic acid and hydroxyammonium chloride, but the authors have, as yet, only found two-thirds of the calculated quantity of each of these bodies. Traces of ammonia and hydrocyanic acid are also produced.

On Hyponitrites. By C. Divers and Tamemasa Haga.—In this paper the authors resume an investigation commenced by Divers in 1871; they criticize especially the results and conclusions of Berthelot and Ogier, who gave to silver hyponitrite the formula $Ag_4N_4O_5$. These chemist. do not seem to have thought that an acid of such a strange constitution as $H_4N_4O_5$ might be a mixture of hyponitrite, having Divers' constitution (HNO) mixed with nitrite and nitrate. The authors of the present paper have made many experiments purifying the hyponitrite in various ways. The final experiment consisted in dissolving the hyponitrite in nitric acid, precipitating with sodium carbonate, washing with water, acetic acid and again with water; all the operations being performed in an atmosphere of carbonic acid. This resolution and reprecipitation were performed several times; the product was finally dried in an atmosphere of carbonic acid, over sulphuric acid. The salt gave 77·69 per cent. of silver. AgNO contains 78·3 per cent. The constitution of the salt is, therefore, AgNO. The authors have hitherto failed to prepare hyponitrites either by Menke's method, heating potassium nitrate with iron filings, or by Zorn's process of using ferrous hydrate as the reducing agent.

Dr. Japp pointed out that Zorn had prepared an acid barium hyponitrite, and had shown that nitrous oxide was evolved when a hyponitrite was heated.

The Society then adjourned to February 7, when a paper "On the Influence of the Temperature of Distillation on the Composition of Coal Gas" will be read by L. T. Wright.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, January 10, Mr. H. G. Greenish, Vice-President, in the chair.

Mr. W. H. Ince read a paper on "Hydroxylamine," of which the following is the substance:—

Hydroxylamine.

BY W. H. INCE.

This compound, NH_3O, was discovered by Lossen in 1865, when he obtained it by acting on nitrous acid with tin and hydrochloric acid.

It may be prepared by several methods which involve the action of nascent hydrogen upon an oxide of nitrogen, most readily by acting on zinc by dilute sulphuric acid, to which a few drops of nitric acid have been added.

Another easy method of preparation, lately discovered by Dr. Divers, is by acting on tin by a mixture of strong hydrochloric acid with one tenth of nitric acid.

$$9\,HCl + 4\,Sn = 4\,SnCl_2 + 4\,H_2 + HCl$$
$$4\,H_2 + 8\,HNO_3 + HCl = (NH_3O.\ HCl) + 3\,H_2O$$

The tin is precipitated by sulphuretted hydrogen, and the liquid evaporated over a water-bath to dryness; the resulting saline mass, which is a mixture of hydroxylamine hydrochloride and ammonium chloride is boiled with absolute alcohol, which dissolves out the hydroxylamine salt and a little of the ammonium chloride. The ammonium salt is precipitated by platinum perchloride, and the resulting hydroxylamine hydrochloride may be crystallized out, either from alcohol or water.

The formation of the ammonium salt is mainly due to the action of hydroxylamine on the metal.

I found that instead of precipitating the tin as sulphide, if sodium carbonate were added to the solution, so as to just render it alkaline (and so precipitate the tin as carbonate), then by filtering and carefully heating the filtrate over a water-bath until it ceases to smell of ammonia, the ammonium salt is decomposed, ammonia being given off, leaving hydroxylamine unacted upon.

But if this solution is evaporated or allowed to stand, the hydroxylamine is decomposed.

The hydroxylamine can be obtained from the liquid by reacidulating with hydrochloric acid, evaporating and extracting with absolute alcohol: on evaporating the alcoholic solution the hydroxylamine hydrochloride is deposited in crystals.

Another method consists in dissolving dry mercury fulminate in hydrochloric acid.

$$\underset{\text{Mercury fulminate.}}{HgC_2N_2O_2} + 4\,H_2O + 4\,HCl = \underset{\text{Hydroxylamine HCl.}}{2\,NH_3O.HCl} +$$
$$HgCl_2 + \underset{\text{Formic acid.}}{2\,H_2CO_2.}$$

If the mercury fulminate is damp, hydrocyanic acid and hydroxylamine are formed.

I have found that many substances containing the NO_2 group when acted upon by nascent hydrogen, or by being dissolved in hydrochloric acid, reduce mercury and copper salts, pointing to the presence of hydroxylamine.

Thus pyroxylin (gun cotton), $C_6H_7(NO_2)_3O_5$, xyloidin, $C_6H_8NO_2O_3$, and nitromannite, $C_6H_8(NO_2)_6O_6$, treated as above, give hydroxylamine reactions.

I found that the action of benzene upon nitric acid yielded no hydroxylamine, but nitrobenzene, $C_6H_5NO_2$, when treated with zinc and hydrochloric acid, and the aqueous solution filtered from the aniline answered the tests for hydroxylamine.

Aniline was not found to reduce mercury or copper salts as hydroxylamine does.

I have endeavoured to obtain hydroxylamine by oxydizing ammonia, first by passing a stream of oxygen into a warm solution of ammonia (specific gravity ·88), and, secondly, by leaving ammonium chloride in an oxidizing mixture, such as sulphuric acid, oxide of manganese, and potassium bichromate; but in neither case was I successful.

Picric acid, which from its constitution $C_6H_2(NO_2)_3OH$ might be expected to yield hydroxylamine, gave no traces when dissolved in hydrochloric acid, or when acted on by nascent hydrogen.

The formation of hydroxylamine has usually been ascribed to the action of nascent hydrogen liberated by the action of the acid on the metal, for it can be obtained by passing nitrogen tetroxide into a flask in which hydrogen is generated—

$$2\,NO_2 + 6\,H_2 = NH_3O + NH_3 + 3\,H_2O.$$

But Dr. Divers asserts that no nascent hydrogen is required for the formation of hydroxylamine when nitric acid acts upon a metal.

The following is the probable reaction with zinc and nitric acid—

$$7\,HNO_3 + 3\,Zn = NH_3O + 2\,H_2O + 3\,Zn\ (NO_3)_2,$$

In all cases hydroxylamine combines with the acid present forming a salt, as when hydrogen is liberated from zinc and sulphuric acid, the hydroxylamine is produced as sulphate $(NH_3O)_2H_2SO_4$. Hydroxylamine may be isolated by treating the sulphate with baryta water, which precipitates barium sulphate leaving hydroxylamine in solution—

$$(NH_3O)_2H_2SO_4 + BaH_2O_2 = 2\,NH_3O + BaSO_4 + 2H_2O.$$

It is an unstable colourless fluid, and uncrystallizable. It is quickly decomposed by strong potassium hydrate solution, giving off nitrogen and ammonia.

The constitution of hydroxylamine, according to the formula NH_3O might be expressed in two ways, nitrogen either acting as a triad or pentad element—

$$N\begin{cases}H\\H\\O.H\end{cases}\qquad O{=}N\begin{cases}H\\H\\H\end{cases}$$

As the salts of hydroxylamine are formed by taking the whole acid group into the element, the former is preferable, in fact hydroxylamine may be regarded as ammonia with the hydrogen replaced by the hydroxyl group OH. This is further confirmed by the fact that hydroxylamine is readily converted into ammonia.

All the simple salts of hydroxylamine are additive compounds, the principal ones are hydrochloride, $NH_3O.HCl$; sulphate, $NH_3O_2H_2SO_4$; nitrate, $NH_3O.HNO_3$, and cyanide, $NH_3O.HCN$. (isomeric with urea).

All the salts are soluble in water and absolute alcohol, and all decompose when strongly heated with violent evolution of ammonia and oxygen.

Hydroxylamine also forms substitution products, where one or more hydrogen atoms are replaced by monad organic radicles; these form simple salts with the acids.

$$\underset{\text{Hydroxylamine.}}{N\begin{cases}H\\H\\OH\end{cases}}\qquad \underset{\text{Ethyl hydroxylamine.}}{N\begin{cases}C_2H_5\\H\\OH\end{cases}}\qquad \underset{\text{Diethyl hydroxylamine.}}{N\begin{cases}C_2H_5\\C_2H_5\\OH\end{cases}}\qquad \underset{\text{Tribenzy hydroxylamine.}}{N\begin{cases}C_7H_5O\\C_7H_5O\\O.C_7H_5O\end{cases}}$$

Hydroxylamine acts in two ways, either as a powerful reducing agent or as an oxidizer.

As a reducing agent it splits up into N, H_2O, and H, the H reducing metallic salts.

In solutions made alkaline with potassium hydrate it reduces cupric sulphate, throwing down a yellow precipitate, which is further reduced to red oxide on boiling.

$$2\,NH_3O + 2\,CuO = Cu_2O + 3\,H_2O + N_2.$$

It reduces silver and mercury salts to their respective metals.

1. $NH_3O + AgNO_3 = Ag + HNO_3 + H_2O + N.$
2. $NH_3O + HgCl_2 = HCl + HgCl. + H_2O + N,$
then $NH_3O + HgCl = HCl + Hg + H_2O + N.$

It also reduces tin, lead, nickel and zinc salts.

When it acts as an oxidizing agent it gives up its oxygen, liberating ammonia.

Thus it converts aldehyde, CH_3COH, into acetic acid—

$$NH_3[O.CH_3COH].$$

It acts in a peculiar manner on dibromononitroethane, forming ethylnitrolic acid—

$$CH_3.C.Br_2.NO_2 + NH_3O = CH_3C.NOH.NO_2 + 2\,HBr,$$

and on thio-carbanilide, precipitating sulphur.

Hydroxylamine forms substitution products with benzyl, anisyl and cinnamyl, by replacing the hydrogen atoms of the hydroxylamine by the radicals.

First, those in which a chloride, as when benzoic chloride forms a substitution product with hydroxylamine hydrochloride, producing dibenzhydroxamic acid—

$$2\,NH_3O.HCl + 4\,C_7H_5O.Cl + 2\,Na_2CO_3 =$$
$$N.C_7H_5O.C_7H_5O.OH + 6\,NaCl + 3\,CO_2 + 3\,H_2O.$$

This acid forms a potassium salt, which, when acted on by ethyl or methyl iodide, produces ethyl or methyl-dibenzhydroxamate—

$$C.C_7H_5O.C_7H_5O.OK+C_2H_5I = N.C_7H_5O.C_7H_5O.O.C_2H_5+KI.$$

The ethyl salt is reconverted into hydroxylamine by the action of hydrochloric acid.

A second class of substitution products are not directly formed from hydroxylamine, but by the action of nascent hydrogen on a nitrate, such as ethylnitrate—

$$C_2H_5O.NO_2+3H_2=N.H_2.OC_2H_5+2H_2O.$$

A third class are obtained by the action of a chloride on a silver salt of a hydroxamic acid. This compound may be considered as hydroxylamine in which the three hydrogen atoms have been replaced by organic radicals.

Dibenzanishydroxylamine is formed by the action of anisyl chloride on silver dibenzhydroxamate.

$$N.C_7H_5O.C_7H_5O.OAg+C_8H_7O_2.Cl = N.C_7H_5O.C_7H_5O.O.C_8H_7O_2+AgCl.$$

There are three isomeric bodies having the same formula as dibenzanishydroxylamine, but slightly differing in their reactions with potassium hydrate and hydrochloric acid.

This may be explained by supposing that the different radicals $C_8H_7O_2$ and C_7H_5O take different places in the molecule.

In considering the action of metals upon nitric acid two classes of reactions occur, depending on the metal which is employed.

First, those reactions where nitrates and no hydroxylamine are formed, and secondly, those in which hydroxylamine or ammonia results. Silver and mercury are metals which give rise to the first class of reactions. Silver with nitric acid forms silver nitrite and nitrate, but no hydroxylamine.

$$2Ag+HONO_2=HO.Ag.+AgNO_2$$

$$\left\{\begin{array}{l} HO.Ag.+HONO_2=AgO.NO_2+H_2O \\ AgNO_2+HONO_2=AgO.NO_2+HNO_2 \end{array}\right.$$

The second or zinc-tin class differs from the silver class by forming no nitrite directly from nitric acid, but producing hydroxylamine and ammonia.

When this reaction is utilized for the preparation of hydroxylamine, it is usual to add a second acid, as hydrochloric or sulphuric, but the hydroxylamine is directly eliminated from the nitric acid:—thus

$$7HNO_3+3Zn=NH_3O+2H_2O+3Zn(NO_3)_2$$

and not indirectly obtained by nascent hydrogen from the action of the second acid on the metal.

The use of the second acid is to set free the nitric acid as soon as it becomes metallic nitrate, and so keep the nitric acid to the end of the operation free to be acted upon. Without the second acid only one-seventh of the nitric acid is converted into hydroxylamine.

When iron is dissolved by nitric acid a large quantity of ammonia is formed, but no hydroxylamine can be detected; this production of ammonia is probably due to a secondary reaction in which hydroxylamine is reduced by the ferrous salt as soon as it is formed.

The paper was fully illustrated by experiments, and a discussion followed in which the Chairman, Secretary, Mr. R. W. Giles, Mr. Joseph Ince, Messrs. Dymond, Elliott and Lowe joined.

A vote of thanks was passed to Mr. Ince.

The Reporter on Inorganic Chemistry, Mr. A. J. G. Lowe, then made two reports on inorganic chemistry. In the first report he drew attention to the white phosphorus of Messrs. Remsen and Keiser (*Chem. News*, xlviii., p. 201), and exhibited a specimen, together with the apparatus by means of which it had been prepared just before the meeting. The apparatus was a flask and receiver containing ice and water, similar to that described by Remsen and Keiser, in which stick phosphorus could be distilled and condensed quickly. A current of carbon dioxide was, however, employed, as on the whole preferable to the hydrogen used by the original experimenters, and the condensed phosphorus, which collected in a thick layer on the surface of the ice and water in the receiver, was a white or yellowish white spongy mass, in appearance between that of flowers of sulphur and phosphoric anhydride. Under the microscope it was seen to consist of minute adhering globules which did not affect polarized light. This distilled phosphorus is light and plastic, and placed in water slightly warm at once melts and assumes the ordinary wax-like condition. It becomes warm and assumes this same condition when dried and exposed to the air. It is not an allotropic modification, but ordinary phosphorus, sublimed and condensed in minute particles. It is thus perfectly analogous to sublimed sulphur. Mr. Lowe therefore suggested that it should be called "sublimed phosphorus" rather than "white phosphorus," which might be thought to imply an allotropic modification.

The second report was upon the "Fluorescence of Iodine Vapour," which had been recently investigated by Lommel (*Wiedemann's Ann.*, 1883, No. 6, p. 356; *Phil. Mag.*, vol. 16, No. 102, p. 463). This was shown experimentally, and it was pointed out that it was the first recorded instance of a fluorescent vapour, and further, that unlike all other cases of fluorescence the refrangibility of the violet and ultra-violet rays was unaffected.

These reports were discussed by the Chairman, Secretary, Mr. R. W. Giles, Mr. Joseph Ince, and also by Messrs. Baily, Elliott and Short.

The Secretary then announced that the Executive Committee had made a grant from the Research Fund to Mr. W. H. Ince in order to defray the expenses connected with his work upon hydroxylamine.

Parliamentary and Law Proceedings.

The Sale of Poisons.

At Newton Abbot Petty Sessions, on Tuesday, J. H. Bibbings, a local chemist, pleaded guilty to a charge of selling prussic acid to a lady without obtaining her signature. The customer, Mrs. Jane Pinsent, obtained the drug about a fortnight ago, on the plea that she was going to kill a dog, but on the following day she poisoned herself. The defendant, who expressed regret for what had occurred, was fined £2.—*Daily Telegraph.*

Fatal Use of Quack Medicine.

An inquest was opened at Moss Bank, near St. Helens, on Wednesday, the 16th, by Mr. W. Hardy, on the body of Samuel Yates, aged nine years, son of John Yates, collier. The lad, it appeared, had enjoyed good health up to the previous Saturday, when he complained of feeling sick. Mrs. Yates gave him some warm tea, but he continued to vomit until noon, when she went to the shop of William Ashall, grocer, and purchased threepennyworth of "Indian tincture," the whole of which she gave to the boy in warm water and then put him to bed. About six o'clock deceased was breathing heavily, and as she was unable to awaken him she carried him downstairs and laid him across her knee, but he died shortly afterwards. Dr. Anderson, of Billinge, and his assistant, Mr. Nicholson, of Rainford, made a *post-mortem* examination of the body on Tuesday. They stated that the body was that of a healthy lad. All the organs were normal. Having heard the mother's evidence, and judging from the symptoms generally, they were of opinion that death had been caused by some narcotic poison, but what they were not in a position to say. The stomach and a portion of the duodenum had been placed in separate jars, and sent to Dr. Campbell Brown for analysis.

Mrs. Yates said the grocer did not label the glass and did not tell her what was the dose for a child.

Mr. Ashall produced the bottle from which he had supplied Mrs. Yates, on the label of which it was stated: "The only original highly medicated tincture for coughs, colds, bowel complaints, etc. Doses: For adults; one tablespoonful; ten to fifteen years, half a tablespoonful; seven to ten years, one large teaspoonful; two to seven years, half a teaspoonful, to be taken in warm water or gruel. Now ready to be used everywhere. Admirably adapted for everybody. Calculated to save scores of pounds in doctors' bills. A real boon to the people of this country. Sold here at 3*d.* per ounce." There was no maker's name on the bottle, and Mr. Ashall said it came from Daubhill, near Bolton, but he did not know the name of the man who brought it. He had not told Mrs. Yates what she ought to give the child, thinking she knew, as it was a common medicine. It seemed that six or seven times the proper quantity had been given to the child through the ignorance of the mother.

The inquest was then adjourned until Saturday, and at the adjourned inquest, in answer to the coroner, the police officer said he had made inquiries, and found that the stuff had been supplied by a Mr. Riley, wholesale druggist, Daubhill, near Bolton.

The coroner then told the jury the inquest would have to be adjourned so that the analyst, Dr. Campbell Brown, of Liverpool, might get some indication of the nature of the ingredients of the bottle.

Alleged Poisoning of a Chemist and Druggist.

On Monday, Mr. G. H. Hull, Coroner for the Western Division of Surrey, resumed an adjourned inquiry at Wandsworth Prison, respecting the death of George Robinson, chemist, of Walworth, aged 51, committed for three months' hard labour by the magistrate at Lambeth Police Court for an assault on his wife. The deceased was admited to the gaol on December 19, in pursuance of his sentence, which followed a week's imprisonment in the House of Detention, at Clerkenwell. It was stated that while at the police court he partook of a meat pie and liquid refreshment, which were brought to him, it not being contrary to regulations for friends to supply prisoners with diet while under remand. The man died from arsenical poisoning an hour or two after his admission to Wandsworth Prison, and the evidence of Captain Colville, the Governor of the gaol, was to the effect that when received at half-past five in the evening, the prisoner was very ill indeed, and apparently in great pain. The man could not account for his symptoms, and was treated in the infirmary, where he died.

Dr. Mosse, who was acting for the medical officer of the prison, deposed that he saw the deceased about eight o'clock on the night of December 19. He was then in a state of collapse, and complained of pains in the abdominal region. He was constantly sick, and had frequent diarrhœa; his heart was beating quickly but feebly, and his pulse was barely perceptible. Witness was not present at the time of death. Deceased complained of extreme thirst, and his tongue was dry and parched. He told witness that he was quite well in the morning, and that his symptoms came on at three o'clock in the afternoon. He also said that he was very ill in the van on the way to the prison. Witness ordered him to the infirmary, and he was taken from the cell. A *post-mortem* examination was made four days after death, Dr. Winter, the medical officer to the prison, being present. The body was well nourished. The result of the *post-mortem* was negative—the organs being all healthy excepting the lungs, and there being no apparent cause of death. The stomach contained about three ounces of dark, bilious-looking fluid, which was preserved in a jar and afterwards handed to Professor Stevenson, of Guy's Hospital, for analysis.

Professor Stevenson, deposed that he received a jar containing the stomach of the deceased and the liquid contents. There were no recognizable particles of food in either the stomach or the liquid, and no unusual appearances or signs of disease, except a slight redness of the inner coat of the stomach. From the fluid in the jar he obtained a quantity of arsenic—about a quarter of a grain. It was nearly all in a soluble form, and he could not detect any solid visible particles of arsenic or its compounds. There were also traces of bismuth in the stomach—no doubt given as a medicine, as deposed to by Dr. Mosse. The vomit of the deceased, which consisted of 104 grains of dried matter, contained a white powder, which on analysis, proved to be the subnitrate of bismuth. The vomit also contained arsenic equal to more than one-third of a grain.

By the Coroner.—The arsenic found was only the residue, but no doubt a quantity of the mineral poison was absorbed into the blood or ejected from the system in the vomit and by other means. If a fatal dose had been given, he found as much as he should have expected to find in the body after death. He actually found about half a fatal dose, and it was more than equal to six or even eight medicinal doses. It was not likely that the bismuth contained arsenic as an impurity, and the substance must have been taken or given for the purpose of causing death. He had found no clue as to the form in which the arsenic had been administered. He mentioned this because the sale of such a deadly poison was generally associated with some other compound for the purpose of identification.

The inquiry was then adjourned.—*Times.*

Correspondence.

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

Lime Water.

Sir,—The fellowing may be interesting as bearing on the subject of Mr. C. Abraham's letter in your last issue:—In the year 1879, I was engaged to investigate the cause of an unsightly and extensive efflorescence on the bricks of a new public building in the neighbourhood; the incrustation proved to be almost pure sulphate of soda; indeed, a sample of well crystallized "Glauber's salts" prepared from it was sent in with the report, but, for some time, I was unable to point out the source of the soda. The bricks, the clay and the gravel were examined without success, but in the lime both potash and soda were found in the caustic condition; the proportion given in my notes being 0·32 grains caustic soda and 0·3 grains caustic potash in 4 ounces of lime. This is hardly sufficient to account for any appreciable increase in the alkalinity of lime water prepared by the official process, but it is interesting as confirming Mr. Abraham's view as to the presence of caustic alkalies in lime. The proportions, no doubt, differ in different samples.

The Wyle Cop, Shrewsbury. Thos. J. Blunt.

S.Y.—The arrangement of giving an unqualified person an interest in a branch shop would be illegal under the existing law, and should the Pharmacy Bill pass in its present form it will be unlawful to carry on a branch establishment except under the charge of a qualified person.

A.P.S.—We do not agree with you that the "means for attaining so many useful hints is entirely taken away," since the memoranda are all indexed and available for reference. The dose of hydrogen peroxide (10 vols.) that has been recommended is one-half to two drachms.

Associate.—We are not aware that such a photograph has been taken.

Anon.—An indiarubber cement, suitable for fastening the tyres on bicycle wheels, may be made by digesting during three or four weeks with frequent agitation 1 part of shellac in 10 parts of liq. ammon. fort. in a wide-mouthed bottle, placed in a warm spot. The mixture first forms a transparent mass and then becomes liquid.

J. E. L.—You are recommended, to test the iodine used.

W. Wilkinson.—We understand that the subject is already being inquired into and therefore defer the publication of your letter for the present.

A. B.—We do not remember the experiments. Are you thinking of Professor Tyndall's paper on the "Conversion of Radiant Heat into Sound"? (See *P. J.*, [3], xii., 628).

Communications, Letters, etc., have been received from Messrs. Burchell, Cock, Dispenser, J. E. L., N. B., A. P. S., T. G. R.

"THE MONTH."

At the drug sales this month an unusually large quantity of assafœtida was offered and some very fine "Socotrine" aloes. The Socotrine aloes above alluded to came in small tin dishes and in small white saucers, in which the juice had apparently been poured to solidify it. On account of the bad quality of this drug in recent years the cultivation of the aloe yielding it is deserving of the attention of planters in the colonies, especially since the plant (*Aloe Perryi*) has been brought to Kew Gardens by Professor J. B. Balfour and there can be no great difficulty in obtaining it for cultivation. There was also exposed for sale a large white-looking variety of jalap from Mexico, which bore some resemblance to what has been described as stalk jalap (*Ipomœa Orizabensis*). A root was also offered (apparently from the west of Africa) under the name of pareira brava root, which resembled the genuine article in the black colour of the exterior surface, but was evidently not the root of *Chondrodendron tomentosum*, the concentric rings being narrower and of much more dense structure. This false pareira brava was offered without reserve and there were 164 "pockets" of it for sale. It was bought at a low price by one or two firms, and may, therefore, be expected to be met with in retail commerce. It was interesting also to note among the drugs offered for sale "Syrian" cummin seed, showing that cummin is still an article of commerce in that country as it was in the times of the Evangelists. There were also a number of Brazilian drugs, including one not observed before, "tinguasseba" bark (*Xanthoxylum Tinguaciba*, St. Hil.), which is used in Brazil for intermittent fevers. Some bark of the balsam of peru tree from which the balsam had been prepared was put up for sale, but for what purpose it was imported did not appear.

The unusually fine and mild weather of the last few weeks has in many places caused a most precocious development of vegetation. The coltsfoot was seen in blossom on December 30, wild primroses were sold in the streets early in the month, and the roses are already putting forth green leaves in the gardens. In a list of plants given in *Nature* (January 10, p. 236), to call attention to the mildness of the season, there are mentioned among others *Centaurea Scabiosa*, *Achillea Millefolium*, *Pimpinella Saxifraga*, *Pastinaca sativa* and *Rumex crispus*. These were gathered on December 24 and 26, in the neighbourhood of Bath and Bradford-on-Avon. A correspondent at Reigate forwarded on January 14 a box full of blossoms of *Chrysanthemum segetum*, gathered in a turnip field. Another correspondent writes this week that in the neighbourhood of Poole the catkins of the willows are open and camellias are in full bloom out of doors, and on all sides there are reports of plants in blossom which are rarely seen in that condition in January. It is quite possible, however, that this may not be the case in sandy or dry soils, since the Kew Gardens do not present signs of unusually early vegetation. The Christmas rose, *Helleborus niger*, is in full bloom and the bearsfoot (*Helleborus fœtidus*) is already in bud; but the mezereon does not appear as yet to have opened its flower buds, and neither the Jeffersonia nor Sanguinaria, both early flowers, have made any start. In the Economic House the nutmeg is coming into flower, and the *Olea fragrans* perfumes the whole compartment with its delicate odour.

At the meeting of the Linnean Society held on January 17, Mr. J. G. Baker read a paper on the tuberous species of *Solanum*. There have been about nine hundred species described as belonging to the genus, which, however, Bentham and Hooker could reduce to about seven hundred. Only a very small proportion of these have tuberous underground stems; this section including, according to M. Dunal's monograph in De Candolle's 'Prodromus,' twenty species, all natives of the South American continent, and as far north as Mexico and Texas. These twenty species Mr. Baker thinks should be reduced to six, with well-marked specific characters. While from a botanical point of view the range of *Solanum tuberosum* has thus been unduly narrowed by separating from it forms which are not specifically distinct; from a popular point of view it has, on the other hand, been erroneously extended, from the fact that the late Mr. Darwin, in his 'Voyage of the *Beagle*.' described the potato as growing as far south as 50° S. lat. But Mr. Baker has clearly determined that the species gathered there by Mr. Darwin is not *Solanum tuberosum*, but a quite distinct species, *S. Maglia*. The geographical range of the true *S. tuberosum* extends from Chili to Mexico, though it is doubtful to what extent it is native in the equatorial regions, having been cultivated from time immemorial by the Indians. Besides *S. Maglia*, the most important of the tuberous species are *S. Commersoni*, widely dispersed through Uruguay and Paraguay, and *S. Jamesii*, a native of New Mexico. The tubers of the latter species are, however, very small, not much larger than a hazel-nut. The remaining species are but little known, and probably are of no economic value. The only one ever cultivated in Europe is *S. Maglia*, which was at one time grown at Chiswick by Mr. Sabine, but has long gone out of cultivation. By a visit to the establishment of Messrs. Sutton at Reading, Mr. Baker satisfied himself that all the potatoes grown in this country are varieties of *S. tuberosum*. As regards any practical hints to potato growers, Mr. Baker pointed out that the whole energy of cultivators has been thrown into the production of the tuber at the expense of the flower and seed, a proceeding which cannot fail ultimately to decrease the vigour of the plant, and render it an easy prey to the attacks of enemies, animal or vegetable. The early spring varieties now never flower. An experiment of Andrew Knight's demonstrated that if the tubers are removed, or the supply of food to them restricted, the plant at once commences to flower. It would be quite worth while for potato growers to turn their attention to the cultivation of others of the American tuberous species, especially *S. Maglia* and *Commersoni*. The former in particular, coming from Southern Chili, would appear to be especially adapted for cultivation in Scotland and Ireland, its native country being much more rainy than that of *S. tuberosum*. Hybridizing might also be tried with advantage. The annual value of the potato crop in the British Isles Mr. Baker estimates at not less than £20,000,000.

On December 17, Professor Dickson read a paper before the Royal Society of Edinburgh, "On the Structure of the Seedling Pitcher of Nepenthes." He has found that there is a row of button or cushion-shaped glands just within the inflexed edge of the rim of the pitcher, and in the adult plant he has discovered just above the free edge of the inflexed rim a single line of orifices alternating with the ridges of the rim. Each of these proved, on dissection, to be the opening of a canal-like furrow, from the base of which a cellular nipple-shaped gland, or rather the apex of one, projects, the bulk of the gland being immersed in the substance of the rim. The glands vary in length, according to the species, from $\frac{1}{37}$ (*N. ampullaria*) to $\frac{1}{12}$ of an inch (*N. distillatoria*, *N. phyllamphora*). These glands are believed by Professor Dickson to secrete honey.

In the *Journal of Botany* for this month, Mr. H. Groves gives an illustration and description of the new British *Chara*, *C. Braunii*, Gm., which was discovered by Mr. C. Bailey, near Reddish, Lancashire. In the same journal Mr. F. Townsend has some interesting remarks on *Erythræa capitata*, Willd, var. *sphærocephala*, Towns., showing that the flowers are evidently proterogynous, and that in consequence of the exterior surface of the petals of the unopened flowers being of a brighter colour than the interior at the time when the stigma is protruded, the colour of them attracts insects, so that cross-fertilization is ensured. After fertilization the corolla grows longer so as to enclose the stigma, and the anthers are protected until they have matured.

Mr. C. Woolley Dod, in the *Gardeners' Chronicle* (Jan. 19, p. 90), has pointed out a curious habit in one of our rare British plants, *Lithospermum purpuro-cæruleum.* He has observed it on limestone rocks in the Vale of Clwyd, Denbighshire, where he noticed that the terminal tufts of leaves at the apex of the shoots put forth roots which, when the arched stem touched the ground late in the year, entered the ground and formed new plants, the connecting stem decaying and ultimately disappearing. The same habit has been observed in another rare British plant, *Scirpus Holoschœnus*, in which the roots are given off at the base of the inflorescence. It may also be commonly observed in brambles, but does not appear to have been previously recorded concerning the *Lithospermum*, which, at least in Devonshire, ripens its fruit freely. It would be interesting to know if this be the case also in Denbighshire.

Mr. W. Watson, in the same journal, gives an account of the germination of the *Nymphæa*, with an illustration exhibiting the curious pseudo-endogenous character of the embryo and germination, which taken in conjunction with the endogenous structure of the rhizome and the hydrocharoid habit of the plant has led to the genus being referred by some authors to the *Endogenæ.* Mr. Watson shows that although one group of species open at night and another during the day this is not affected by reversing the conditions, those which open during the night doing so even in brilliant gas light, but refusing to open during the day when kept in total darkness. He finds also that the pollen will sink in water, and is therefore not likely to be floated away from the flowers.

A very pretty little marsileacean plant from Carolina, *Azolla Caroliniana*, has recently become naturalized in a large pond near Pinner, Middlesex, in which it overrides the duckweed; it is also spreading on other ponds of the neighbourhood, apparently having originated from private gardens close by ('Science Gossip,' Dec., p. 279).

M. C. Naudin furnishes an interesting account (*Annales Sc. Nat.*, [6], vol. xvi., p. 337) of the species of *Eucalyptus* introduced into the Mediterranean region, and more particularly of those which have arrived at the adult stage in France and Algeria, thirty years having now elapsed since the culture of the species of this genus was commenced in France. He states that so far as regards production in timber alone the *E. globulus* has four times the value of the oak tree, since the growth of twenty-five years equals that of an oak of one hundred. By cutting down the trees in the winter, when the wood has the least sap in it, the tendency of the wood to split is avoided. He makes the suggestion that in the future a residence in the *Eucalyptus* groves of Algeria may become a part of the treatment prescribed to sufferers from phthisis. The astringent bark of the tree, which is shed naturally and thus has an advantage over such as are obtained only by the destruction of the tree, might, he believes, be used in the manufacture of leather. Owing to the rapid growth of the tree it is also likely to prove of great value as firewood, which, in France, is an important consideration. *E. melliodora* he considers not only valuable as a decorative tree, but also for the bee-keeper, on account of the abundance of fragrant flowers which it bears.

Chlorophyll has been the subject of a considerable number of investigations, but the problem of its nature and constitution remains at present far from being solved. Dr. Schunck, attacking the question from the chemical side, has in a communication to the Royal Society made known his reasons (*Chem. News*, xlv., 5) for supposing that it is a glucoside, resembling in this respect certain other colouring matters that occur ready formed and in a free state in vegetable organisms, such as those of turmeric and safflower. The greatest obstacle in deciding this point has been the difficulty experienced in obtaining pure chlorophyll, Dr. Schunck considering the so-called "crystallized chlorophyll" to be really a decomposition product. The process followed was to extract spinach leaves with boiling alcohol, filter off the deposit that formed after a time and mix with the tincture an equal volume of ether and about two volumes of water. Upon standing the liquid separated into two layers, the upper one green and containing all the chlorophyll, the lower bright yellow and containing colouring matter and a substance reducing Fehling's solution. The upper layer was separated, a little fresh ether added, and again washed with water, the process being repeated until the fresh lower layer ceased to give the glucose reaction. The upper layer then left upon evaporation a bright green residue, which although not pure chlorophyll was free from all matter soluble in water. This residue treated in the cold with concentrated sulphuric acid formed a green solution, which after standing some time gave on the addition of water a dark green precipitate, consisting essentially of the phyllocyanin and phylloxanthin of Fremy, whilst the filtered liquid gave the glucose reaction. Dr. Schunck therefore infers that the green leaves of all plants contain a glucoside, insoluble in water, but soluble in alcohol and ether, and that this is probably chlorophyll.

The separation of digitalin and the bodies which accompany it in *Digitalis purpurea* has been the subject of many communications. The method usually followed in Germany depends upon digitalin being precipitable by tannic acid, whilst the French method is based upon digitalin and digitin being thrown down by water from an alcoholic extract of the plant, the digitalein, being easily soluble in water, remaining in solution. Herr Palm recommends (*Zeits. anal. Chemie*, xxiii., 22) a process for the separation and quantitative determination of digitalin, digitalein and digitin, which consists in treating an aqueous extract of the plant that has been completely decolorized by repeated filtration through animal charcoal with a solution of lead acetate and alcoholic ammonia, then making the precipitate, which consists of the glucosides in combination with lead oxide, into a thin paste with water, and decomposing it by means of sulphuretted hydrogen. Upon filtration the digitalein passes into the aqueous filtrate; whilst the digitalin can be removed from the residue on the filter by treatment with chloroform and the digitin by means of alcohol. Picrotoxin and solanin are also thrown down under similar conditions; but whilst the digitalin precipitate is gelatinous and becomes flesh-coloured upon the addition of concentrated sulphuric acid, a picrotoxin precipitate is more slimy and coloured saffron yellow by sulphuric acid, and a solanin precipitate is sandy, and with sugar and sulphuric acid becomes first violet and then blne.

"Cascara amarga," also known in commerce as "Honduras bark," obtained from a tree indigenous to Mexico, has been submitted to examination by Mr. Thompson in the laboratory of Messrs. Parke, Davis and Co. He reports (*Ther. Gazette*, v., 8) that he has isolated from it a crystalline alkaloidal substance, which is freely soluble in chloroform, less soluble in ether and benzine and insoluble in dilute acids and fixed alkalies. Only amorphous salts of this substance were obtained, which were freely soluble in water, but insoluble in chloroform or ether. As the plant yielding the bark is supposed to belong to the genus *Picramnia*, it is proposed that the alkaloid, of which the yield is about 3 per cent., should be named "picramnine."

Dr. Hesse has been engaged upon an exhaustive investigation of the derivatives obtained from morphine by treatment of the base with acid anhydrides, using acetic and propionic anhydrides. He reports (*Annalen*, ccxxii., 203), that his experiments show that in morphine there are only two atoms of hydrogen which can be replaced by radicals of the fatty acid series,—such as acetyl or propionyl,—thus confirming previous statements that the base contains only two hydroxyl groups. But these two hydroxyl groups do not both stand in the same relation to the morphine, the hydrogen of one of them being replaceable by an acid radical and the other either by an acid or an alcohol radical It is to the latter hydroxyl that the phenol-like character of morphine is attributable.

In the new periodical, *The Asclepiad* (p. 91), there is an illustrated description of Mr. A. W. Blyth's cochineal test for lead in water. This consists in adding ten drops of a one per cent. solution of cochineal in proof spirit to an ounce of the suspected water, placed in a white porcelain dish. If the water be free from lead the cochineal colour will remain unaffected, but if it contain one part of lead in seven hundred thousand it will be changed to a purple pink, whilst with one part of lead in seventy thousand it will become purple blue. By a slip in the text one grain in ten gallons is represented as equal to one part in seven hundred.

The sophistication of quinine sulphate with a cinchonine salt, which occurred some time ago in Paris, has occasioned the issue by the French War Department of an official test for the purity of the samples of quinine sulphate that may be submitted to that department, and the test is an exemplification of the truism that a little knowledge is a dangerous thing. Among the nine tests that are given it is required that the sample shall be white, homogeneous and crystalline; and that when calcined it shall not leave a residue exceeding 25 centigrams per 100 grams (that is, 0·25 per cent.). It should not contain any quinidine, salicin or other foreign matters; its aqueous solution should be perfectly clear and alkaline to test-paper; moreover, it should consist of quinine, 76·25; sulphuric acid, 9·42; water driven off at 100°, 12·00; water combined at 100°, 2·33. Finally, the quantity of cinchonine admitted by tolerance should not exceed "two-hundredths." Apart from the other singularities in these requirements, no mention is made of cinchonidine, the alkaloid commonly occurring in samples of commercial quinine sulphate, and it is difficult to understand the reason of fixing the limit of water at 12 per cent.

According to Dr Hager (*Ph. Central.*, xxiv., 570), benzoate of soda prepared from "resin benzoic acid" (*i.e.* benzoic acid prepared from resin by the wet process) is said to be more active than the benzoate prepared from artificial acid. As a means to distinguish between the two, he recommends to dissolve 0·1 gram of the benzoate of sodium in 10 c.c. of water and add to the solution 20 drops of solution of potassium permanganate (presumably the P.G. volumetric solution, 1 gram in a litre). The resin benzoate causes no change of colour within an hour, whilst with the "artificial" benzoate the permanganate undergoes reduction within half an hour. The assumption that the term "resin acid" indicated the sublimed acid, which Dr. Hager says is incorrect, has given rise to some criticism of this test, marked by the acrimony that appears to be inseparable just now in Germany from any discussion referring to the action of potassium permanganate upon benzoic acid.

In a pamphlet issued by Messrs. Schering, of Berlin, which contains an interesting account of the experiments made by Dr. Cervello and others with paraldehyd, some surprise is expressed that notwithstanding the results obtained with this compound as a hypnotic it has not yet come more widely into use. This, it is thought probable, is due to some extent to the unfavourable impression caused sometimes by the use of an impure article, and mention is made of a preparation, labelled "pure paraldehyd," which not only contained acetaldehyd, boiling at 20° C., but was contaminated also with the poisonous amylaldehyd. The characters of pure paraldehyd, as given in this pamphlet, are that it should have a specific gravity of 0·998 at 15° C., boil at 124° C., solidify at 10° C., mix in all proportions with alcohol and ether and with 10 parts of water at 15° C. On account of its complete solubility in water, paraldehyd is said to be most conveniently administered in aqueous solution, with an addition of a suitable syrup.

A considerable amount of attention has been paid recently to the preparation of a "tasteless tannate of quinine," but a series of experiments made by Mr. C. E. Field (*Pharm. Record*, iv., 5), using solvents representing the gastric juice, as well as gastric juice obtained from a dog, have led him to the conclusion that as a remedy representing quinine the tannate is comparatively valueless in consequence of its insolubility. Further, when given to adults in doses of ten grains it failed to produce the usual effects of quinine.

In a paper contributed to the New York *Medical News*, Dr. Da Costa has published the result of observations made by him, following the administration of some salts of nickel in the treatment of certain nervous diseases, and has recommended the use of a syrup of nickel bromide. According to Mr. Genois (*Pharm. Record*, iv., 5) this syrup can be conveniently prepared by the direct combination of the elements and the addition of sugar to the solution obtained. He gives a formula for preparing it of a strength corresponding to five grains of the salt in each teaspoonful, which consists in mixing together 468 grains of bromine, 172 grains of granulated zinc and 16 fluid ounces of water, promoting the reaction by the aid of a very gentle heat, when it is completed adding 25 troy ounces of sugar, and after straining mixing with sufficient syrup to measure a quart.

In the *British Medical Journal* (Jan. 19, p. 103) Dr. G. C. Kingsbury recommends the use of chloral for persistent hiccough, a dose of 30 grains having proved sufficient to stop the hiccough after the patient had suffered incessantly from it for twelve days.

A few years ago Dr. Luton, of Rheims, stated that strychnia is the antidote for alcoholic intoxication, and that the presence of strychnia in alcoholic drink ought to be authorized by the Government. M. Dujardin Beaumetz contributed some interesting remarks on this subject at a meeting of the French Temperance Society, in which it was stated that strychnia had been found to combat the symptoms of drunkenness and also of acute delirium, but that it does not at all prevent or modify the condition of the organs injured by excessive drinking of alcohol (*Brit. Med. Journ.*, Jan. 19, p. 132).

It was lately proposed by M. A. Gerard, at the Academy of Sciences, to destroy by means of sulphuric acid the bodies of animals dying of virulent diseases; but M. Regnard (*Revue Medicale*, Dec. 1) now points out how easily bodies might be made away with by means of a liquid so readily procurable, and suggests that some restriction should be placed upon its sale. His experiments on dead newly born infants showed that the body entirely disappeared when digested with twice its weight of commercial sulphuric acid for twenty-six or thirty hours, leaving no trace except the presence of some fat, phosphoric acid and nitrogen (*Med. Times*, Jan. 5, p. 32). It by no means follows, however, that the bony structure of an adult would leave no traces or would dissolve so easily, as seems to be taken for granted.

Although numerous remedies have been proposed from time to time for the cure of hydrophobia, hardly any of them appear to have been the object of careful physiological experiment. Some months ago Professor Bouley communicated to the Academy of Medicine of Paris a case in which hydrophobia had been apparently cured by the administration of pilocarpine. The use of garlic in the same disease has also recently been revived. M. Gibier, desirous of ascertaining whether these drugs were of any real value, has submitted them to the test of careful experiments (*Comptes Rendus*, xcviii., p. 56), and has found that rats inoculated with the poison, in spite of being fed with a mixture of meat and garlic every day to the extent of 4 grams of garlic per day, succumbed to the disease in ten or thirteen days, even when their systems had been saturated with garlic by feeding on it a month previous to inoculation. Garlic, therefore, is neither a prophylactic nor an antidote to the poison. The same results followed the trial of hydrochlorate of pilocarpine as a remedy. The cats and rats experimented on died of hydrophobia, and the inoculation of the nervous matter produced the same disease in other subjects of experiment.

Dr. W. C. Gregg directs attention (*Brit. Med. Journ.*, Jan. 12, p. 56) to the great value of vinegar in *post-partum* hæmorrhage, a fact which cannot be too widely known, as vinegar is almost sure to be at hand and in such cases immediate action is required. He discovered its value by accident. He had ordered a wineglassful of brandy, and vinegar was administered by mistake; it had, however, the desired effect, the hæmorrhage ceasing immediately. Subsequent trials proved it to be superior to ergot in rapidity and certainty of action; so much so that it is not advisable to give it until after removal of the placenta.

The value of oil of hypericum for bedsores, as recommended by Dr. H. S. Snow, receives further confirmation from Mr. F. Clark, honorary consulting surgeon to the Leamington Provident Dispensary, who says he has used it with manifest advantage in severe cases. He adds that the oil requires exposure to the sun for three months to acquire the reddish brown tint. The name of the species of *Hypericum* from which the oil is derived is given in the *British Medical Journal* (January 5, p. 9) as "*Hypericum medium perforatum* which flowers in July." The name, however, will not be found in any work on British botany. *Hypericum perforatum* is a well-known plant, but why the word "*medium*" is used it is difficult to understand, as there is no variety of that name mentioned either in English botany or in De Candolle's 'Prodromus.' The remarks in Sowerby's 'English Botany,' ii., p. 146, indicates that *H. perforatum* is probably the plant intended, since it is stated under that species, "In country districts it is sometimes still used as a medicine, and oil in which the shoots or flowering tops have been steeped is sold by herbalists as oleum hyperiæ." Gerarde says of it, "a balsam prepared from it is a most precious remedie for deep wounds and those that are thoro the body, for the sinues that are prickt or any wound made with a venomed weapon. Dioscorides says: The seed drunke for the space of forty daies together cureth the sciatica and all aches that happen in the hips." The writer has known an ulcerated leg to be healed simply by the application of the bruised leaves of a shrubby garden species of *Hypericum*. Doubtless the properties of the plants of the genus are worth investigating, and may possibly, like the now disused willow bark and meadowsweet, be found to contain a substance as useful in other ways as the salicin contained in those two plants.

In continuation of the subject of the administration of anæsthetics, M. Paul Bert has recently communicated to the Paris Biological Society some details concerning his method of administering chloroform mixed with air (*Brit. Med. Journ.* Jan. 19, p. 132). He states that with such a mixture anæsthesia is reduced more slowly, but also more peacefully, the period of agitation being generally absent. The patient continues to sleep after the cessation of the inhalation, allowing of the dressing being effected painlessly, and upon waking is always calm and cheerful. As a rule a mixture in the proportion of eight grams of chloroform with one hundred litres of air is easily endured, and less chloroform is necessary than is generally required, from 15 to 20 grams sufficing for operations lasting as many minutes. It was also stated by M. Dubois, the principal of M. Bert's laboratory, that anæsthesia is more rapidly induced during alcoholic intoxication.

Dr. A. H. Hassall has continued his experiments on the best mode of administering inhalations, and in the *British Medical Journal* (January 12, p. 47) he shows that the atmosphere of a room can be impregnated with disinfecting agents to an extent and with a rapidity dependent on the surface exposed to diffusion and the vitality of the substance employed. Thus 616 grams of thymol melted in hot water in a dish having a superficies of 64 inches entirely disappeared in twelve hours, being exposed during that time to a temperature of 161·6° F. For the same reasons creasote sprinkled on a towel was found not to volatilize so quickly as when a towel was dipped in a solution of it; less surface being exposed to diffusion in the first case than in the latter.

A subject has been brought forward by Dr. Carter Moffat, which, interesting in itself, stands some risk of being brought into derision by absurd statements made in connection with it. The fact that the inhalation of some gases is followed by perceptible effects upon the *timbre* of the voice is well known, and the observation might be well worth following up from a musical point of view. But according to certain statements Dr. Moffat's alleged discovery was arrived at in a different way. Assuming that there was a connection between the fame of Italian vocalists and the atmospheric conditions of their native country, it is said that he made repeated analyses of the air and dew in different districts of Italy and found peroxide of hydrogen and free ammonia always present. He therefore attempted to imitate these conditions, and this it is claimed he is able to do by means of inhalations through an instrument which he calls an "ammoniaphone," described as containing an absorbent material saturated with peroxide of hydrogen combined with ammonia and other ingredients. This "portable artificial Italianized air" is credited with remarkable physiological properties, since, as the result of fourteen days' experiments, it is said to have caused an expansion of Dr. Moffat's chest half an inch, and to have converted his voice, which was previously weak, harsh and destitute of intonation, into a pure tenor of extraordinary range. Demonstrations of the effect of inhalations through the ammoniaphone have been given in connection with lectures delivered at Glasgow, and according to the *Evening News* "the results were highly satisfactory."

A patent has been taken out in Germany by Messrs. Vorster and Grüneberg, for a process for preparing what they term "dry sulphuric acid," which resembles one already followed in the preparation of dynamite. It consists in saturating dry and finely powdered "kieselguhr" with three or four times its weight of 66° sulphuric acid. The product, which, therefore, represents at least 75 per cent. of its weight of absolute acid, is said to retain the pulverulent form, and the advantage claimed is that in this condition it can be transported by land or sea in lead-coated sheet iron vessels without danger of breakage. When required for such purposes as petroleum refining, the manufacture of dynamite, or the production of carbonic acid gas for aerated waters, it is stated that the "dry" acid can be used without previous treatment, the finely divided condition in which it is present in the powder being indeed advantageous in some instances; but where necessary, the strong acid may again be obtained in the liquid condition by a systematic washing of the powder, the "kieselguhr" remaining unacted upon and fit for use in a fresh operation. The process can also be applied to the other mineral acids.

Some interesting details of comparative experiments as to the value of calcium chloride and strong sulphuric acid as exsiccating agents have been published by Dr. E. Fleischer (*Zeits. anal. Chemie*, xxiii., 33). In order to avoid repeated weighings to ascertain the point at which the weight became constant, Dr. Fleischer introduced a delicate hygrometer by Lambrecht, by which he was enabled to observe the point at which no further change took place. The results obtained seem to show that both in respect to rapidity and completeness of the dehydration effected calcium chloride is far inferior to sulphuric acid. The apparatus used was a bell-glass of 2266 c.c. capacity, ground to fit air-tight upon a glass plate, within the bell-glass being placed the hygrometer and a glass vessel an inch in height and half the diameter of the bell, to contain the hygroscopic material. When the glass dish was covered with 60 grams of fused calcium chloride, in pieces about the size of a hazel nut, and covered over with the bell-glass, the hygrometer, which at first showed 62 of relative moisture, or equal to 10 grams of water vapour per cubic metre of air, fell in two hours to 31°, four hours to 25°, in six hours to 21°, and then remained stationary; only an imperfect dehydration had been effected, therefore, in that time. When, however, the calcium chloride was replaced by 20 grams of concentrated sulphuric acid, the hygrometer, which at first stood at 67° fell in thirty-five minutes to 30°, in fifty-five minutes to 18°, and in one hundred and five minutes to 0°.

In a communication to the Royal Society (*Proceedings*, xxxv., 345), Dr. Tilden and Mr. Shenstone have given an account of some experiments made with the view of determining the solubility of salts in water at temperatures above the boiling point of water. The main conclusion arrived at is that solubility is directly related to fusibility. When salts usually crystallizing in the anhydrous state are written down in the order of their melting points, it is observed that increase of solubility consequent upon a rise of temperature above 100° C. is greatest in the most fusible, the others following regularly in order of their fusibility, and that the higher the melting point of a compound the more nearly does a curve representing its solubility at temperatures above 100° C. approach a straight line.

In a communication to *Nature* (Dec. 20 and 27) Mr. Barlow puts forward an ingenious theory as to the probable nature of the internal symmetry of crystals. Mr. Barlow is of opinion that in the atom-groupings of a molecule the several atoms occupy distinct portions of space and do not lose their individuality. He therefore first proceeds to inquire what number of very symmetrical arrangements of points or particles in space are possible. Of these he describes five, and he argues that every one of the various symmetrical forms presented by crystals can be shown to be consistent with the subsistence of an arrangement of the atoms of the crystallizing compound in one or other of these five kinds of symmetry at the time when crystallization begins. It is not meant by this that there are only five forms of crystallization; for although two of these kinds of symmetrical arrangement admit of no variation, in which compounds containing an equal number of atoms of two kinds have the atoms built up regularly, so that in one case each point is equidistant from the nearest eight points, and in the other equidistant from the nearest six points (cubic system), in the remaining three kinds, where the numbers of the dissimilar atoms in the molecule are unequal, a considerable amount of variation is possible in the arrangement of the third layer. Hence, whilst as a rule compounds consisting of an equal number of atoms of two kinds crystallize in cubes, in the case of water, where the dissimilar atoms are in the relation of 1 : 2, the arrangement of the atoms, according to the above theory, is capable of taking the form either of a six-sided prism or a rhombohedron.

Encouraged by his advance upon the results previously obtained by Messrs. Pictet and Cailletet, in the liquefaction of oxygen under the influence of the cold produced by the vaporization of liquid ethylene in a vacuum combined with pressure, M. Wroblewski has been pursuing his experiments upon the liquefaction and solidification of gases with some further success. He reports (*Comptes Rend.*, xcvii., 1553) that when a considerable quantity of liquid oxygen is caused to "boil" by the sudden removal of the pressure it does not solidify like carbonic acid, but leaves a crystalline residue at the bottom of the vessel, which disappears as the temperature commences to rise. The temperature at the moment of the formation of these crystals is estimated to be as low as – 186° C., and when liquefied nitrogen was submitted to this cold, by enclosing it in the vessel in which the oxygen was liquefied, and the pressure upon the nitrogen then slightly removed, it fell like snow, in crystals of a considerable size. In a subsequent communication (*Comptes Rendus*, xcviii., 149) M. Wroblewski states that hydrogen refrigerated by "boiling" oxygen is liquefied upon being released from pressure.

Last week, Professor Hughes read before the Institute of Mechanical Engineers an account of his further researches on the physical condition of iron and steel. In a previous paper (*Pharm. Journ.*, [3], xiii., 685), Professor Hughes stated his reasons, based upon the results of experiments with his induction balance, for believing that the molecules of soft iron, and even of hard drawn iron, are much less rigid as regards motion among themselves than the molecules of tempered steel. Since then he has continued his experiments and arrived at conclusions that he formulates as follows: (1) the magnetic capacity is directly proportional to the softness or molecular freedom; and (2) the resistance to a feeble external magnetizing force is directly as the hardness or molecular rigidity. Up to the present time mechanical tests as well as chemical analyses have failed to find any distinct line of demarcation between the numerous varieties of steel and iron, and this physical method appears to show that there is no such dividing line. But Professor Hughes is of opinion that by determining the magnetic capacity of a bar or wire of iron or steel a considerable amount of light may be thrown upon its homogeneity and other characteristics.

A "RENNET" FERMENT CONTAINED IN THE SEEDS OF WITHANIA COAGULANS.*

BY SHERIDAN LEA, M.A., TRINITY COLLEGE, CAMBRIDGE.

The Report of the Royal Gardens at Kew for 1881 contains abstracts of correspondence, in which it was pointed out that, in order to introduce a cheese-making industry in India, some vegetable substitute must be found for the ordinary animal rennet, since cheese made with the latter is unsaleable among the natives. In response to the above "Surgeon-Major Aitchison brought to the notice of the authorities at Kew that the fruit of *Puneeria*† *coagulans*, a shrub common in Afghanistan and Northern India, possesses the properties of coagulating milk;" and experiments showed that an aqueous extract of the seed-capsules of the above plant does somewhat rapidly coagulate milk.

I was recently requested to make some experiments on the seeds of *Withania* to determine whether they contain a definite ferment with the properties of ordinary rennet, and the applicability of such a ferment to cheese-making purposes.

The material supplied to me consisted of an agglomerated dry mass of seed-capsules and fragments of the stalks of the plant. When crushed in a mortar the whole crumbled down into a coarse powder, in which the seeds were for the most part liberated from the capsules. I picked out the larger pieces of stalk, sifted out the finer particles, chiefly earth and fragments of the capsules, and then by a further sifting I separated the seeds from the other larger particles. The seeds appeared to be each enveloped in a coating of resinous material, presumably the dried juice of the capsules in which they had ripened.

Taking equal weights of the seeds, I extracted them for twenty-four hours with equal volumes of (i) water, (ii) 5 per cent. sodic chloride, (iii) 2 per cent. hydrochloric acid, (iv) 3 per cent. sodic carbonate. Equal volumes of each of the above were added in an acid, alkaline, and neutral condition to equal volumes of milk, and heated in a water-bath at 38° C. The milk was rapidly coagulated by the salt and sodic carbonate extracts, much less rapidly by the other two; of the four, the salt extract was far the most rapid in its action. All subsequent experiments have shown that a 5 per cent. solution of sodic chloride is the most efficient in the extraction of the active principle from the seeds.

There is no doubt that the substance which possesses the coagulating power is a ferment closely resembling animal rennet.

I. A portion of the 5 per cent. sodic chloride extract loses its activity if boiled for a minute or two.

II. The active principle is soluble in glycerine, and can be extracted from the seeds by this means; the extract possesses strong coagulating powers even in small amounts.

III. Alcohol precipitates the ferment body from its solutions; and the precipitate, after washing with alcohol, may be dissolved up again without having lost its coagulating powers.

IV. The active principle of the seeds will cause the coagulation of milk when present in very small quantities, the addition of more of the ferment simply increasing the rapidity of the change.

V. The coagulation is not due to the formation of acid by the ferment. If some of the active extract be made neutral or alkaline and added to neutral milk, a normal clot is formed, and the reaction of the clot remains neutral or faintly alkaline.

VI. The clot formed by the action of the ferment is a true clot, resembling in appearance and properties that formed by animal rennet, and is not a mere precipitate.

Having thus determined the presence of a rennet

* Communicated by Professor M. Foster, Sec. R.S.—From the 'Proceedings of the Royal Society.'

† The genus *Puneeria* is now reduced by botanists to *Withania*.

ferment in the seeds, I endeavoured to prepare an active extract, which should be applicable for cheese-making purposes. All the extracts of the seeds are of a deep brown colour, and it appeared, therefore, in the first place, desirable to obtain less highly coloured, if not colourless, solutions, which should still be active. In this I have so far failed. The precipitate caused by alcohol carries down the chief part of the colouring-matter also, so that on being subsequently redissolved the solution is nearly as highly coloured as before the precipitation. The colour can be removed by using animal charcoal, but the ferment is at the same time destroyed. If all excess of charcoal is avoided and the solution is filtered at once, the filtrate is largely decolorized, but contains only traces of the ferment. Animal rennet is similarly removed by filtration through charcoal. The colour can be removed by the addition of very finely-powdered kaolin in a dry state, but, as before, the ferment activity is thereby destroyed. The same holds good of animal rennet. The colouring-matter is scarcely soluble in either ether or alcohol, so that no advantage is gained by a preliminary treatment with these before extraction with the salt solution. I have also endeavoured to get rid of the colour by treating the seeds as rapidly as possible with successive quantities of water before making the final extract. By using a centrifugal machine I was able to wash the seeds six or seven times with large volumes of water without their being exposed for any considerable time to the action of the water. Each portion of water was highly coloured and the seeds were thus freed from adherent colouring-matter. But, apart from the fact that some, though not much, ferment is thus lost, no special advantage is obtained, since the seeds are themselves coloured, and even after prolonged treatment with water the final extract is always of a dark brown colour.

In order to obviate the disadvantages of this colouring-matter, if disadvantage it is, I have found it best to prepare very concentrated active extracts of the purified seeds, so that it should only be necessary to add a very small quantity of the extract in order to coagulate the milk and obtain a colourless curd. This I have done by grinding the dry seeds very finely in a mill and extracting them for twenty-four hours with such a volume of 5 per cent. sodic chloride solution that the mass is still fluid after the absorption of water by the fragments of the seeds as they swell up. From this mass the fluid part may be readily separated by using a centrifugal machine (such as is used in sugar refining), and it can then be easily filtered through filter-paper; without the centrifugal machine the separation of the fluid from the residue of the seeds is tedious and imperfect, 40 grams of the seeds treated as above with 150 cubic centims. of 5 per cent. sodic chloride solution gave an extract of which 0·25 cubic centim. clotted 20 cubic centims. of milk in twenty-five minutes, and 0·1 cubic centim, clotted a similar portion of milk in one hour. When added in these proportions the curd formed is quite white. The presence of the colouring-matter is, however, perhaps on the whole unimportant, since even if a larger quantity of the ferment extract is added in order to obtain a very rapid coagulation the colouring matter is obtained chiefly in the whey, the curd being white.*

The question of preparing an extract which should be capable of being kept for a considerable time is perhaps of importance. Ordinary commercial rennet usually contains a large amount of sodic chloride and some alcohol. One specimen I analysed contained 19 per cent. of common salt, and 4 per cent. of alcohol. I have, therefore added to the 5 per cent. chloride extract mentioned above, enough salt to raise the percentage of this to 15 per cent., and also alcohol up to 4 per cent. The activity of the extract is not appreciably altered by this, and such a preparation corresponds very closely in activity with a commercial solution of animal rennet with which I compared it. The possibility of making extracts which may be expected to keep is thus indicated, but of course time alone will show whether the activity of the ferment is impaired to any important extent by such keeping.

I may add in conclusion that I have coagulated a considerable volume of milk with an extract such as I have described, and prepared a cheese from the curds. I have also given a portion of the extract to a professional cheese-maker who has used it as a substitute for animal rennet in the preparation of a cheese. The product thus obtained, and the statements of the person who has made the experiment for me, lead me to suppose that extracts of the seeds of *Withania* can be used as an adequate and successful substitute for animal rennet.

* It is extremely probable that some stage in the growth or ripening of the seeds of *Withania* might be found at which the development of colouring-matter is slight, while at the same time the ferment is present in considerable quantity.

THE HYPOPHOSPHITES WITHOUT SYRUP.*

Dr. G. S. Gerhard recommends the following formula: —℞ Calcii hypophosph., Potassii hypophosph., Sodii hypophosph., āā gr. j; Quiniæ hypophosph., Mangan. hypophosph., āā gr. $\frac{1}{4}$; Ferri hypophosph., gr. $\frac{1}{2}$; Strychniæ hypophosph., gr. $\frac{1}{120}$; Glycerini, ♏iij; Liq. acid. hyposulph., ♏ij; Aq., ad fl. ℥j. The addition of a definite amount of hyposulphurous acid prevents the precipitation of at least two of the salts (those of iron and manganese). The solution is clear, slightly fluorescent and pleasantly acid. This formula is certainly an improvement on the ordinary syrups, the excess of sugar in which often decreases the appetite and deranges digestion. Two minims of acid. phosphoric. dilut., B.P., if substituted for the hyposulphurous acid in the above formula, appear to be equally efficacious in preventing precipitation. If the iron and manganese be omitted, a few drops of dilute hydrobromic acid serve to maintain the other ingredients in clear and permanent solution.

THE PRESS ON THE SALE OF POISONS.

From the Saturday Review, *January 26.*

It is high time that some steps should be taken to amend the present state of the law on poisons. Many of us have been long under the happy delusion that the Act of 1868 was quite sufficient for the purpose of protecting the public. But, owing to defects in its wording, it is easily and systematically evaded, and a recent decision of the House of Lords has practically abrogated one of its principal provisions. Not only are poisons openly sold by unqualified people, but so are drugs of other kinds so inferior in quality as either to be useless or else actually deleterious. Nearly all drugs are more or less poisonous at best, but bad drugs are doubly so; and it is difficult even by legislation to protect people who are not learned in their properties. They are absolutely at the mercy of the vendors, who may call any substance by the name of a medicine, and the buyer has no means of ascertaining the truth or falsehood of the description. This view is borne out by many recent examples, and is put forward prominently by some of the most eminent members of the Pharmaceutical Society. In a recent address Dr. Attfield, the President [of the British Pharmaceutical Conference], called public attention to it, and asserted that the present condition of things is worse than before the Act of 1868. The Act prohibited any one from taking the title of "chemist and druggist," and practising under it, without having qualified at an examination, and being placed on the State Register. But by some oversight no provision was made for the case of drug-sellers who did not take the title of "chemist," and the result is that a grocer may keep medicines, and sell them as if they were food or chandlery. Nay more; though the adulteration of food is forbidden, and the buyer is able to judge for himself, with drugs he cannot judge, and the State does practically

* From the *Phil. Med. Times,* November 3, 1883. Reprinted from the *Medical Times,* January 26, 1884.

nothing for his protection. True, the State forbids the sale of ostensible poisons, or rather draws a line between some poisons and others; but even this provision is easily evaded. Under cover of a patent-medicine stamp such poisons as opium, laudanum, and morphia are constantly sold by grocers or general dealers. Soothing syrups alone, which may be bought everywhere, are accountable for a vast number of deaths, and bring up infant mortality, especially in London, to its present appalling figure. It is asserted that in some districts in which opium is largely sold it is put up in regular packets, labelled "Sedative Powder," or some such name, sealed with a $1\frac{1}{2}d.$ stamp, and sold by any one who holds a patent medicine licence. The respectable chemists refuse, as they are bound to do, to sell deadly poisons in dangerous quantities to any stray customer; but it is notorious that in other places—wherever, in short, an unauthorized chemist carries on his trade—the merest formality, such as signing a name, suffices, and the poison is sold, no questions being asked. This is, of course, the strong point in the complaints recently made by the pharmaceutists. It remains to be seen how far they are justified in their protests; but, admitting that the will of the nation was revealed in the Act of 1868, it is difficult to avoid the conclusion that something more must now be done to give it effect.

Oddly enough, the whole question is complicated by another, with which at first sight no one would think it had any connection whatever. We hear enough about the enormities of co-operative stores from tradesmen whose former profits are now cut down; and for the most part we turn a deaf ear to their complaints. The stores are a convenience; and if the small tradesman is unsuited to the spirit of the times, he must go, as other people have had to go in the course of ages. But when the chemists complain of the stores, their case is wholly different. Their complaint may be in part selfish, like that of the grocers, but it is also in part, and that the larger part, for the public good. Co-operative stores have peculiar advantages in the sale of drugs. If they are managed by seven owners or more, they are absolutely in this particular beyond the reach of the Act. According to the recent decisions, a co-operative store may even sell poisons "if no registered assistant is employed," thus simply reversing the obvious meaning and intention, though not, of course, the letter, of the Act. But even as regards single shopkeepers it is inoperative. Professor Attfield gives particulars of many cases, described by his correspondents, in which most drugs are openly sold, and a few in which "not only ordinary poisons, but the scheduled poisons," are also to be had, but under certain bonds of secresy. The druggist who has studied and has passed his examinations has no chance with the unqualified grocer or the storekeepers. They can both undersell him and make capital by pointing out what an extortioner he is. We have knowledge of a certain virulent and deadly poison which can be bought wholesale at about $4d.$ the pound, but which a chemist retails at about $4s.$ the ounce, and rightly so. But the unqualified druggist sells it at a moderate price, if he sells it at all, and perhaps binds his customer to secresy as well, thus involving him in a conspiracy to break the law. A single grain of that particular poison has frequently produced death, yet in many different households enough may be met with to poison a regiment. There is a law regarding another poison which seems to be very seldom observed. Sulphuric acid is one of the most easily obtained, and one of the most destructive agencies known of its kind. Hardly a day passes but we read some case of "vitriol throwing." Vitriol being practically colourless may easily escape notice until too late. The public are partially protected against arsenic by its being, when sold in small quantities, coloured with indigo. The rule is frequently evaded, but it should be enforced and applied to sulphuric acid also. Dr. Attfield, in his speech at Southport, was necessarily more immediately concerned with the honour and the standing of his professional brethren than with the convenience or safety of the public; yet it is remarkable how completely the two were shown to be interdependent; and no one can doubt that a lowering in the standing and character of the dispensers of drugs must result, not only in loss to the qualified chemist, but in still more disastrous consequences to the consumer.

The quantity of medicine now prescribed and used is very much less than formerly. In 1830, for example, at St. George's Hospital the cost for every in-patient's medicine was 16*s.* 5*d.* In 1880 it was less than half. Partly this is owing, no doubt, to a cheapening in druggists' wares; but it is also due to the alteration in medical practice. Leeches, for instance, which used to be so frequent, are now seldom seen. Blisters are characterized by some eminent physicians as mere useless torture. Instead of a costly black draught, we have a few pence worth of some pleasant effervescing mixture. The whole aspect of medicine-taking has been altered. Ten years ago, even, a new-born baby received a dose calculated to injure it for life; and twenty years ago all children had medicine once a week, whether they wanted it or not. Mrs. Squeers with her brimstone-and-treacle was no exaggeration. Such scenes as Dickens describes in 'Nicholas Nickleby' were common not only in such places of Dotheboys Hall, but in every large boarding-school, when many of us were almost grown up. At the present day, therefore, the apothecary cannot expect the same sale for his simples as formerly; but the public is not on that account the less justified in demanding greater security and greater excellence. The patent medicine system is liable to all kinds of abuses, and should be abandoned. It brings in a trumpery sum, and is a legalization of quackery. The very name of "patent medicine" is a lie. We have by the abortive Act of 1868 acknowledged that something should be done. The principle is admitted. Of course before 1868 it was open to any one to object that it is "grandmotherly legislation" to interfere with the sale of drugs. But no such argument will hold now, except perhaps with such old ladies and their friends as supported Mr. Stansfeld on a recent occasion. The right of the free-born Briton to make a beast of himself with drink is seriously called in question; but before proceeding to limit the sale of such a comparatively innocuous compound as beer or gin we should endeavour to protect ourselves both from adulterated drugs and also from poisons. Every daily paper contains stories of poisoning. Three have appeared this very week, each of which could have been prevented by proper regulations. A prisoner is poisoned in the very hands of the police. A child is poisoned by a quack. A husband obliterates features he once professed to admire by the use of a little sulphuric acid. The list might be indefinitely prolonged. Where did all these people obtain their poisons? It would be well worth the while of the Pharmaceutical Society to make a list of such cases for say three months, and to ascertain in each case if possible where the poison was bought. If it should be found that all or a majority came from stores, grocers, and other unauthorized dealers in drugs, the case put by Dr. Attfield would be immensely strengthened. It is perfectly true that legislation can hardly be evoked at the present day—in the so-called "Nineteenth Century," as it has recently been described—for the prolongation or strengthening of a monopoly; but, if the chemists can show that it is owing to the unauthorized sales of drugs and poisons that these shocking tragedies, so far from being less common than before 1868, are actually more common and on the increase, they may come to Parliament with a very good case; and when some of the much less important measures to which the present Government has pledged itself to please its Radical supporters have been disposed of, a Bill in extension, explanation, or confirmation of that of 1868 may be passed, and English people may be protected like Frenchmen, Germans, Italians—indeed almost all nations—against the occurrence of such horrors as we have mentioned.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 2, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

THE SALE OF NARCOTICS.

THE report, on another page, of the proceedings in connection with an inquest held at Moss Bank, near St. Helens, supplies a vivid illustration of the evil results attending a custom widely prevalent in the manufacturing districts, and also shows how ready local authorities are to imitate the waggoner of the classics and invoke extraneous help instead of using the power they already possess to do the work that lies before them. The death, which was the occasion of the inquiry, was, probably, typical of many that take place continually, the principal difference being that now and then one—like that at Moss Bank—attracts passing attention through becoming the subject of an investigation before a coroner; but even then, after a certain amount of more or less wise official and volunteered commentary, it passes into oblivion. In the case under notice, a child, nine years old, being sick and purged, was dosed by his mother with an ounce of a compound called "Indian tincture," which she had purchased from a grocer. As to the nature of the compound, or the quantity that could be safely administered to a child, both buyer and seller appear to have been profoundly ignorant; the latter ingenuously saying that he had sold the compound for five or six years in the state in which he had received it, and that when asked by the buyer whether half an ounce would be too much for a child, he had replied that he did not know. The posological demonstration followed, however, in due course; but as it was made upon a poor creature not protected by an analogue of the Vivisection Act, it has involved no punishment upon the originators, beyond the very problematic quantity resulting from twinges of conscience. The mother having administered the medicine went out, hoping, no doubt, that before her return it would bring relief from the vomiting and purging. And so it did, though not in the way desired; for when she came home the child was comatose, and a quarter of an hour afterwards it lay dead in her lap, the victim, in the opinion of the medical practitioner who was called in, of narcotic poisoning.

In consequence of the nature of the evidence given at the inquest, the Coroner ordered an analysis to be made of the contents of the stomach as well as of a sample of the "Indian tincture," and the report of Dr. CAMPBELL BROWN is instructive. He found the tincture to contain about 30 per cent. of its volume of methylated spirit, a small quantity of ether, sugar, extractive and two kinds of resin. One of these resins had been derived from capsicum, the other is conjectured to have been the resin of *Cannabis Indica*, apparently upon the grounds that this resin is capable of producing symptoms similar to those observed in the child. But we think that the influence of the doubtful resin may be safely ignored, for although Messrs. SMITH found that the two-thirds of a grain of Indian hemp resin acted as a powerful narcotic,* yet since the total quantity found of the two resins together only amounted to 0·012 per cent. of the tincture, and of this the greater part was capsicum resin, the amount of the other resin contained in the ounce of tincture would only have been a small fraction of half a grain. The symptoms would seem to find a sufficient explanation in the fact that the child, exhausted by vomiting and purging, had swallowed a third of an ounce of methylated spirit, besides a quantity of ether. Upon inquiry it was found that the mixture had been supplied wholesale to the grocer by a "licensed patent medicine dealer," and that the stock bottle bore a label in which the preparation was vaunted as "the only original highly medicated tincture for coughs, colds, bowel complaints, etc."

We are thus brought face to face with a traffic that has, according to the evidence, been carried on during five or six years at least under conditions that involved continuous breaches of two highly penal laws, though neither of these happened to be the Pharmacy Act, as the Coroner appeared to suppose. In the first place the use of methylated spirit in the preparation of any article capable of being used internally as a medicine is an offence under the Spirits Act, punishable with a fine of one hundred pounds; in the second place the sale of a preparation recommended on a label or in any way by public advertisement as a remedy for the cure or relief of any disorder, unless the seller shall hold a licence and the thing sold shall bear a stamp of value in proportion to the price for which it is sold, is an offence rendering the seller liable to a penalty of ten pounds for each sale. It must not be understood, however, that we in any way intend to convey approval of the sale of compounds containing poisonous substances under the cover of the Medicine Stamp and Licence Acts, or that conformity with these Acts is any sufficient guarantee for the public safety in such cases. But, however this may be, if the proper authorities under existing circumstances did their duty the penalties recoverable under these Acts would be equal to any profit that could be derived from this trade, and the sale of probably more than one deleterious preparation would be thus stopped. The statistics quoted by the Coroner as to

* *Pharmaceutical Journal*, [1], vi., 172.

the extent to which the trade in this class of preparations is carried on in the St. Helens district are hardly surprising to those who have any knowledge of the subject, and we notice with satisfaction the moderation of his statement, as compared with what is occasionally asserted, that he only believes that some of them contain opium. There is no doubt many of these preparations put forward more or less ostensibly as narcotics are carefully kept outside the application of the Pharmacy Act, notwithstanding the fact that the names they bear and the statements put forward in respect to them may suggest, to those competent to judge, that they may contain a scheduled poison. Probably with respect to a large number of them the provisions of the Sale of Food and Drugs Act or of the Excise Acts would be more applicable for their control as those of the Pharmacy Act. When, however, the police authorities are in possession, as they are frequently said to be, of certain information that preparations of opium or any other scheduled poison are being sold indiscriminately by shopkeepers, it undoubtedly becomes their duty to put in force the provision of the seventeenth section of the Pharmacy Act, which relates to labelling, which would also facilitate proceedings under the section that restricts the right of selling such poisons to qualified persons.

On the occasion of an inquest held recently at Eastbourne, as has already been mentioned, the Coroner refused to admit that a pharmaceutical chemist actually engaged in business was exempt from serving as a juror on an inquest, and intimated that he intended in future to enforce his opinion, if necessary, by means of a fine. We understand however, that, acting under the instructions of the President of the Pharmaceutical Society, the Solicitor has brought under the notice of the Coroner the specially inclusive words of the Act in relation to the exemption of pharmaceutical chemists, and that there is reason to hope the threatened contingency will not arise. Meanwhile, should any pharmaceutical chemist be summoned to serve on a coroner's jury it is desirable that he should at once put himself in communication with the Secretary. Whilst referring to this subject we may remark that it is important to remember that the exemption is not a personal privilege and should not be claimed as such, but is a condition imposed by the Legislature for the protection and safety of the public at large.

* * *

An Evening Meeting of the Pharmaceutical Society will be held on Wednesday next, the 6th inst., at 8.30 p.m. On that occasion Messrs. Dunstan and Short will continue their Report on the Pharmaceutical Preparations of Nux-Vomica, dealing with the Preparation of a Standard Extract and of a Standard Tincture of Nux-Vomica. There will also be a paper on "The Estimation of the Alkaloids in the Root of *Atropa Belladonna*," by Messrs. Dunstan and F. Ransom, and one on "A Sample of Sophisticated Oil of Turpentine," by Mr. Boverton Redwood.

The *British Medical Journal* says it is understood that it is the intention of the Government to re-introduce the Medical Bill of last session with certain modifications, and that it is not probable that it will be again allowed to drop.

* * *

The past week has seen the issue of the first part of the new English Dictionary that was projected in 1857, by the Philological Society. Since that time hundreds of volunteers in Great Britain and the United States, as well as in other countries, have been working assiduously in the compilation and arrangement of materials, and the work is now being printed under the editorship of Dr. J. A. H. Murray, the President of the Philological Society, at the Clarendon Press, Oxford. The size of the work, which it is estimated will extend to six volumes of fourteen hundred quarto pages, will put it beyond the reach of more than a comparatively few private individuals, but there can be no doubt that it should be included in every library of any pretension. It promises to be a most valuable work of reference, and some idea may be formed of the wide range of literature that has been ransacked for words and quotations illustrative of their history and meaning from the fact that the complete series of the *Philosophical Transactions* from the year 1665 has been laid under contribution.

* * *

The interesting memoir on Kolas, by Messrs. Heckel and Schlagdenhauffen, an abstract of which appeared in last week's Journal, furnishes a fresh illustration of the desirability that investigators should make themselves acquainted with the existing literature of any subject they are working upon. It has been brought under our notice that the plant yielding "bitter kola," which those authors supposed themselves to be the first to identify, was identified as a species of *Garcinia* by Dr. Maxwell T. Masters eight years ago, and was partly described and the fruit figured by him in the *Journal of Botany* for March, 1875.

* * *

A fortnight since the *Medical Press and Circular* quoted from a German source a "well-found story" about the etymology of the word "charlatan," according to which it originated in connection with a Paris doctor, named Latan, who took to driving through the streets—crying his wares and looking out for patients—on a one-horse waggon (*char*). This is said to have given rise to the phrase, "Voilà le char de Latan," afterwards abbreviated into "charlatan." A correspondent in the following number, however, upsets this ingenious rendering by pointing out that the word is related to the Italian *ciarlare*, to prate, and *ciarlatano*, a quack.

* * *

We learn from the Barcelona *Enciclopedia Médico-Farmacéutica* that a committee of delegates of the pharmacists in the Spanish capital has recently presented a memorandum to the Governor of Madrid, pointing out certain abuses that exist to the injury of the public health, such as the distribution of globules by homœopaths to their clients, the sale of dosimetric granules, medical consultations in pharmacies and drug stores, the existence of pharmacies owned by unqualified persons, and other objectionable practices not unknown to pharmacists in our own country.

The endorsement of nostrums by leaders in medical and other branches of science in this country has on different occasions found varying explanations; but we doubt whether any of them has been so suggestive of the impudent side of smart advertising as one that has been communicated to the New York *Medical Gazette* by Professor Hamilton. The Professor, having seen a circular issued by a wine dealer, in which his name appeared as recommending certain wines, writes to say that some time since the wine dealer brought to him an album and laying it open before him asked him to add his name to those of other members of the medical profession which it contained and that he complied. But he protests that if the album contained, as he is now informed it did, recommendations of any wines, he was not aware of the fact. The *Medical News* asks, what more urgent plea could be presented for the abolition of the unprofessional habit of lending names to promote the interests of dealers in wines and nostrums?

* * *

The energetic Director of Public Gardens and Plantations in Jamaica, Mr. D. Morris, appears to have taken advantage of a recent vacation trip to collect a number of seeds and plants of economic importance, with a view to attempting their cultivation in the island. Among those obtained from Kew were a fine well-grown set of *Cinchona Ledgeriana* plants, as well as specimens of *C. caloptera* and *C. Calisaya*, var. *Josephiana*; a good strong scammony plant (*Convolvulus Scammonia*), which it is intended to attempt to cultivate in the hills; a plant of *Aloe Socotrina* and one of *A. Perryi*; this last mentioned, however, has not survived the voyage. Other plants obtained were the *Garcinia Mangostana*, *Quillaia Saponaria*, *Piper methysticum* (kava-kava), *Olea Europæa*, *Quercus Suber* and *Dracæna Draco*. Since his return also, a pot has been received from Kew containing about fifty plants of *Dracæna Cinnabari*, the species which, acccording to Professor Bayley Balfour (see before, p. 372), yields the true dragon's blood, as collected in the island of Socotra, referred to by Pliny and other old authors.

* * *

According to a comparison contained in a German official report the extent of the utilization of the post office as a means of communication by people of different European nationalities is represented by the following figures, which show the number of letters, post cards, etc., sent anually per head of population according to the returns for the year 1882 or the latest previous year for which a return had been made:—Great Britain, 52·5; Switzerland, 49·8; Belgium, 42; France, 35·3; Netherlands, 32·6; Germany, 31·8; Denmark, 30·6; Luxemburg, 23·1; Austria, 17·4; Sweden, 14·8; Norway, 14; Italy, 11·1; Hungary, 9·4; Spain, 7·1; Portugal, 6·9; Greece, 3·6; Russia, including Poland, 2·9; Roumania, 2; Servia, 0·7; Bulgaria, 0·5. In respect to the gross amount of business transacted by the Post Office Department, the United Kingdom ranks first, Germany second and France third.

* * *

In the earlier business days of the late Professor Holloway he appears not to have been averse to advising individuals upon the treatment of their particular complaints, and for this purpose he kept a printed form with blanks that were filled in according to circumstances. A quotation from the first paragraph of one of these forms, as filled in for a consultant in 1846 (the written words being printed in italics), may interest some of our readers and illustrate one method of creating a demand for specialties. The sentence runs, "I would recommend *eight* of my pills to be taken night and morning for the first *fifteen* days, *ten* night and morning for the following *thirty* days, and *twelve* night and morning might be taken after that time for about *thirty* days longer, or until such time as a perfect cure might be effected." The prescription, therefore, provided for the consumption of 1560, or 130 dozen pills. There was also a general direction to "rub plenty of my ointment into your chest night and morning, as effectually as forcing salt into meat."

* * *

The Paris correspondent of the *Lancet* states that after a service of more than a half a century as Director of the Gobelins manufactory, M. Chevreul has been placed on the retired list. In consideration of his great services the illustrious chemist has been allowed to retain the full salary; but such is the wonderful juvenility of which he appears conscious that although only wanting two years to become a centenarian he is said to resent his retirement as premature.

* * *

The proposal for the more frequent appearance of the *Archiv der Pharmacie*, the organ of the German Pharmaceutical Association, is being carried into effect, and the new volume commences with the issue of fortnightly parts, which are to consist of from thirty-two to forty-eight pages each.

* * *

In the case of Chave and Jackson *v.* Kitson heard last week in the Chancery Division of the High Court of Justice, before Mr. Justice Kay, a perpetual injunction was granted against the defendant in respect to the use of the registered trade mark "Celandine" claimed by the plaintiffs.

* * *

The Third Junior Pharmacy Ball is to be held at Willis's Rooms on Wednesday next. The Honorary Secretary is the gentleman who has so ably managed affairs in the two previous years, Mr. W. H. Kerr, 30, Conduit Street, W.

* * *

A meeting of the School of Pharmacy Students' Association will be held on Thursday, February 7, at 8 p.m., when a "Note on Crystallized Phosphoric Acid" will be read by Mr. P. L. Huskisson, and the Reporter upon Physics, Mr. H. Allen, B.Sc., will make a report upon "Holtz's Electrical Machine and its Modifications," which will be illustrated by experiments.

* * *

The papers to be read at the meeting of the Chemical Society on Thursday next will be, "On the Influence of the Temperature of Distillation on the Composition of Coal Gas," by Mr. L. T. Wright; and "Researches on Secondary and Tertiary Azo-Compounds: No. II.," by Mr. R. Meldola.

* * *

A meeting of the London Section of the Society of Chemical Industry will be held in the rooms of the Chemical Society, Burlington House, on Monday next, at 8 p.m., when papers will be read—(1) "On the Disposal of Sewage Sludge;" (2) "On the Porter-Clark Process for the Purification of Water;" (3) "On Some Technological Applications of Kieselguhr."

Transactions of the Pharmaceutical Society.

EXAMINATION IN EDINBURGH.

January 22, 23 *and* 24, 1884.

Present on each day—Messrs. Baildon, Clark, Gibson, Gilmour, Maben, Nesbit and Stephenson.

Professor Maclagan was present on the 22nd and 23rd on behalf of the Privy Council.

MINOR EXAMINATION.

22*nd.*—*Fourteen* candidates were examined. *Six* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Barratt, William ....King's Lynn.
Black, James Watson ....Aberdeen.
Borthwick, Robert Waddell ...Bathgate.
Cairns, John ....Kelso.
Campbell, Charles...................Manchester.
Coats, John Thomson ....Edinburgh.
Cumberbirch, William............Wilmslow.
Drummond, Robert Gordon ...Broughty Ferry.

23*rd.*—*Fourteen* candidates were examined. *Four* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Blackburn, Albert Ed. Henry...Eccles.
Findlay, James.....................Glasgow.
Flett, Arthur ....Edinburgh.
Graham, Robert ....Langholm.
Hays, Richd. Tanner Orchard...Cirencester.
Hood, Thomas ....Leith.
Jack, James ....Arbroath.
Macintosh, John ....Edinburgh.
Mackay, Alexander ....Inverness.
Rennie, William ....Dumbarton.

24*th.*—*Thirteen* candidates were examined. *Four* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Miller, Alexander Sutherland...Edinburgh.
Mitchell, William Kirkpatrick...Wigton.
Morris, John Hall ....Bolton.
Parry, Richard ....Liverpool.
Patterson, David ....Bolton.
Percival, Thomas ....Falkirk.
Scott, Samuel ....Glasgow.
Shairp, William ....Glasgow.
Steward, Josiah William.........Bridgnorth.

PRELIMINARY EXAMINATION.

A meeting of the Board of Examiners for England and Wales was held on Wednesday, January 30, 1884.

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

Certificate of the College of Preceptors.

Hughes, David Thomas ....Carnarvon.

Certificates of the University of Cambridge.

Cox, Charles Earnshaw ....Doncaster.
Ralling, Ernest Lewis............Colchester.
Sangers, Edgar Arthur ....London.

Certificates of the University of Oxford.

Atherton Henry Charles.........Tunbridge Wells.
Jackson, Frederick ....Manchester.

The following report of the College of Preceptors on the examination held on January 8 was received:—

Two hundred and seventy-eight candidated had presented themselves for examination, of whom *one hundred and fifty-one* had failed. The following *one hundred and twenty-seven* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

(Arranged alphabetically.)

Acutt, Frank Edward ....Wincanton.
Adams, Anthony Allan ....Salcombe.
Agar, Robert Langbourne ......Bridport.
Alford, Herbert Joseph ....Low Moor.
Allan, David..........................Gorebridge.
Andrew, John Herbert ....Oldham.
Aspden, Henry ....Over Darwen.
Baxter, Gilbert.......................Blackburn.
Bell, John Renwick.................Newcastle-on-Tyne.
Bethune, Andrew Wright ......Lochgelly.
Boe, John Alexander ....Edinburgh.
Bowie, Alexander...................Kincardine.
Brazil, James Joseph ....Monkwearmouth.
Brittain, Florence...................Birmingham.
Brown, Arthur Miller ....West Malvern.
Brown, George Hy. Allan ......Liverpool.
Brown, Thomas ....Hayes.
Burden, Chas. Henry Brown ...Bude.
Callam, William Eggleton ......Ilford.
Cameron, John ....Aberfeldy.
Capon, Henry Charles............London.
Cartwright, Benjamin ....Glasgow.
Chappell, Charles Creswell......Bromsgrove.
Chatterton, Joseph Owen ......Stockport.
Cherrett, Ernest Robert ....West Hartlepool.
Clarke, William Ernest ....Aberystwith.
Clayton, William Arthur..........Sheffield.
Cleghorn, James ....London.
Cockburn, Charles Taylor ......Glasgow.
Cole, John Frederick ....Worcester.
Copp, William Risdon.............Southampton.
Couzens, Albert E. ....Westbury, Wilts.
Cranstone, Ernest Haughton ...Hemel Hempstead.
Dewar, Daniel ....Stirling.
Dunlop, Thomas William ....Berwick-on-Tweed.
Durant, William James ....Crewe.
Eastwood, Frederick Allen......Rochdale.
Eastwood, Horace ....Milnsbridge.
Eatough, Nicholas William......Blackburn.
Edwards, Richard ....Shrewsbury.
Emerson, Richd. Wm. James...Hull.
Evans, Joshua William ....Llandyssul.
Evans, Thomas Henry............Llanelly.
Ferguson, Joseph Johnston......Southampton.
Fish, Benjamin, jun. ....Barrow-in-Furness.
Floyd, Joseph Arthur.............Alcester.
Ford, Arthur Miller................Glasgow.
Ford, James ....Montrose.
Foster, Edgar Denney.............Rugby.
Fraser, Archibald Morrison ...Glasgow.
Furness, Alexander Scott ....Edinburgh.
Gibson, George Wood ....Whitby.
Gibson, William Thomas..........Collingham.
Goddard, Saml. Hy. Carter ...Southport.
Grassick, Alexander ....Aberdeen.
Griffiths, William Robert ......Clynderwen.
Hall, Sidney Charles ....Newark.
Hardy. Robert ....Edinburgh.
Heap, Alfred.......................... Kendal.
Heaton, George Edward.........London.
Heaton, Thomas ....Batley.
Hender, Walter Coad ....Plymouth.
Hepton, John Cussons............Prescot.
Higson, John Russel...............Ruthin.
Hoare, William Richard.........Cheltenham.
Hornby, Arthur Smith ....Easingwold.
Howell, Albert.......................Warminster.
Jeeves, Henry ....Brighton.
Jones, William.......................Holyhead.
Joyce, Leonard.......................Boston.
Kelland, Richard ....Banwell.
Kendall, George William ......Rawdon.

Kennish, Joseph ....Whitehaven.
Kidd, George Thomas ....Stowmarket.
Kimber, Mary Jane...............London.
King, Arthur Hill ....Maldon.
Lacey, Thomas ....Ketton.
Laycock, William Frederick ...Lowton.
Leaper, John Shirley ....Spalding.
Le Gros, Alfred Joshua ....Jersey.
Lenton, Joseph........................Hastings.
Lloyd, James Herbert............Leicester.
Lyne, Walter Henry ....Grantham.
McClement, Thomas ....Penmaenmawr.
McLeod, William G. ....Nairn.
Madge, Herbert Abraham ....Ottery St. Mary.
Martin, John..........................St. Stythians.
Merrick, Wm. Stephen Nickels.Exeter.
Mills, George ....Southsea.
Mills, Herbert Henry ....Peterborough.
Morgan, James Gilbert ....Leamington.
Muir, George McCartney ......Cumnock.
Newman, Richard Seymour ...Hanley.
Ogilwy, Thomas William.........Windsor.
Orme, William Charles ....Atherstone.
Palmer, David Henry ....Peterborough.
Park, Frederick ....Tynemouth.
Perry, William Arthur ....Hitchin.
Pollard, Walter Henry ....Reading.
Prentice, Bertram ....Edinburgh.
Robertson, George ....Bridge of Allan.
Robinson, Joseph.................. Sunderland.
Senior, George ....Llanfairfechan.
Simpson, Frederick Charles ...Pershore.
Slinn, Harry Edwin ....Burton-on-Trent.
Smith, Edward Charles H.......Hull.
Smith, Kate Love .... Glasgow.
Smith, Robert William ....Edinburgh.
Stead, John Christopher ....Weston-super-Mare.
Stent, Frederick Richard ......Bath.
Stockdale, Richard ....Skipton-in-Craven.
Sturton, Frederick ....Peterborough.
Thornhill, Ernest ....Brighton.
Timmins, Albert ....Kidderminster.
Weatherby, Samuel MawdesleyBurslem.
White, James Leslie ....Edinburgh.
White, William John ....Edinburgh.
Widdowson, George William ...Leicester.
Wilkinson, Jacob Hardy.........Wibsey.
Williams, Cuthbert ....Leicester.
Williams, William ....St. Clears.
Wilson, George Alexander ....Aberdeen.
Winfield, George Fredk. ....Birmingham.
Woodington, Herbert ....Bristol.
Woolley, Edward James.........Manchester.
Wyatt, Alvan Lovell ....Stourbridge.
Wyllie, Harry Boak...............Kinghorn.

"College of Preceptors,
"Incorporated by Royal Charter.
"42, Queen Square, London, W.C.
"28 *January*, 1884.

"Dear Sir,—I send you herewith the copy of a short report made by the examiner on the recent Preliminary examination, supplementing the statement of marks forwarded to you to-day. "I am, dear Sir,
"Yours faithfully,
"C. R. Hodgson,
"E. Bremridge, Esq. "*Secretary.*"

"At the examination held in January, 1884, 278 candidates presented themselves at 36 centres with the following result:—

Passed 127 or about $45\frac{5}{7}$ per cent.
Failed 151 or about $54\frac{2}{7}$ per cent.

"Of the 151 who failed 78 failed in one subject only; 55 in two subjects; and 16 in all three subjects. Two candidates passed in the three subjects, but failed to obtain the required total.

"LATIN.

"Only 8 candidates brought up the 'Virgil,' and of these 6 passed the examination; of the other two 1 failed in Latin. In this subject an improvement has been steadily going on for some time past, especially in the answers to grammatical questions. The translation from the Latin is given very accurately in the large majority of cases, but very few indeed translate correctly into Latin the simple English sentences given.

"ARITHMETIC.

"This is still the 'plucking' subject. Of the 78 who failed in one subject only no fewer than 65 failed in this. Notwithstanding the special instruction in the Regulations, some of the candidates show no acquaintance with the metric system, and ignore the questions requiring for their solution a knowledge of it. To emphasize the importance of this branch of the subject, it would be well for some time to come that at least one question of this description should be given in every paper.

"ENGLISH.

"This, on the whole, at this examination was the best subject, and very few failed to write the composition creditably. Five candidates failed in English on account of errors in spelling, but the majority had no error of this description. The weakest point was the punctuation, some of the candidates ignoring stops and some others inserting them without any method whatever. I am of opinion that to draw attention to this it would be well that in the next two or three examinations a special test question on punctuation should be introduced.

"In conclusion, I desire to state that the alteration made by the Council in extending the hours of the examination is very satisfactory to the examiner, and, no doubt, it is also to the candidates. Ample time was allowed for carefully answering all the questions, and in very few cases indeed was there any internal evidence of a candidate being hurried."

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates. Examined.	Passed.	Failed.		Candidates. Examined.	Passed.	Failed.
Aberdeen	7	2	5	Lancaster	5	2	3
Birmingham	18	9	9	Leeds	14	5	9
Brighton	4	3	1	Lincoln	4	4	0
Bristol	9	6	3	Liverpool	11	4	7
Cambridge	3	1	2	London	32	13	19
Cardiff	6	2	4	Manchester	26	12	14
Carlisle	5	1	4	Newcastle-on-T.	7	4	3
Carmarthen	9	3	6	Northampton	3	1	2
Carnarvon	9	3	6	Norwich	2	1	1
Cheltenham	3	2	1	Nottingham	6	2	4
Darlington	4	1	3	Oxford	2	1	1
Dundee	7	2	5	Peterborough	6	5	1
Edinburgh	19	11	8	Sheffield	5	1	4
Exeter	6	3	3	Shrewsbury	1	0	1
Glasgow	21	9	12	Southampton	5	3	2
Hull	4	2	2	Truro	4	3	1
Inverness	2	1	1	Worcester	4	2	2
Jersey	2	1	1	York	3	2	1

The questions set for examination were as follows:—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*).

I. Translate into English either A. (Cæsar) or B. (Virgil).

The Candidate must not attempt both.

A. Cæsar.

(i.) Tamen, ut spatium *intercedere posset*, dum milites, quos imperaverat, *convenirent*, legatis *respondit*, diem se ad deliberandum sumpturum. (ii.) Ita dies circiter quindecim iter fecerunt, uti inter novissimum hostium agmen et nostrum primum non amplius quinis aut senis milibus passuum interesset. (iii.) His rebus cognitis, Caesar Gallorum animos verbis confirmavit, pollicitusque est, sibi eam rem curae futuram: magnam se habere spem, et beneficio suo et auctoritate adductum Ariovistum finem injuriis facturum. (iv.) Hac oratione habita, mirum in modum conversae sunt omnium mentes, summaque alacritas et cupiditas belli gerendi innata est, princepsque decima legio, per tribunos militum, ei gratias *egit*, quod de se optimum judicium fecisset, seque esse ad bellum gerendum paratissimam confirmavit. Deinde reliquae legiones, per tribunos militum et primorum ordinum centuriones, egerunt, uti Caesari satisfacerent: se neque unquam *dubitâsse*, neque timuisse, neque de summa belli suum judicium, sed imperatoris, esse existimavisse.

B. VIRGIL.

(i) Haec ubi dicta, cavum conversa cuspide montem
Impulit in latus; ac venti, velut agmine facto,
Quà data porta, ruunt, et terras turbine perflant.
Incubuere mari, totumque a sedibus imis
Unà Eurusque Notusque ruunt, creberque procellis
Africus, et vastos volvunt ad litora fluctus.

(ii.) Adloquitur Venus, O qui res hominumque Deûmque
Aeternis regis imperiis et fulmine terres!
Quid meus Aeneas in te committere tantum,
Quid Troës potuere, quibus tot funera passis
Cunctus ob Italiam terrarum clauditur orbis?
Certe hinc Romanos olim volventibus annis,
Hinc fore ductores revocato a sanguine Teucri,
Qui mare, qui terras omni ditione tenerent,
Pollicitus: quae te, genitor, sententia vertit?

II. Translate into Latin:—

(i) It is a mark of a foolish boy to wish to learn nothing. (ii.) What part of our earth is not full of labour? (iii.) Take care that you always follow the path of virtue. (iv.) The signal for battle having been given, the general exhorts the soldiers. (v.) The inhabitants of the provinces have been spared by the merciful conqueror.

III. Answer *four only* of the following questions:—

1. Give the principal parts of the verbs in italics in paragraph A.
2. Give the positive and comparative degrees of all the adjectives in the superlative degree in paragraph A.
3. Decline in full (singular and plural) *his rebus*, *eam rem*, in paragraph A.
4. Explain fully the construction of—*legatis respondit, diem se ad deliberandum sumpturum* (paragraph A, sentence i.), and *magnam se habere spem* (paragraph A, sentence iii.).
5. Give the principal parts of all the verbs in part (i.) of paragraph B.
6. Decline *vires*, *Deûm*, *orbis*, *mare*, in paragraph B.
7. Parse *passis* and *potuere*, in part (ii.) of paragraph B.
8. Make a list of all the deponent verbs in part (ii.) of paragraph B, and give their principal parts.

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*).

1. A barrel containing 40 litres of liquid weighs 40 kilog. 5 hectog.; empty, it weighs 3 kilog. 9 hectog. Give in grams the weight of a litre of the liquid.

2. Simplify $$2\tfrac{1}{2}+\cfrac{1}{3\tfrac{1}{3}+\cfrac{1}{4\tfrac{1}{4}}}-1\tfrac{11}{91}.$$

3. Add together $\frac{3}{8}$ of a guinea, $\frac{3}{13}$ of a crown and $\frac{3}{10}$ of 7*s.* 6*d.*; and reduce the result to the decimal of 16*s.*

4. Divide 76·57 by ·0019; and multiply 50400 by $\frac{3}{7}$ of ·0008568.

5. If a sack of corn containing 1 hectol. 20 lit. cost 18 francs, what ought to be paid (in francs) for a sack of corn containing 1 hectol. 60 lit.?

6. If the rent of 13 acres 1 rd. 14 pls. for 150 days be £125, what quantity of the same quality of land ought to be hired for 88 days for £110?

7. A. can do a piece of work in 3 days, B. can do thrice as much in 8 days, and C. five time times as much in 12 days: in what time would they do it together?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*).

1. Name the Parts of Speech, and give, where you can, the derivation of each.
2. Define an Adjective. How are comparatives and superlatives formed in English? When is it impossible for an adjective to have any comparative?
3. State some reasons for considering the English Alphabet to be defective.
4. Correct the following sentences, giving your reasons:—

(*a*) You are a greater loser than me.
(*b*) Who did he give it to?
(*c*) Too great a space separates the third and fourth man.

5. Analyse the following sentence:—

"Kind nature's sweet restorer, balmy sleep,
Swift on his downy pinions flies from woe."

6. Parse the following sentence:—"I can tell you strange news that you yet dreamed not of."
7. Write a short composition on any favourite place or favourite book.

Provincial Transactions.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The thirteenth annual *soirée* in connection with the Midland Counties Chemists' Association was held on Friday evening, January 25, in the Birmingham Town Hall, and from every point of view was the most successful gathering which the Society has held. Early in the evening there was a promenade concert, during which Mr. Stimpson gave an organ recital, and Messrs. Synyer and Gilmer's band performed a selection of music. Later dancing was commenced, and was continued until an early hour on Saturday morning, Mr. E. J. Reynolds carrying out the duties of the M.C. to the satisfaction of the company present. The hall was tastefully decorated by Messrs. Manton and Sons; the plants, of which there was a profusion, coming from Mr. Vertegan's nursery. Everything passed off in a manner highly creditable to Mr. Charles Thompson, who, as Honorary Secretary, had the arrangements of the *soirée* entrusted to his supervision.

LIVERPOOL CHEMISTS' ASSOCIATION.

The seventh general meeting of the thirty-fifth session was held at the Royal Institution, on Thursday evening, January 17, 1884. Mr. Edward Davies, F.C.S., F.I.C., in the chair.

The minutes of the previous meeting were read and confirmed and the following donations to the Library and Museum were announced:—*The Canadian Pharmaceutical Journal*, from the Editor; *The Pharmaceutical Journal* (two numbers), from the Society; and a complete set of the products of the distillation of shale, including specimens of crude shale, from the Young's Oil Co., Addiewell, presented to the Museum by Mr. H. A. Tobias.

The President then called on Mr. Haddock to read the paper of the evening on "The Uses of Permanganate of Potassium in Analysis."

The paper will be printed in an early number of this Journal.

Dr. Symes, in moving a vote of thanks to Mr. Haddock, said he was agreeably surprised to learn that eleven such important substances as those mentioned in the table given could be so successfully estimated by potassium permanganate. He trusted the paper would be published, as he thought it would be a valuable one for reference.

Mr. T. Fell Abraham had pleasure in seconding the vote of thanks, which was supported by Messrs. Parkinson and Ward.

Mr. Davies, in putting the resolution, said that for the estimation of tannin and manganese salts the volumetric method by potassium permanganate was of the utmost value, as the old method was exceedingly doubtful and uncertain, and in the case of manganese, when the quantity of the latter was small, it utterly failed to determine the same.

The motion having been put, was carried by acclamation, and Mr. Haddock having briefly replied, the proceedings terminated.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

The Manufacture of Gas from Limed Coal.

On Thursday, January 24, a paper was read by Professor Wanklyn before the Applied Chemistry and Physics Section of the Society of Arts, upon "The Manufacture of Gas from Limed Coal," special reference being made to Cooper's method of mixing lime with coal before distillation. The lecturer commenced by remarking that although the distillation of coal in the process of gas-making forms the chief source of the ammonia of commerce, it is nevertheless a well ascertained fact that only a small fraction of the total nitrogen of coal is made to take the form of ammonia in the distillatory operation as at present carried out. He then proceeded to point out the material differences between the products of the distillation of limed and of unlimed coal, which he said consisted in the limed coal yielding more of its nitrogen in the form of ammonia and a larger fraction of its carbon and a smaller fraction of its sulphur in the form of volatile compounds, besides leaving the coke in a more advantageous state for general use. The quantity of lime allowed in the process referred to, he said, was about half a hundredweight of quicklime to every ton of coal, the lime being slaked with about its own weight of water before mixture. It had been expected that the limed coke would not burn so well as common coke, owing to the presence of a greater amount of fixed matter in the form of lime; but this proved to be an advantage, for the calcium compound, acting as an oxygen carrier, caused the coke to burn more brightly and readily. It was also claimed that whereas common coke, when burnt, gives off fumes of sulphurous acid abundantly, coke prepared from coal properly limed evolves absolutely none. Professor Wanklyn stated that from the 2,000,000 tons of coal carbonized annually by the London gas works ammonia is distilled at an average of from 5 to 6 lbs. of ammonia per ton of coal, but that if the coal were limed before distillation the average would be raised to 12 or 15 lbs. per ton. If all the nitrogen in coal were converted into ammonia the yield would be from 25 to 50 lbs. per ton, but this production would reduce that of coke, as the latter contains a solid carburet of nitrogen. Without laying emphasis on the slight increase in the amount of volatile carbon compounds, the lecturer drew attention to the advantage to be derived from the diminution of the fraction of volatile sulphur when the coal is distilled with lime. He argued that it is known that sulphur present in organic compounds will readily attach itself to calcium if the compound be heated with lime, and therefore, theoretically sulphur cannot be evolved from coal in the presence of an excess of lime. In coal-gas the main portion of the sulphur exists as sulphuretted hydrogen, from 0·8 to 1·5 per cent. by volume being found in crude gas distilled by the common method, and about 0·3 per cent. of "sulphur compounds other than sulphuretted hydrogen." From the results obtained in a series of experiments made with crude gas from limed coal, the lecturer said it had been shown that the volume of sulphuretted hydrogen is diminished by about one-third. Professor Wanklyn further stated that in consequence of the fixation of the sulphur by the lime mixed with the coal, the use of lime purifiers could be dispensed with, whilst those filled with oxide of iron lasted much longer; indeed, it has been practically shown that as low an average as 3 grains of sulphur per 100 cubic feet of gas could easily be maintained by the mixture of lime with coal before distillation, and the use of oxide of iron purifiers alone. As regarded cost, he calculated that from the gain in ammonia and tar and the saving in purifying material, the decrease in expenditure would at least amount to one shilling per ton of coal carbonized. The lecturer concluded his paper by remarking that looked at from the sanitary point of view the use of limed coal would decrease the pollution of the air with sulphurous acid, and render gas as harmless as the electric light.

In the discussion which followed this paper, most of the speakers agreed that there was a considerable increase in the amount of ammonia obtained, which was estimated by some as a gain of about 30 per cent. One speaker stated that he had not noticed any decrease in the amount of sulphur in the crude gas manufactured from limed coal, and that though he had been biassed in favour of the process, he could not call it a success. Another speaker remarked that the white appearance of the limed coke lowered its market value, and the majority condemned its use for the purpose of heating furnaces, because of the damage caused to the flues, which had compelled the process to be stopped. The Chairman, Mr. D. Howard, in closing the discussion, drew attention to the great value now attached to the bye-products of the distillation of coal, as compared with their value a few years ago.

Professor Wanklyn in answer to the statements of some of the speakers, remarked that he thought the failure of the process when tried by them had been owing to imperfect mixture of the lime and coal before distillation. In answer to some questions put forward during the discussion, he stated that the presence of free carbonic dioxide in the gas did not materially diminish its illuminating power, but it had been always removed previously as a preliminary step to the elimination of the sulphur compounds; the oxide of iron purifiers now rendered this step unnecessary. He also reiterated his opinion that no decomposition of the sulphide of calcium took place in the presence of an excess of lime.

Recent Improvements in Photo-Mechanical Printing Methods.

The first of a course of Cantor Lectures, by Thomas Bolas, upon "Recent Improvements in Photo-Mechanical Printing Methods," was delivered before the Society of Arts, on Monday last. The lecturer mentioned that this course would be a continuation of a series of lectures delivered before the Society upon the same subject about four or five years ago. The present lecture was confined to an explanation of the Woodburytype process, the new developments of this method being especially dwelt upon. The process is based upon the fact that gelatine, slightly pigmented with bichromate of potash, is rendered insoluble in warm water by the action of light. Mr.

Bolas, accompanying his remarks by experiments, stated that the old method of obtaining the printing mould was to expose the gelatine with a negative for a certain time to a strong light, and then to wash away the soluble parts from the back or unexposed side with hot water. The mould was then mounted on tin foil coated with copper, and a sheet of glass attached by a resinous composition so as to form a stiff plate which would be able to stand pressure without harm to the mould. A more recent method is to commence by treating the gelatine mould with a solution of indiarubber in benzol; a sheet of tin foil is then placed over it, and in order to insure the tin foil covering the mould closely, they are passed between indiarubber rollers, the pressure being gradually increased. It has been found advantageous to use steel-faced tin foil for this purpose, the facing of steel enabling the mould to keep its surface for a longer time. Among some curiosities that the lecturer showed was the first printing mould made by Mr. Woodbury, and also some of his earliest printings. During the lecture, Mr. Bolas mentioned that it is little known that when ordinary paper is submitted to a high pressure it becomes semi-transparent, like opal glass or ordinary porcelain. Advantage has been taken of this by French manufacturers to copy watermarks, and some ingenious imitations were passed round for inspection. In concluding, he remarked that so rapid had been the improvements in photo-mechanical printing, that he considered it reasonable to expect that in a few years' time we might see photographs printed in the newspapers.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, January 24, Mr. H. G. Greenish, Vice-President, in the chair.

The first paper read was the following—

Note on Iodide of Cadmium.

BY F. W. SHORT.

Of late years, a good deal of speculation has taken place with regard to the elements, as to whether the bodies now generally considered elementary, because we have not yet been able to further decompose them, are actually *bonâ fide* elements, or whether many of them are not in reality compound bodies, like ammonium, but of very great stability. The relation between the atomic weights of many elements which display great similarity in other respects, such as chlorine, bromine and iodine, for example, has been thought to point to the conclusion that these bodies may really be compounds of actual elements in different proportions, similar to the hydrocarbons and analogous groups in the organic kingdom. For just as in the hydrocarbons, etc., we get a constant increase in molecular weight and an increased melting or boiling point for every CH_2 group introduced into the molecule, so in this series of elements, for example, as we ascend from the lowest or gaseous chlorine, to the liquid bromine and solid iodine, we get an increase in atomic or molecular weight corresponding to the increased boiling point.

If this speculation were correct, we should expect to find among the elements of higher atomic weight more examples of isomeric compounds than among the lower, just as is the case with analogous groups of organic bodies; and this is certainly the case with iodine, the yellow and red iodides of mercury and the three iodides of antimony being examples.

In order to ascertain if any other iodides presented similar modifications, Messrs. F. W. Clarke and E. A. Kebler have lately made various experiments, chiefly with iodide of cadmium, and their results were published in the *Chemical News* for December 28, 1883. They state that they prepared iodide of cadmium in various ways and obtained it in two distinct forms, one having a specific gravity of about 4·6, and the other, which was the commoner and more stable modification, about 5·6. Specimens prepared by digesting cadmium and iodine in sealed tubes exhausted of air and crystallization from water, by digesting the elements in water, and by double decomposition with cadmium sulphate and potassium iodide, all gave a specific gravity between 5·5 and 5·7, while a specimen prepared by dissolving cadmium carbonate in hydriodic acid and taking up some free iodine which had been produced with a little metallic cadmium, showed a specific gravity of 4·6; this was proved by quantitative analysis to be practically pure CdI_2. Three more specimens obtained by dissolving the carbonate in hydriodic acid all had the higher specific gravity. Another specimen of low specific gravity, viz. 4·638, was obtained by dissolving metallic cadmium in hydriodic acid; this was found to lose weight considerably on heating, becoming partially insoluble; by merely heating to 50° C. its specific gravity was altered to 5·14, and on twice more heating to 50° C. it rose to 5·545, showing according to the authors that the salt of lower gravity was very unstable and converted by heat into the other variety. They cannot state the conditions under which this unstable modification is formed, but suggest that nascent hydrogen may have something to do with its production, as in each case where they obtained it the salt had been exposed to nascent hydrogen.

I have made a few experiments in order to try and obtain a specimen of each kind to place before you. In the first place I took the specific gravity of three commercial specimens, using benzene, the medium employed by Messrs. Clarke and Kebler, with the following results:—

A	specific gravity 5·455
B	specific gravity 5·485
C	specific gravity 5·584

These salts were all taken in small crystals, and, evidently, all consisted of the normal variety. A specimen of cadmium iodide was then prepared by digesting together cadmium and iodine in water at about 60° C. until colourless, evaporating over a water-bath and crystallizing. The crystals were dried over sulphuric acid without heat, and were quite pure; their specific gravity was 5·667.

A specimen prepared by dissolving cadmium carbonate in hydriodic acid, adding a little metallic cadmium to combine with free iodine (the method by which Messrs. Clarke and Kebler obtained one of their abnormal specimens), evaporating to crystallization over a water-bath and drying over sulphuric acid, had a gravity of 5·089.

Another specimen was prepared by mixing equivalent proportions of sulphate of cadmium and iodide of potassium, evaporating to dryness over a water-bath, extracting the cadmium iodide with alcohol and allowing it to crystallize. The specific gravity of this was taken in small crystals, as in the preceding cases, but in this case more difficulty was experienced in getting rid of all air-bubbles. After considerable agitation, when no more bubbles seemed to come off, the specific gravity was, apparently, 4·511; however, on standing twenty-four hours, more bubbles could be got off, raising the apparent specific gravity to 5·347.

One of the other specimens (sp. gr. 5·667) was dissolved in alcohol and subjected to the action of nascent hydrogen obtained from metallic sodium. The soda was neutralized by sulphuric acid, and the alcoholic solution of cadmium iodide filtered off and crystallized. The specific gravity was taken in crystals, and the same difficulty was experienced with regard to air-bubbles as in the preceding case, where the salt had also been crystallized from alcohol. A first determination gave only 4·152, but after standing five or six hours, more air could be got off, and it then seemed 4·287. It appeared more probable, therefore, that the apparent lowness of specific gravity was due rather to air being inclosed in the interstices of the crystals than to the salt being abnormal, so a portion was rubbed into a fine powder and its specific gravity determined in that condition, when it was found to be 5·778.

As the salt when crystallized from aqueous solutions did not present the same difference between the crystals and the powder, it was thought that this might be due merely to their crystallization from alcohol; one of the preceding specimens (specific gravity 5·485) was therefore dissolved in alcohol and crystallized out.

The crystals were placed with benzene in a specific gravity bottle and placed under the bell-glass of an air-pump until no more air-bubbles could be got off; the gravity was then taken and found to be 4·375. More of the crystals on being powdered gave a specific gravity corresponding nearly with that originally found.

These results show that iodide of cadmium obtained by crystallization from alcohol has generally a lower specific gravity than that crystallized from water, but that this is probably due to the presence of air in the crystals, and not to their being in the abnormal condition described by Messrs. Clarke and Kebler, who do not state whether they used crystals or powder for the determination of the specific gravity. I have been unable to obtain any specimen which when powdered had a gravity less than about 5·5.

A discussion followed in which the Chairman, Secretary, Messrs. Dymond, Elliott and Thompson took part.

A vote of thanks was passed to Mr. Short.

The Reporter on Analytical Chemistry, Mr. C. Thompson, then read a report on "The Qualitative and Quantitative Separation of Chlorides, Bromides and Iodides," in which he brought under notice a modification of Vortmann's method, proposed by F. Jones, for their qualitative separation, and also the method proposed by Julius for their quantitative determination, based on replacing the halogen elements in the silver salts by each other. Mr. Thompson said he was still experimenting with these processes and would bring forward his results at a future meeting.

A discussion followed the report in which the Chairman, Secretary, Messrs. Cullinan, Dymond, Elliott, Ranken and Short took part.

The meeting then adjourned.

Parliamentary and Law Proceedings.

Poisoning by Prussic Acid.

An inquest was held in Worcester by Mr. R. T. Rea, City Coroner, on Thursday, January 24, concerning the death of Eliza Ross, aged 40, and her child, aged 6. It appeared that the deceased had been living apart from her husband and had been much depressed in consequence of not being allowed to have access to her children. On the day of her death she appears to have fetched the deceased child from school and the two were afterwards found dead together.

William Morris, chemist, Lowesmoor, said: On Monday evening last about seven o'clock I sold six pennyworth of prussic acid to the deceased. I knew her. The quantity was 3 drachms, which would be about three teaspoonfuls. Fifteen drops is a fatal dose, and the quantity I sold to deceased would make ten such doses. I observed the usual requirements of the law in selling the poison, and received from deceased the name of "Mrs. Jones, Carden Street." She paid the sixpence for it, and took the bottle produced away with her.

The Coroner: You said you knew deceased. Did you know her as Mrs. Jones?

Witness: I did not know her by name. I knew her as a customer for twelve months past. I had had no occasion previously to ask her name.

The Coroner: Was there anything particular about the manner of deceased to excite suspicion?

Witness: Nothing at all.

The Coroner: Did she appear calm, collected, and reasonable?

Witness: Yes.

The Coroner: Was anything said when you sold her the poison?

Witness: I asked her if she knew prussic acid was a powerful poison. She said "No." I asked her what she wanted it for. She said a friend had told her it was an excellent thing to clean with. I suggested that she should use some salts of lemon instead. She said, "I have tried that, and it has not answered." I produced my book, and said she would have to sign her name and address. Deceased said, "I have no objection to sign; I have done the same in purchasing mice poison at other shops." Whilst she was signing the book, which she did very slowly, I ran over the probabilities of the case, and as deceased had before bought laudanum of me, and had made no improper use of it to my knowledge, I considered it a *bonâ fide* purchase, and I let her have the prussic acid. Deceased received it in the bottle in which she had previously purchased laudanum.

Witness produced his register of the sale of poisons, and showed that the sale in question was attested by the name and address of the purchaser, the quantity and nature of the poison sold, and the purpose for which it was bought. There was, however, no signature in the space provided for the person introducing the purchaser, and Mr. Power, who was present throughout the inquiry, pointed out that the sale was therefore not in accordance with the statute.

Mr. Morris said he did not consider any introduction necessary in this caee, as deceased was an old customer.

Dr. Crowe said on Tuesday evening he was fetched to Mrs. Deakin's, in Lowesmoor, and saw the body of the deceased there, in a water closet. He had since made a *post-mortem* examination of the body. He discovered the presence of prussic acid by a chemical test.

Mr. Power (to witness): Have you ever heard of prussic acid being used for cleaning dresses?

Witness: Never.

Mr. Power: Is it usual for chemists to sell prussic acid for that purpose?

Witness: I think not.

Mr. Power: Do you think if I were to go to Mr. Virgo's or Mr. Steward's they would sell me prussic acid?

Witness: I should think they would not give it you in a poisonous quantity unless prescribed by a medical man. A fatal dose of Scheele's acid is twenty drops; and that is two and a half times stronger than the prussic acid usually sold.

After hearing other evidence, the Jury found a verdict "That the deceased committed suicide whilst in a state of temporary insanity, and also that she destroyed her child in a fit of temporary insanity." They added a rider to the effect that greater restrictions should be placed upon the sale of poisons.—*Worcester Daily Times.*

The "Indian Tincture" Poisoning Case.

The adjourned inquest on the body of Samuel Yates, nine years of age, son of John Yates, collier, Moss Bank, near St. Helens, was held on Saturday last by Mr. Hardy, Deputy Coroner. Mr. Finney, solicitor, Bolton, appeared to represent the maker of the Indian tincture, Mr. William Riley, licensed patent medicine dealer, Daubhill, near Bolton; and Inspector Whitaker watched the proceedings for the chief constable of the county. The facts, as already published, are that on the morning of the 12th inst. deceased complained of being sick and purged, and about noon his mother went to the shop of William Ashall, grocer, Moss Bank, and purchased an ounce of "Indian tincture," for which she paid 3*d.* On her return home she put a teaspoonful of warm water to the tincture and gave it to the sick boy. She then put him to bed, and left his step-brother, a lad named Cartwright, in the house, while she went to St. Helens. When his mother came home he was in a comatose condition, and died a quarter of an hour afterwards.

At the inquiry on Saturday the mother of deceased repeated her evidence, and said she had never before given

Indian tincture to any of her family. Some fifteen months ago her step-daughter, a young woman of twenty-five years, while in her house had bowel complaint, and she took ninepennyworth (three onnces) in five days. In cross-examination by Mr. Finney witness said it did her daughter-in-law good. She drank threepennyworth at a time.

The Coroner: But you know, Mr. Finney, her daughter-in-law is twenty-five years of age.

Witness: Ah! that makes the difference.

William Ashall said he sold the tincture to Mrs. Yates. He purchased it about five months since from William Riley, Daubhill, near Bolton. He had sold the tincture for five or six years. Working people—generally women—purchased it. From the time he received the tincture to the time he sold some of it to Mrs. Yates he did not put anything in it—he sold it in exactly the same state as it was in when he received it. He could not say that he ever knew an adult take an ounce for a dose. He had taken it himself, and drunk it out of the bottle many a time, not thinking it was anything dangerous.

The Coroner: Now you won't drink any more?

Witness: No fear.

The Coroner: What was the sensation after you had taken it—soothing, lulling?

Witness: When I have felt cold I have tasted it, and felt no different.

The Coroner: What age are you?

Witness: Thirty-three.

The Coroner: There is a difference between eight and thirty-three.

In reply to Mr. Finney, witness said he had sold it for children out of the particular bottle. About four weeks since he had sold half an ounce to Mrs. Yates for a child who was a little younger than deceased. Mrs. Yates told him herself it was for her child. She asked him if half an ounce would be too much for a child, and he (witness) replied that he did not know, but thought not. He then read her the doses from the label. He could not just say whether he had sold it to other people for children. They did not always say who it was for. Witness did not give Mrs. Yates instructions on the last occasion.

By the Coroner.—He was quite certain that Mrs. Yates came and purchased half an ounce of tincture from him four or five weeks ago.

Mr. Finney remarked that Mrs. Yates stated in evidence she had not had any before.

This was the whole of the evidence.

The Coroner said he had received Dr. Campbell Brown's report of his analysis, which he read, as follows:—"Analysis of a bottle labelled 'Indian tincture,' received from Mr. Superintendent Johnston, proves it to contain about 30 per cent. of its volume of methylated spirit, a small quantity of ether, and a very large proportion of sugar, probably more than 30 per cent. of its weight. It also contains two resins, one derived apparently from capsicum or cayenne pepper, and the other present in only very small quantities, and accompanied by other vegetable extractive matter. The weight of the two resins taken together is only 0·012 per cent. The smaller quantity of resin is not capable of being identified by any chemical means, and I believe that the only way in which its properties might perhaps be determined would be by making experiments on living animals. This I am prohibited by law from doing, and I can only conjecture that the resin may possibly be derived from Cannabis Indica or Indian hemp, a substance which yields such a resin, and which produces symptoms similar to those which have been described to me as resulting from the use of this tincture. At the same time I should point out that the administration of methylated spirit and ether was a dangerous proceeding, and might have produced many of the symptoms observed in the present instance. The tincture contains no opium. I have analysed the stomach and contents, and further examined the bottle of intestines. I have extracted from the stomach a small quantity of alcohol, and a trace of some resinous substance which it is quite impossible to identify. No opium is present, and there is no trace of any ordinary poison."

The Coroner then proceeded to address the jury. Having carefully reviewed the evidence, Mr. Hardy said the jury would have no difficulty in coming to the conclusion that the boy's death resulted directly from his mother having administered this Indian tincture. Was anyone responsible to the law for his death? He thought there was not the slightest evidence upon which they could answer that Mrs. Yates's object was any other than to see him better—a desire to stop his vomiting and purging. There was no suspicion, and the police did not even suggest any idea of foul play. That being so, he must tell the jury, and they must take the law from him, that what the mother did was in ignorance. Ashall was the next man who had to do with the Indian tincture. He would not say this man was guilty of gross neglect, but he did not evince that care and caution which a man with his intelligence should have done. He (the Coroner) had seriously considered whether he should not direct the jury to place him upon his trial for a serious charge, but having found from the police that he had evinced a great desire to assist them in this inquiry, and having heard his straightforward evidence, he did not think he had been guilty of wilful neglect, gross carelessness and recklessness, which the law required them to find before they called upon him to answer a charge of manslaughter. Then they came to the third person, Mr. Riley, by whom this mixture was made and sold to small shopkeepers. This Indian tincture evidently included injurious and deleterious ingredients, and was sold for all complaints, its virtues and efficacy being set forth in highly flown language on the labels. Although he might tell them that Mr. Riley was not criminally liable, he might be responsible to the law in another way which did not concern the jury. Especially he would direct the attention of the Inland Revenue authorities to the report which he had read from Dr. Campbell Brown and to the law relating to pharmacy. It was a most unfortunate state of things that men like Mr. Riley, in Liverpool, Manchester, Preston, and elsewhere should be permitted for one moment to concoct these mixtures and go about to little shopkeepers, or that the little shopkeepers should be permitted to retail such deleterious and injurious medicines. He had been told since that inquiry commenced by several medical gentlemen who had seen him and written to him, that if the public only knew the number of infants' lives that were annually sacrificed through their mothers dosing them with syrups and other compounds, they would be positively astounded. He (Mr. Hardy) had frequently held inquests upon children, and he was beginning to think himself, that in many cases where verdicts were returned, "Found dead in bed," "Died from convulsions," and so on, if they could get at the truth, it would be found that death was really the result of dosing them with syrups and other like compounds. Medical gentlemen had told him that the system of preparing and retailing these tinctures and drugs was doing a great harm to the working classes, and that even women were going to shops and drinking it as they would other things. Superintendent Johnston, of St. Helens, had taken the trouble to ascertain how many shopkeepers in St. Helens alone sold these mixtures containing opium and methylated spirit.

Mr. Finney: You do not mean shopkeepers who sell Indian tincture?

The Coroner said he meant Indian tincture and kindred mixtures. There were ninety-three shopkeepers in St. Helens who sold these mixtures. He believed they were all of a like kind to Indian tincture. He did not know whether they all contained such ingredients as Indian hemp, which was a powerful sedative, but some of them he believed did contain opium. In the Rainford section, of which Police-sergeant Smith had charge, there were eleven shops; and Superintendent Weir, of Wigan, said that within a mile radius of the spot where he was located there were some thirty or forty persons who were selling not only Indian tincture, but kindred mixtures. In his (the Coroner's) opinion shopkeepers ought to be prohibited from dealing in these compounds. In this case he could not acquit Ashall from all blame; as it was his duty to have read over the label. The jury might say, if they liked, that the law ought to absolutely prohibit shopkeepers from selling these injurious and deleterious compounds.

After an absence of twenty minutes, the Jury returned with the following verdict:—"That the boy Samuel Yates died from the effects of the overdose of a mixture called Indian tincture, which was administered to him as medicine by his mother by misadventure." They also desired to say that although William Ashall was not criminally responsible for the death of deceased, they thought he deserved some censure for not informing the mother of deceased when she bought the mixture that the dose was as it appeared upon the label of the bottle produced, which he kept in the shop, and that Mrs. Yates was also to blame for not inquiring what should be given to a child. They further desired to make a presentment that they thought all shopkeepers ought to be absolutely prohibited by law from selling Indian tincture and mixture of a similar kind; and if in this case the law relating to the Inland Revenue had been broken by the manufacturer of this Indian tincture they hoped steps would be at once taken by the proper authority to enforce the penalty fixed by law. Mrs. Yates and Mr. Ashall were then called into the room and censured by the Coroner.—*Liverpool Daily Post.*

Poisoning by Ammonia.—A Wrong Bottle.

On Friday, January 25, a man named George Wragg died at Sheffield from poison administered to him by his mother, under the belief that it was a dose of medicine. The deceased was in well-to-do circumstances. He was married, but he separated from his wife some time ago, and had since been living with his mother. He had been under medical treatment for indigestion, and had been taking medicine. After he retired to rest on Thursday night his mother, an old lady of eighty, gave him what she thought was a dose of the medicine. The bottle, however, contained strong ammonia, which Wragg purchased some time before to clean some clothes. He soon afterwards experienced all the symptoms of having taken an irritant poison, and, in spite of prompt medical attendance, died in three hours.—*Standard.*

Poisoning by Arsenic.

On Monday, Mr. Hull resumed an adjourned inquest at Wandsworth Prison, on the body of George Robinson, aged 51, lately dwelling in Walworth, who died as reported last week.

Barnett, coroner's officer, stated that he had searched Mr. Robinson's room. Witness found a number of bottles, one of which contained arsenic. The deceased was traveller to a chemist.

The widow of the deceased, after having been cautioned by the Coroner, said that for years past her husband had been given to drink. He had struck her with a sharp instrument. While he was waiting at the police court she gave him a meat sandwich and some ale. After he had been sentenced he said to witness, "I shall never go through this three months," and asked for some more refreshment. She procured him some coffee, which he partook of.

J. Clarke, a friend of the deceased, stated that he accompanied last witness to see her husband. He procured some coffee from a neighbouring coffee house, and handed it to the gaoler, who gave it to the deceased.

The Coroner remarked that he was not satisfied with the evidence. He should report the case to the Home Secretary, and ask him to take up the matter.

After hearing the evidence of the daughter of the deceased, the case was again adjourned.—*Standard.*

BOOKS RECEIVED.

The Veterinarian's Pocket Remembrancer; being Concise Directions for the Treatment of Urgent or Rare Cases. By George Armatage, M.R.C.V.S. Second Edition. London: J. and A. Churchill. 1884. From the Publishers.

A Short Manual for Monthly Nurses. By Charles J. Cullingworth, M.D. London: J. and A. Churchill. 1884. From the Publishers.

Correspondence.

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

The Solubility of Calcic Hydrate.

Sir,—I am pleased that Mr. Abraham has called attention to my statement regarding the solubility of calcic hydrate in the presence of carbonate, as I am unwilling that an error on my part should go forth uncorrected.

In estimating the proportion of hydrate in solution when carbonate was present, I did not allow the mixture to stand longer than two hours, and to this cause my low results are no doubt due. Believing, however, that I had not been so very far from the mark as Mr. Abraham's communication would show, I repeated his experiments, taking the precaution to wash the mixtures of hydrate and carbonate previous to use. After twenty-four hours the solutions were filtered, and titrated with seminormal oxalic acid, the following results being obtained:—

Percentage of $CaCO_3$ present.	Grain measures, seminormal oxalic acid required to neutralize 1000 grains.	Equal to grains CaO per fluid ounce.
15	90	·55
50	89	·54
75	87	·53
90	60	·36

From this it is evident that the admixture of carbonate with hydrate does make a difference in the strength of the solution, though the variation is not so great as my former statement indicated. The titrations were repeated in presence of my analytical assistant, Mr. Dechan, with the normal oxalic acid in use in the laboratory, the results obtained being practically identical with the above.

Without going into all the points raised in Mr. Abraham's letter, I may direct attention to his table, which bears internal evidence of untrustworthiness. I refer to the facts that all the four solutions contained lime in suspension; that No. 2 held more in suspension than No. 1 (and we might quite reasonably infer that Nos. 3 and 4 held more than No. 2), and that Nos. 3 and 4 are relied upon to prove Mr. Abraham's position, though it is evident that, the solutions not having been filtered, the results cannot be accepted as correct.

With reference to the solubility of the pure hydrate, it is apparently almost hopeless to expect any two observers to agree. It was not till after I had quite finished all my observations and was looking up the results obtained by others, that I began to realize how difficult it would be to arrive at figures that would be accepted as correct. There are contingencies connected with the test solutions in which the slightest variation of strength would show a considerable difference in the results, and sources of variation even in connection with the indicators employed, as shown by Mr. Thomson, in a recent number of the *Chemical News*, which render it highly probable that different results would be obtained by different observers. Any value that my paper may possess lies not so much in the fact that lime is stated to have a given solubility—the correctness of which might readily be disputed—but in the influence shown to be exerted by different temperatures, an influence which is well enough known, but which had not hitherto, so far as I am aware, been systematically investigated.

Hawick. Thos. Maben.

The Examination of Chemicals.

Sir,—Will you allow me to remark upon a few points in Mr. Symons's contribution to your issue of the 19th instant? The value of such examinations is beyond question, but I fear that it is only too often left undone.

Liquor Potassæ.—Twenty ounces of pot. bicarb. would require 14·8 ozs. of slaked lime to combine with the whole of the carbonic acid thus—

$$\underset{100}{KHCO_3} + \underset{74}{CaHO_2} = KHO + H_2O + CaCO_3$$

It would appear as if Mr. Symons calculated pot. bicarb. as containing two molecules of water, but the test of purity given in Squire's 'Companion,' namely, 50 grains heated to redness leaves $34\frac{1}{2}$ grains, *i.e.*—

$$2\,KHCO_3 = K_2CO_3 + H_2O + CO_2$$
$$\frac{200}{4} = 50 \quad \frac{138}{4} = 34{\cdot}4$$

negatives this idea.

Peroxide of Hydrogen.—This unstable compound deteriorates rapidly, and therefore approximation to the stated strength is the best that we can expect to get. Mr. Symons's samples would seem to be rather bad, the volume strengths being properly only half of what he states, for half of the oxygen liberated is due to the bichromate. (See a paper in the *Analyst* for this month.)

Citrate of Magnesia.—It would be interesting to know what the public expect to receive when they ask for this; generally, I think, a powder which effervesces when dissolved in water, therefore the above is an obvious misnomer, for even a mixture of carbonate of magnesia and citric acid is not citrate of magnesia until chemical combination has actually taken place. I may presume (from experience) that the composition of the remainder of Mr. Symons's sample, which he omits to give, was sodæ bicarb. and ac. tart., or perhaps the latter partly replaced by ac. citric.

Liq. Sodæ Effervescens.—It is a well-known fact that only a few of the so-called soda waters contain any added soda at all, and it is well for the general consumer that they do not. I make this remark principally in order to advocate the alteration of the title of the beverage to aerated (or carbonated) water; also the manufacture of medicinal waters of various strengths, say 5 grains, 10 grains and 15 grains per bottle. The statement that ordinary town water contains chalk equal to 1·5 grain of sodic carbonate in each half pint is quoting from very widely differing quantities. I have before me the results of a great number of analyses of water supplies, and see that the temporary hardnes (due to $CaCO_3+MgCO_3$) calculated as Na_2CO_3, varies from ·1 to 1·5 grain per half pint.

W. O. Nicholson.

The Supply of Prussic Acid.

Sir,—I should think most chemists who have read the Newton Abbot poisoning case, reported in the Journal of January 19, will be rather staggered to learn that anybody unconnected with the medical profession (either known or unknown to the seller) should have got possession of 6 drachms of prussic acid.

"Favourite dogs" on this side of the border are usually disposed of by the administration of prussic acid at the hands of the chemists' apprentices, who are careful enough with the dangerous drug. Signing the poisons sale book will not prevent suicide.

N. B.

In re Patent Medicines.

Sir,—In the Journal of January 12, Dr. Connell expresses his surprise that so many who are makers of patent medicines are unconnected either with pharmacy or medicine, and calls upon pharmacists to combine with medical men in order that the supply of medicines should be distributed through the proper channels; whilst, on the other hand, Mr. Allen says dispensing chemists would be only too willing to assist in the matter. Dr. Connell seems to be unaware of the fact that the chemist and druggist assists and greatly encourages the sale of patent medicines. Not only do the greater body of them conspicuously display the show cards, distribute the hand bills, and disseminate the other literature of the patent medicine vendors, but if we are to believe some of the advertisements, many of the trade, so anxious are they to oblige the maker and also benefit (?) the public that they write testimonials and otherwise manifest great anxiety to forward the sale, frequently also personally recommending the articles, to the amusement doubtless, and certainly to the profit, of their sometimes next-door neighbour, the oilman, etc., who, when a demand has been created by his shortsighted fellow-tradesman, lowers the price and sells the medicine. But Dr. Connell would be more astonished did he know that some of his medical brethren not only refrain from discountenancing the use of patent medicines put up by anybody, but also recommend and thus encourage the sale of them. Thus, it appears to me, those doctors and pharmacists both proclaim to their respective patients or customers, either that they are not capable of ministering to the needs of the public, or that they are indifferent alike to their own interests and also to those of other members of their own profession. The public must perceive this, and respect them accordingly.

Is Mr. Allen unconscious of these facts? We must have respect for ourselves before we ask others to respect us.

Pondo.

Sir,—With your kind permission I should like to say a few words on the important question of patent medicines. I am inclined to think it would be much better for the trade at large, it would improve our position in the estimation of an intelligent public and the medical profession, if chemists as a body, instead of puffing and supporting by every means in their power every nostrum that springs into publicity, would do all they possibly could to discourage the sale of them, and on the other hand, recommend to their customers, requiring medicine for slight indisposition, some preparation of their own with which they are thoroughly acquainted, and in which they have every confidence. I think it beneath the dignity of a chemist, with his knowledge of drugs and after the training he has had to go through, to recommend patents of which he, as a rule, knows absolutely nothing, and which generally are compounded of drugs and chemicals of a dangerous character.

Dispenser.

M. Conroy.—Thanks for your communication.

Alpha.—(1) The dispenser would not be justified in substituting one article for another, though he might on occasion withhold a dangerous dose; but 15 grams of potassium iodide is not a dangerous dose. (2) See a note on the change of colour this ointment is subject to in "Dispensing Mem.," No. 130, *Pharm. Journ.*, [3], ix., 65.

W. P.—Thanks for your note. You will see that the "Month" has not been omitted, but postponed, as is our practice occasionally when the last Saturday in the month falls early. We are glad to know that you so much appreciate this article.

Student.—A satisfactory mixture appears to be unobtainable. The prescriber should be referred to.

Inquirer.—Rub the quinine, finely powdered, with a little mucilage, and dissolve the salicin in a little of the aq. chloroformi with the aid of heat. A mixture containing tinct. sumbul and tinct. nucis vom. cannot be otherwise than opaque.

W. Barron.—The U.S.P. tinct. gelsemii is made by percolation with alcohol, specific gravity ·820, 15 parts of finely powdered rhizome being used for 100 parts of finished product.

H. Rainsford.—We are unacquainted with the book mentioned.

T. G. R.—The language of the 30th section of the Dentists Act is that "every person registered under this Act, shall be exempt, if he so desires, from serving on all juries and inquests whatsoever."

Annikcam.—The statement as to the solubility appears as quoted in the earlier editions of the work. We have forwarded your letter to the writer of the paper.

Hibernia.—The Pharmacy Act, 1868, does not extend to Ireland; but pharmacy in that country is regulated by an Act passed in 1875.

Novice.—We shall be happy to name the specimens if they are in good condition and do not exceed six in number.

Communications, Letters, etc., have been received from Messrs. Samuel, Ince, Gatehouse, Kerr, Masters, MacEwan.

REPORT UPON THE PHARMACEUTICAL PREPARATIONS OF NUX VOMICA.*

(*Continued.*)

IV. THE PREPARATION OF A STANDARD EXTRACT OF NUX VOMICA.

BY WYNDHAM R. DUNSTAN,

Assistant Lecturer in Chemistry and Physics to the Pharmaceutical Society and Demonstrator of Practical Chemistry in the School of Pharmacy;

AND F. W. SHORT,

Assistant Demonstrator of Practical Chemistry in the School of Pharmacy.

In previous communications to this Society and to the British Pharmaceutical Conference we have described the results of a chemical investigation of *Strychnos Nux-vomica* and its pharmaceutical preparations. Processes for the estimation of the total alkaloid in the nux vomica seeds, in the tincture and in the extract have been devised, and a method for the quantitative separation of strychnine and brucine has been proposed. At the last meeting of this Society the results of some experiments were communicated relative to the extractive power of alcohol of various degrees of dilution for the alkaloidal salts which are contained in nux vomica. Now our analyses of authentic and commercial specimens of nux vomica have shown that different specimens vary very considerably in alkaloidal content, and a very serious want of alkaloidal uniformity has been shown to obtain in the instance of commercial tinctures and extracts of nux vomica. In the present papers it is intended to apply the results of the above investigation in the preparation of a standard extract and tincture of nux vomica, that is, an extract and tincture of nux vomica which shall contain a definite and constant quantity of total alkaloid. Perhaps the most obvious method of attaining such a result would be in the first place to obtain a specimen of nux vomica which contained a known percentage of total alkaloid, and completely to exhaust a certain weight with a definite volume of alcohol. There are, however, certain practical difficulties connected with the complete exhaustion of nux vomica by a definite volume of spirit, and still greater difficulties in obtaining nux vomica constant in percentage of alkaloid, that led us to work upon somewhat different lines.

It is proposed at the outset to take a good commercial specimen of nux vomica in powder. We have previously shown that the powdered nux vomica at present in commerce is free from adulteration, and hence this substance can be used with advantage for the present purpose. In case of a necessity arising for obtaining nux vomica seeds in fine powder it should be noted that we have in a previous paper given a method for easily effecting this (*Pharm. Journ.*, [3], xiii., 1053). Commercial specimens of nux vomica contain, on an average, 3 per cent. of total alkaloid. The seeds having been obtained in a fine state of division they are extracted by percolation with a definite volume of alcohol of specified strength. The percolate is then measured and the quantity of total alkaloid is estimated in a given volume of it. The volume of this percolate which contains a quantity of alkaloid corresponding to the percentage of alkaloid which should be present in the extract is then taken and evaporated to a definite weight. We have fixed 15 per cent. as the quantity of total alkaloid which shall be contained in the standard extract of nux vomica; this decision is based upon a careful consideration of the results of our analyses of the extracts of nux vomica which are now used in medicine, which results were communicated at the last meeting of this Society.

It will be necessary now to consider some important practical questions connected with the actual preparation of the extract. It cannot, in the first instance, be too strongly insisted that the seeds should be in a very fine and uniform state of division, for unless this is the case, thorough and uniform extraction is impossible. In the extraction of the seeds we recommend the employment of a dilute alcohol, made by adding 25 volumes of water to 100 volumes of rectified spirit, for we have previously shown that alcohol of this strength has the highest solvent power for the alkaloidal salts which are contained in nux vomica. Extract of nux vomica is usually made by boiling the nux vomica with alcohol until exhausted; but it seemed to us that if the nux vomica could be exhausted with a comparatively small quantity of spirit without the aid of heat there would be a distinct advantage, especially in the manufacture upon the small scale. Experiments were therefore made in this direction. Thirty grams of nux vomica in impalpable powder were packed in a stoppered percolator, mixed with 60 cubic centimetres of alcohol (100 : 25) and allowed to macerate for twelve hours. Percolation was then commenced and when it had ceased an additional 60 cubic centimetres of the alcohol were poured upon the marc. When this had ceased to pass through the percolate measured 80 cubic centimetres. Sixteen cubic centimetres were analysed by the process which has been previously described (*Pharm. Journ.*, [3], xiv., 441), and it was found that the 80 cubic centimetres of alcohol had extracted 0·735 gram of alkaloid. A portion of the specimen of nux vomica employed had been previously assayed and found to contain 2·66 per cent. of total alkaloid; 30 grams consequently contained 0·8 gram of total alkaloid, so that 92 per cent. of the total alkaloid had been extracted by the 80 cubic centimetres of alcohol. To the marc were now added another 60 cubic centimetres of the alcohol; the percolate was analysed and found to contain 0·041 of alkaloid, making a total of 0·775 gram of total alkaloid extracted from 30 grams of nux vomica, which contained 0·8 gram of total alkaloid.

These experiments were now repeated upon a larger scale, and the quantity of extract as well as of total alkaloid was estimated in each successive fraction of the percolate. One pound of finely powdered nux vomica was intimately mixed with one pint of alcohol (100 : 25) and allowed to macerate for twelve hours. Percolation was then commenced and continued with more alcohol, portions of the successive fractions of the percolate being assayed for total alkaloid. A total quantity of four pints of alcohol was employed. The results were as follows:—

One pound of nux vomica, containing 189 grains of total alkaloid, was extracted with 4 pints of dilute alcohol (100 : 25).

* Read at an Evening Meeting of the Pharmaceutical Society, February 6, 1884.

Fractions of percolate.	Volume of fraction.	Amount of extract containing 22·67 per cent. of moisture.	Amount of total alkaloid (strychnine and brucine).
First fraction . .	26 ounces	856 grains	125 grains
Second fraction .	16 ounces	220 grains	32 grains
Third fraction .	10 ounces	74 grains	11 grains
Fourth fraction .	10 ounces	29 grains	3 grains
Total percolate .	62 ounces	1179 grains	171 grains

These results show that, proceeding in the above way, nux vomica is practically exhausted by four times its weight of alcohol of the specified strength. It will be noticed that maceration and percolation were adopted, principally because it was found that the first fraction of the tincture made by direct percolation deposited, after a short time, a flocculent precipitate that was not permanently redissolved by heat. No such result occurred when maceration was adopted, although the strong tincture if kept for some time, especially in cold weather, deposits a substance which is apparently a fatty acid and consequently contains no strychnine or brucine, and by gently heating is permanently redissolved. It now remained to prepare the extract from this strong tincture in which the amount of alkaloid was known. After a number of preliminary experiments it was found that 9 ounces (fluid) of this strong tincture, containing 10 grains of total alkaloid, were converted into an extract of suitable consistence by evaporating upon the water-bath until the product weighed 66·6 grains; that is, contained 15 per cent. of total alkaloid. In order to confirm the calculated alkaloidal content of this extract 1 gram was assayed and yielded 0·151 gram of total alkaloid, thus agreeing admirably with the calculated percentage (15 per cent.). We then prepared this standard extract from different specimens of nux vomica, representing high and low percentages of total alkaloid, and found that in all cases it was feasible to prepare a product having all the physical properties of a good extract and containing 15 per cent. of total alkaloid by the direct evaporation of the strong tincture.* The following is a description in official phraseology of the process which we propose for the preparation of a standard extract of nux vomica.

Take of—

Nux vomica in fine powder . .	1 pound.
Rectified spirit	64 fluid ounces.
Distilled water	16 fluid ounces.

Mix the spirit with the water and make the nux vomica into a paste with one pint of the mixture. Allow this to macerate for twelve hours, then transfer to a percolator and add another pint of the mixture. When this has percolated, pour on the remainder of the diluted spirit in successive portions; press the marc, filter the expressed liquid and add it to the percolate. Take of this liquid one fluid ounce and estimate the amount of total alkaloid in the following way:—Evaporate almost to dryness over a water-bath, dissolve the residue in two fluid drachms of chloroform and half a fluid ounce of dilute sulphuric acid with an equal bulk of water, agitate and warm gently. When the liquids have separated draw off the chloroform and add to the acid liquid excess of solution of ammonia and half a fluid ounce of chloroform, well agitate, gently warm, and after the liquids have completely separated transfer the chloroform to a weighed dish, evaporate over a water-bath and dry for one hour at 212° F. Allow the residue of total alkaloid to cool and then weigh. Take of the percolate as much as contains $131\frac{1}{4}$ grains of total alkaloid and evaporate over a water-bath until the extract weighs two ounces. This extract will contain 15 per cent. of total alkaloid.

Ten grains of this extract when treated in the following manner should yield one and a half grains of total alkaloid. Dissolve the extract in half a fluid ounce of water with the aid of a gentle heat and add a drachm of carbonate of sodium previously dissolved in half a fluid ounce of water; add half a fluid ounce of chloroform, agitate, warm gently and separate the chloroform. Add to this half a fluid ounce of dilute sulphuric acid with an equal bulk of water, again agitate, warm and separate the acid liquid from the chloroform. To this acid liquid add now an excess of ammonia and agitate with half a fluid ounce of chloroform; when the liquids have separated transfer the chloroform to a weighed dish and evaporate the chloroform over a water-bath. Dry the residue for one hour and weigh.

[*The discussion on this and the following paper is printed at p.* 634.]

* Of course such standard extracts prepared from seeds containing different percentages of alkaloid will not have the same consistence; but this variation in consistence is not sufficiently considerable to be of any practical moment.

REPORT UPON THE PHARMACEUTICAL PREPARATIONS OF NUX VOMICA.*

(*Concluded.*)

V. THE PREPARATION OF A STANDARD TINCTURE OF NUX VOMICA

BY WYNDHAM R. DUNSTAN,

Assistant Lecturer in Chemistry and Physics to the Pharmaceutical Society and Demonstrator of Practical Chemistry in the School of Pharmacy;

AND F. W. SHORT,

Assistant Demonstrator of Practical Chemistry in the School of Pharmacy.

In the previous paper we have proposed a process for the preparation of a standard extract of nux vomica, containing 15 per cent. of total alkaloid. In considering a feasible method for preparing a standard tincture of nux vomica, we were led by our former results to two suggestions. First, the dilution with alcohol of the assayed percolate (the method of producing which has been described in the former paper) to a definite degree, corresponding to a given percentage of total alkaloid, and second, the solution of a definite quantity of the standard extract in a given volume of alcohol. We propose that the standard tincture of nux vomica shall contain 0·24 per cent. of total alkaloid, that is 1 grain of total alkaloid in 1 fluid ounce of tincture. This proposal results from a comparison of the analyses which we have already published of the various tinctures of nux vomica now being used in medicine, and represents the alkaloidal content of a good commercial specimen. The mode of preparing the standard tincture by the first method is simple in procedure and eminently satisfactory in result. An experiment was made by taking that volume of the strong percolate, assayed as before described, which contained 20 grains of total alkaloid, this was diluted to one pint with alcohol (100 : 25). A pale yellow

* Read at an Evening Meeting of the Pharmaceutical Society, February 6, 1884.

perfectly clear tincture was obtained, every ounce of which contained 1 grain of total alkaloid. This tincture did not deposit or otherwise change after being kept for one month. A practical objection perhaps attaches to this method, as one for general use, which must be allowed to have some weight. It involves the preparation of two tinctures of nux vomica, the one strong, the other weak, and the substitution of the one for the other in dispensing would be attended with grave results; this perhaps is an objection to recommending the process for general use, although it is a point on which we speak with some reserve. A number of experiments were then made in connection with the second method. It has been already shown that with ordinary extract of nux vomica there is no very easy method of obtaining a solution in alcohol which is at once perfect and permanent (*Pharm. Journ.*, [3], xiv., 442). But it now seemed probable, having prepared an extract by exhausting the nux vomica with alcohol of definite strength and evaporating on a water-bath, that such an extract would redissolve in alcohol of the same strength that had been used in its production. One gram of the standard extract of nux vomica, containing 15 per cent. of total alkaloid, was mixed with 60 cubic centimetres of alcohol (100 : 25). By stirring the whole of the extract was dissolved and the perfectly clear tincture deposited a very small quantity of a white sediment after one month.* Some of the sediment was examined and contained no alkaloid. Thus a standard tincture of nux vomica could also be readily prepared by the solution of the standard extract in alcohol of certain strength. The tincture prepared as above detailed should contain 0·24 per cent. of total alkaloid and to confirm this the tincture was assayed and yielded 0·2402 per cent. of total alkaloid, thus coinciding with the calculated result. The standard tinctures prepared by the two processes which have been described contain, of course, the same percentage of total alkaloid. They differ in colour, that prepared by the first process being pale yellow, by the second, light brown; the latter also deposits very slightly, while the former is perfectly stable. For reasons already stated, we incline to recommending the latter process for general use; the former would probably be preferred by the manufacturer upon the large scale. The following is a description of both the processes which we have devised for the preparation of a standard tincture of nux vomica containing 0·24 per cent. of total alkaloid:—

I. Take of—

Nux vomica in fine powder . . .	1 pound.
Rectified spirit	64 fl. ozs.
Distilled water	16 „

Mix the spirit with the water and make the nux vomica into a paste with one pint of the mixture. Allow this to macerate for twelve hours, then transfer to a percolator and add another pint of the mixture. When this has percolated, pour on the remainder of the diluted spirit in successive portions; press the marc, filter the expressed liquid and add it to the percolate. Take of this liquid 1 fluid ounce and estimate the amount of total alkaloid in the following way:—Evaporate almost to dryness over a water-bath, dissolve the residue in 2 fluid drachms of chloroform and half a fluid ounce of dilute sulphuric acid with an equal bulk of water; agitate and warm gently. When the liquids have separated draw off the chloroform and add to the acid liquid excess of solution of ammonia and half a fluid ounce of chloroform; well agitate, gently warm and after the liquids have completely separated transfer the chloroform to a weighed dish. Evaporate over a water bath, and dry for one hour at 212° F. Allow the residue of total alkaloid to cool and then weigh.

Take that quantity of the percolate which contains 20 grains of alkaloid and dilute to one pint with a mixture of 4 parts by volume of rectified spirit with 1 part by volume of distilled water. This tincture will contain 0·24 per cent. by volume of total alkaloid and 2 fluid ounces of it when estimated, in the same manner as the percolate, should yield 2 grains of total alkaloid.

II. Take of—

Standard extract of nux vomica .	133 grains.
Rectified spirit	16 fl. ozs.
Distilled water	4 „

Mix the spirit with the water and dissolve the extract in the mixture. One fluid ounce of this tincture will contain one grain of total alkaloid.

In concluding this the last part of the Report we wish to gratefully acknowledge the valuable assistance which we have from time to time received from Professor Redwood, who has closely followed the progress of the investigation and made many fruitful suggestions which have contributed to its successful result. We also wish again to thank Professor Attfield for having allowed the work to be carried on in the Laboratories of the Pharmaceutical Society. The investigation has been largely aided by a grant from the Research Fund of the British Pharmaceutical Conference.

* The extract, it should be noted, will not wholly dissolve in rectified spirit.

THE ASSAY OF ATROPA BELLADONNA.*

I. THE ESTIMATION OF THE ALKALOIDS IN THE ROOT OF ATROPA BELLADONNA.

BY WYNDHAM R. DUNSTAN,

Assistant Lecturer in Chemistry and Physics to the Pharmaceutical Society and Demonstrator of Practical Chemistry in the School of Pharmacy;

AND F. RANSOM.

Many methods have been proposed for the estimation of the alkaloids which exists in *Atropa Belladonna*. The majority of these methods involve the use of solvents which extract large quantities of non-alkaloidal organic substances, and thus necessitate the subsequent use of other solvents and precipitants to purify and isolate the alkaloid. A great advance was made by Pesci (*Gazzetta di Chimica Italiana*, x., 425), when he showed that the alkaloid could be extracted in a comparatively pure state by benzene from an aqueous extract of belladonna after the addition of an alkali. The benzene was then agitated with dilute sulphuric acid, which was subsequently rendered alkaline with ammonia and the alkaloid removed by chloroform. Pesci's method of extraction, although a great improvement upon older methods, was still far from perfect and obviously could not be easily applied for the estimation of the alkaloid. In a previous paper† one of us has proposed a new method in plant analysis where a body soluble in chloroform has to be isolated. This

* Read at an Evening Meeting of the Pharmaceutical Society, February 6, 1884.

† Dunstan and Short, "The Assay of Nux Vomica" (*Pharm. Journ.*, [3], xiii., 665).

method was based upon the general principle that in plant analysis that solvent should be selected for the estimation of the active constituent which extracts this constituent with the smallest quantity of the other constituents, thus rendering unnecessary long processes of subsequent purification.

There are many solvents which can be used for this purpose, solvents which easily dissolve alkaloids, glucosides, etc., but less readily dissolve colouring matter, acids, sugars, etc. Chloroform is one which often admits of use, but it was pointed out in the paper referred to that chloroform alone was ill-suited for completely extracting the plant tissues, owing to its weak penetrating power. It was also proved in the special instance of nux vomica that this difficulty could be overcome by the admixture of alcohol with the chloroform; that is to say, while chloroform alone was incapable of extracting the whole of the alkaloid from nux vomica, when mixed with 25 per cent. of alcohol it was able to do so thoroughly and completely, leaving behind the whole of the mucilaginous constituents of the seeds and the other non-alkaloidal constituents, many of which would be extracted if alcohol alone were used. In the present paper we have extended this method of extraction with the chloroform-alcohol mixture to the isolation of the atropine and hyoscyamine existing in the root of *Atropa Belladonna*.

In preliminary experiments 10 grams of very finely powdered belladonna root were extracted with chloroform alone in a Dunstan and Short's extraction apparatus. The operation continued for three hours, during which time the root had been percolated twenty successive times with 50 cubic centimetres of boiling chloroform. The percolate, which had a light brown colour, contained much alkaloid when the residue was tested with phosphotungstic acid. The marc was mixed with lime and boiled with alcohol. The alcoholic residue also gave evidence of containing abundance of alkaloid when tested with phosphotungstic acid and also by its action upon the pupil of the eye. Thus the chloroform had not completely exhausted the root of alkaloid; the experiment was again repeated, the chloroform being allowed to act for a longer time, but yet the marc contained considerably more than traces of alkaloid. The same quantity of finely powdered belladonna root was now acted upon by a mixture of equal parts of chloroform and absolute alcohol under precisely the same conditions. The percolate contained much alkaloid, but no trace could be detected in the remaining marc. This experiment was likewise repeated several times with the same result. It was thus evident that just as chloroform alone had been shown to be an inefficient extractive agent for nux vomica it was now shown that the same obtains with belladonna, and similarly as a mixture of chloroform and alcohol was an excellent solvent for the nux vomica alkaloids, so the same mixture was an equally good solvent for the alkaloidal salts in belladonna. The next experiments were made with different proportions of chloroform and alcohol. A mixture of chloroform with 25 per cent. of alcohol occupied too long a time in accomplishing complete exhaustion to allow it to be made the basis of an easy process for general use. The best results were obtained with a mixture of equal parts of chloroform and absolute alcohol, which consequently was used in further experiments. It was found necessary to use absolute alcohol on account of the action of the water contained in rectified spirit upon the belladonna, which by causing swelling of the root and consequent clogging of the apparatus, seriously impeded the progress of percolation.

In these experiments the root was exhausted at the boiling point of the solvent (60°–70° C.). Experiments were now made to see whether belladonna could be efficiently exhausted by a mixture of equal parts of chloroform and alcohol without the aid of heat; but it was found that after percolating 10 grams of the finely powdered root with 150 cubic centimetres of the mixture the marc still contained a large amount of alkaloid, and it was evident that a great quantity of the solvent would be required for complete exhaustion. This although not an insuperable objection is a practical disadvantage, and having found that the belladonna root could be so well exhausted by the boiling solvent we at once proceeded to examine the effect of a boiling mixture of chloroform and alcohol upon atropine under the conditions of our experiments, and so to discover whether the alkaloid would be injuriously affected at the boiling point of the mixture. Pure atropine was boiled for six hours in an apparatus with an upright condenser with a mixture of alcohol and chloroform. The mixture was then agitated with dilute sulphuric acid and the alkaloid recovered from the acid liquid, after the addition of ammonia, by chloroform. The following results were obtained:—

	Atropine taken.	Atropine found.
α	0·085	0·084
β	0·221	0·217
γ	0·199	0·197
δ	0·213	0·208

The small differences in these figures are obviously accounted for by experimental errors, and the results, taken in conjunction with the fact that the residues were normally crystalline, prove that atropine is not decomposed or chemically altered even when exposed for six hours at the boiling point of the solvent which is proposed for use. We were now able to proceed further in developing the process. The belladonna root was now able to be exhausted with a boiling mixture of chloroform and alcohol, and it now remained to isolate the alkaloid in a pure state from the solvent. Dilute acids were at first used for this purpose, but it was afterwards discovered that the whole of the alkaloid could be withdrawn from the chloroform-alcohol mixture by merely agitating with water; two successive treatments with water in this way sufficed to remove every trace of the alkaloids from the chloroform-alcohol mixture. The separation of the water from the mixture is instantaneous and entire if the mixture is gently warmed; nearly the whole of the colouring matter remains dissolved in the chloroform, whilst the water retains the alcohol and the alkaloidal salts. By rendering the aqueous solution alkaline with ammonia and agitating with chloroform the atropine and hyoscyamine were obtained after evaporation in an apparently pure state; that is to say, the residue was entirely soluble in dilute acids, and when dissolved in chloroform and the solvent spontaneously evaporated the alkaloid remained as a mass of white silky crystals. However, one of the most important points to be demonstrated in such investigations as these is the perfect purity of the final alkaloidal residue, and yet this is a point which is generally assumed and not proved by workers in this field.

On a previous occasion* one of us has proposed a method for ascertaining the purity of residues of strychnine and brucine, which is founded upon the complete precipitation of these alkaloids (when nearly free from other organic substances) by a solution of tannin rendered faintly alkaline with ammonia. This process was tried with atropine and hyoscyamine, but with negative results, for the precipitate at first formed was soluble in excess of the reagent. Other reagents were now experimented with. Potassium mercuric iodide was found to be by no means a complete precipitant of atropine, and is useless for its detection when present in small quantity. Picric acid is also useless alike for the detection and estimation of atropine; even when considerable quantities of the alkaloid are present in solution this reagent fails to afford any indication. Phosphotungstic and phosphomolybdic acids are far more delicate than the former reagents, but even these are not sufficiently exact for quantitative use. As far as the detection of atropine and hyoscyamine is concerned a very delicate test is the dilating action upon the eye's pupil which is distinctly yielded by mere traces of the alkaloids. After attempting the quantitative application of many of the alkaloid precipitants with no success, we found one reagent which is admirably adapted for quantitative use. A solution of iodine in potassium iodide completely precipitates even traces of atropine and hyoscyamine, from a solution in dilute hydrochloric acid, as the dark green periodides. When other acids are present the precipitation is not quite so complete. After a great number of experiments had been made with this reagent, and also in reference to the decomposition of the periodides, we devised the following method for estimating the purity of residues of atropine and hyoscyamine. The alkaloidal residue is dissolved in dilute hydrochloric acid and to this liquid is added excess of a strong solution of iodine in potassium iodide. The precipitate which at once agglomerates is filtered off, slightly washed with the solution of iodine and decomposed upon the filter with a solution of sodium thiosulphate, when it entirely dissolves, forming a colourless liquid from which the alkaloid is removed by agitation with chloroform. This process gave very satisfactory results with pure atropine and the following results were obtained with the alkaloidal residues obtained in our experiments:—

	Residue taken.	Pure alkaloid found.
1	0·020	0·0185
2	0·019	0·0175
3	0·078	0·079
4	0·078	0·076

These figures indicate that the final residue of alkaloid obtained from belladonna root by the process which we have described consists of pure alkaloid. It should be noted that both atropine and hyoscyamine are much affected by prolonged exposure at 100° C., becoming sensibly darker in colour. The residues of alkaloid obtained in the process, and which usually weigh rather less than 0·1 gram, are light yellow in colour and have a fused appearance; crystals of the alkaloids may be obtained by redissolving in chloroform and spontaneously evaporating, when silky needles will remain if the chloroform was free from water. The following is a detailed description of the process which we propose for the estimation of the atropine and hyoscyamine in belladonna root. Twenty grams of the dry and finely powdered root are exhausted by hot percolation with a mixture of equal parts by volume of chloroform and absolute alcohol; if an extraction apparatus is used about 60 c.c. of the mixture is required. The percolate is agitated with two sucessive 25 c.c. of distilled water, which are separated in the usual way. These are mixed and well agitated with chloroform to remove the last traces of mechanically adherent colouring matter. The chloroform is separated, the aqueous liquid rendered alkaline with ammonia and agitated with two successive 25 c.c. of chloroform, which are separated, mixed and agitated with a small quantity of water (rendered faintly alkaline with ammonia) to remove adherent aqueous liquid. The chloroform is then evaporated over a water-bath until the weight of the atropine and hyoscyamine is constant, which usually occupies a little less than one hour.

The special features which distinguish this process are, (1) it is simple and accurate; (2) a high temperature is avoided; (3) the solvent employed extracts a minimum of non-alkaloidal constituents; (4) no precipitants are used; (5) the use of acids is avoided; (6) the alkaloids are not heated with alkalies.

The root of *Atropa Belladonna* grown at Hitchin and carefully dried at 100° F. yielded 0·38 per cent. of total alkaloid (atropine and hyoscyamine) when estimated by this process. Other specimens estimated in the same way yielded 0·39 per cent. and 0·35 per cent. of total alkaloid.

The work connected with this investigation has been aided by a grant from the Research Fund of the British Pharmaceutical Conference. In a future communication we propose to show how this process can be applied to the estimation of the atropine and hyoscyamine in other parts of the plant.

* Dunstan and Short, "The Analysis of some Authentic Specimens of Nux Vomica" (*Pharm Journ.*, [3], xiii., 1053).

NOTE ON A CASE OF SOPHISTICATION OF AMERICAN OIL OF TURPENTINE.*

BY BOVERTON REDWOOD, F.I.C., F.C.S.

A short time ago a sample, representing a shipment of several hundred barrels of oil of turpentine from Wilmington, was handed to me for examination by Messrs. Ingall, Phillips and Co., the wharfingers.

The odour of the sample was peculiar, and the specific gravity very high (·887). The flashing point (Abel petroleum test) was also somewhat high (96° F.). The flashing point of eleven other samples of oil of turpentine, presumably pure, imported about the same time from the United States, was 92° F., and the highest specific gravity 0·8676. Upon distillation in a current of steam the sample yielded 4 per cent. of a viscid residue, slightly heavier than water. The specific gravity of the distillate was 0·873. The residue, besides being some sixteen times greater in quantity, differed in physical characters from the residues similarly yielded by the eleven other samples just referred to. These residues ranged from 0·12 per cent. to 0·35 per cent.

I made a brief report upon the sample but was prevented, by pressure of work, from following up the matter, and I am now unable to procure a further quantity of the oil. My father has, how-

* Read at an Evening Meeting of the Pharmaceutical Society, February 6, 1884.

ever, been good enough to examine the resinous matter left upon evaporation, and with the kind assistance of Mr. Holmes to compare it with specimens in the Pharmaceutical Society's Museum, but has, I understand, not succeeded in identifying it. A distinctive feature is its persistently bitter taste.

It is worthy of remark that the sample was drawn during the landing of the cargo, and the sophistication must therefore have taken place prior to shipment. Oil of turpentine is occasionally adulterated with the crude turpentine, but the character of the residue yielded by this sample would appear to indicate that the resinous exudation from some tree other than those which furnish the American turpentine of commerce had been added. A friend engaged in the turpentine trade, who is returning to Charleston, South Carolina, this month, has promised to ascertain, if possible, what is likely to have been so employed.

THE PRESS ON THE SALE OF POISONS.

From the MEDICAL TIMES, *February* 2.

Several unfortunate cases have recently drawn attention to the facility with which poisons can be obtained, by even the least respectable persons, and many suggestions have been made with the view of preventing "accidents." But the question is not so simple as it seems. Restriction as to the sale of poisons is difficult. Noxious things are among the daily necessities of a civilized community. Phenol, oxalic acid, binoxalate of potash, and others must be retailed to the general public and to the workers in many trades without passing through the cycle of oral and written forms. If it were possible to enact and carry out a very strict Pharmacy Act, a hundred and one arts and industries, from etching on copper to washing linen, would languish. Imagine a Royal Academician desiring to purchase a tube of green paint, and having to give his name and address, to write it in a book, and to state the purposes for which he requires it! What stronger poison is there than tobacco? Half an ounce infused in water would make short work of even an inveterate smoker; but the absurdity of including tobacco in a Poisons Act is too obvious for discussion. Not a few would like to see laudanum and chloral controlled in a much more thorough manner than under the present law, but we are doubtful whether steps in this direction are really practicable. If a person will eat opium or is under the thraldom of chloral no law will prevent him, in any efficient manner, save at the expense of the general community, from purchasing what he requires. If no druggist is to sell more than a grain of opium to one person, the opium eater has but to go to twenty, thirty, or forty druggists until he has accumulated his dose. Some coroners seem to imagine that many suicides would be prevented if common poisons, such as phosphorus paste and the like, were prohibited from being sold at all; but we venture to think, that only that kind of suicide dependent on sudden impulse would be at all influenced by any greater restriction being imposed than at present. There are many doors of death; a man bent on self-destruction, stopped in one direction, succeeds in another. Remove the poison, he cuts his throat with a razor; remove knives and drugs, he suspends himself with his neckcloth.

To sell poison as poison, with a poison label on it, in a poison bottle, is one thing, but to sell it under a fancy name is another. The "soothing syrups," the "cough drops," the "remedies for spasms," the countless pills, elixirs, lotions, drops, and sleeping potions which fill the druggists' shops, and their descriptions the advertising columns of the journals, are so many public dangers. A Lepcha once described the root of a glossy lurid-leaved Himalayan plant as "useful to sportsmen for destroying elephants and tigers, useful to the rich for putting troublesome relations out of the way, and useful to jealous husbands for the purpose of destroying faithless wives." In a similar spirit, looking at the long list of patent medicines of deadly composition, we may describe them as "useful to the insurer of the lives of others, useful to the expectant heir, useful to blight the shame-bud of illicit love, useful to the farmer of babies, and useful to all who have aught human to kill." The "powder of succession" can be bought for thirteenpence-halfpenny; the "Aqua Toffana" has changed its name to "Somebody's infallible skin remedy;" the venom that smeared the Indian's arrow receives the English Government stamp, and pays the Government duty as a never-failing application for neuralgia or toothache. Let us have done with masks; sell each thing and let it be sold under its own name and no other, let soothing syrup be called "a solution of opium, dangerous to children;" let the exact strength and composition of odontalgic essences, of solutions of aconite, of chloral, etc., be stated on the label, and if wrongly stated let the offender be amenable to law. The time is ripe to say that licensed quackery should no longer be permitted in its present form; but that the ignorant and unscrupulous man who puts chloral solution in a bottle, colours it with cochineal, names it "Somnifer," or anything else that can be registered, and casts it broadcast by means of advertisement over the land, should be held responsible for its use and abuse. So long as the composition of medicines and poisons is known, so long as there is no secresy, then there is fair protection both from accidental admixture and wilful ministration; but the present sale of poisons under the guise of patent medicines is not creditable to our laws, and is alien to our method of thought. We hope that an early effort will be made to take from the speculator and the charlatan the liberty they now possess of pressing the poisoned chalice to the lips of the credulous and simple.

SYRUP OF CALCIUM LACTOPHOSPHATE.*

R. Rother has lately recommended to prepare the above-mentioned syrup by dissolving lactate of calcium with the aid of phosphoric acid instead of following the old plan of dissolving phosphate of calcium in lactic acid, and, owing to the fact that lactate of calcium is not everywhere readily obtained, has proposed a formula which provides for its extemporaneous preparation when the syrup is to be compounded.

The proportions given by the author are such that the relative proportions of calcium phosphate and lactic acid contained in the finished syrup shall be one molecule of the former to six molecules of the latter (instead of four molecules, as it happens to be in the officinal syrup):

Calcium carbonate	150	parts.
Lactic acid, sufficient, or ab. . .	360	,,
Phosphoric acid, 50 per cent. .	196	,,
Sugar	6,545	,,
Water, sufficient to make . . .	10,908	,,

Mix the lactic acid with 1500 parts of water, and gradually add the calcium carbonate. If the mixture does not become clear, warm it gently and add lactic acid drop by drop, until a transparent solution is obtained. To this add the phosphoric acid previously mixed with 1500 parts of water together with enough more water to make the whole weigh 4363 parts. Then add the sugar, and when this has dissolved, with frequent stirring, filter the syrup through paper.

* From the *American Journal of Pharmacy*, 1883, 607. Reprinted from the *American Druggist*, February, 1884.

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THE REGISTRAR'S REPORTS.

THE presentation by the Registrar to the Pharmaceutical Council, at its meeting last Wednesday, of his usual Reports on the Registers and on the Numerical Strength of the Pharmaceutical Society enables us, according to our custom for several years past, to complete the statistics commenced in our recent summary of the events of the year 1883, and to estimate the advance or otherwise made by the Society in respect to the fulfilment of its ambition to become more fully representative of the whole body of chemists and druggists. Without referring again to the details as to the examinations it will be sufficient to say that the number of Chemists and Druggists on the Register on the 31st of December, 1883, was 13,665, of whom 2248 were also included in the Register of Pharmaceutical Chemists. These figures show a considerable increase in the number of Chemists and Druggists, but a decrease of 27 in the Pharmaceutical Chemists. Although it will be necessary to use the former of these figures for purposes of comparison, nevertheless, in consequence of the imperfect manner in which the Registrars of Deaths throughout the country carry out the statutory provision as to communicating information of the death of registered Chemists and Druggists, it is impossible to say more than approximately this year what the real number of persons entitled to be on the Register is; but it is certain that the apparent increase will be considerably modified when the Registrar shall again—probably in the course of the present year—exercise the powers conferred upon him for the rectification of the Register.

As to the decrease in the number of pharmaceutical chemists, this is not unanticipated, it being due to a well-recognized cause, which will continue to operate for several years to come. However much it is to be regretted, as narrowing the class competent to become Members of the Pharmaceutical Society, it would be an exaggeration of its signification to look upon it as showing a falling off in the number of persons passing the Major examination; because, as we have pointed out in previous years—and we say it again at the risk of being thought to repeat ourselves—the class is subject to losses from deaths not only among examined men but also among upwards of seven hundred persons included in virtue of having been in business and joined the Pharmaceutical Society upwards of thirty years ago. The fact is that Pharmaceutical Chemists holding the Major certificate continue to increase, the number at the end of last year having been 1547 against 1511 twelve months previously. It follows, therefore, that Major men now constitute 11·32 per cent. of the whole body of Chemists and Druggists. Necessarily the number of persons who have qualified for registration by passing the Minor only has also increased, the number being 3508 against 3287 in the previous return. These two figures give the total number of persons on the Register in virtue of examination, which amounts now to 5055, or 36·99 per cent. of all the Chemists and Druggists in the country. Throwing these figures into a tabular form, for the sake of comparison with previous years, the result is as follows:—

	January 1, 1883.				January 1, 1884.			
	Number.		Per cent.		Number.		Per cent.	
Pharmaceutical Chemists:—								
Examined . .	1511	2275	11·24	16·92	1547	2248	11·32	16·45
Non-examined	764		5·68		701		5·13	
Chemists and Druggists who have passed the Minor only . .		3287		24·44		3508		25·67
Remainder, including those who have passed the Modified . .		7885		58·64		7909		57·88
Total		13,447		100·00		13,665		100·00

The Report of the Registrar as to the numerical strength of the Pharmaceutical Society certainly presents subjects for congratulation; for although it shows a decrease in the number of Members—21 Pharmaceutical Chemists and 17 Chemists and Druggists — the increase in the number of Associates has been more than sufficient to compensate for this in point of numbers. Indeed, not only has the retrogression that was recorded last year been recovered, but the number of registered Chemists and Druggists connected with the Pharmaceutical Society at the end of last year was within six of the highest yet attained, whilst, if Apprentices be included, the highest previous number was considerably exceeded. The decrease in the number of Members, both Pharmaceutical Chemists and Chemists and Druggists, is attributable to causes similar to that previously referred to as affecting the general Register of Pharmaceutical Chemists, and which, indeed, affect the membership of the Society in an even greater degree. But the number of Pharmaceutical Chemists who belonged to the Society as Members at the close of the year was 1882 out of a total of 2248 on the general Register, and it is worthy of notice that although only 55 persons passed the Major examination during the year 1883, 50 Pharmaceutical Chemists were elected Members and 10 restored to membership during the same time. The Associates in Business numbered 1178, showing an increase of 71 on the previous year, and the Associates 827, showing an increase of 3. The steady increase, year by year, in the important class of Associates in Business is remarkable, and points to the desirability of the provision in the Draft Pharmacy Bill that the passing of the qualifying examination shall constitute eligibility to full membership of the Society. It remains only to say that the number of Apprentices had increased from 1037 to 1098. The figures of the two years may be compared as follows:—

	January 1, 1883.		January 1, 1884.	
	No.	Per cent of whole.	No.	Per cent of whole.
Pharmaceutical Chemists, Members of the Society .	1882	82·72	1861	82·78
Other Registered Chemists and Druggists connected with the Pharmaceutical Society	2710	—	2767	—
Total number of Registered Chemists and Druggists connected with the Pharmaceutical Society. . .	4592	34·15	4628	33·89
Registered Apprentices subscribing to the Society .	1037	—	1098	—

The Registers of Pharmaceutical Chemists and Chemists and Druggists, for 1884, is now ready and copies may be obtained from the Registrar, 17, Bloomsbury Square.

* * *

In the House of Commons, on Thursday, Mr. Warton, according to notice, asked the Secretary of State for the Home Department whether his attention had been called to the case of William Henry John Heath Sheaham, aged seven months, on whose body an inquest was holden on the 31st December, 1883, by Dr. Danford Thomas, and whose death the jury found was caused by the antimony contained in a patent medicine called "Holt's Specific for Whooping-Cough;" whether he was aware that the jury did not (*sic*) desire to call attention to the sale of patent medicines, with a view to legislation on the subject; and whether it was his intention to bring in a Bill to restrict the sale of poisonous patent medicines. The question was replied to by the Vice-President of the Committee of Education of the Privy Council (Mr. Mundella), who said that the attention of the Privy Council had been directed to this and two other similar cases, and that a Bill was under consideration, which would be introduced shortly in the House of Lords, dealing with the whole subject. Mr. Warton's question was no doubt asked as *à propos* of the fact that a "Bill to restrict the Sale of Patent Medicines" had been introduced by him in the House of Commons on the previous evening and read a first time. This Bill has not yet been printed, but the second reading is set down for the 26th of March.

* * *

A Bill dealing with this subject has been introduced into the United States House of Representatives containing provisions that appear to have disturbed the equanimity of transatlantic patent medicine dealers. It proposes to make it illegal for the post office authorities to include in the mails any advertisement or advertising device of "any medical preparation, compound or prescription, or any punch, bitters, cordial or similar compound or preparation to be used as medicine or mixed with food, liquor, wine or any other substance used as a beverage or as food or medicine," until the exact formula for the preparation of the article advertised has been deposited, together with a sample, in the Patent Office, and a certificate has been issued by examiners appointed for the purpose that the article is not noxious or dangerous to health. As such a provision, if carried out stringently, would exclude nearly all newspapers from postal privileges or necessitate a radical alteration in their advertising columns involving, it is estimated, a probable annual loss to the proprietors of at least a million sterling, it will be interesting to observe the attitude of the public press in the States towards the Bill.

* * *

A Bill providing for the registration of firms and of persons carrying on business under names and styles other than their own was read a first time in the House of Commons on Wednesday last, and the second reading is set down for the 3rd of March. The Bill was brought in by Mr. Norwood.

* * *

The new Rules for the Registration of Trade Marks, with Classification of Goods and Table of Fees, were on Tuesday, in accordance with the terms of the Patent Act, laid before Parliament. It may be useful to state that a pretty full abstract of this paper is printed in the new Calendar of the Pharmaceutical Society.

* * *

A curious case, involving the question as to how far unqualified persons can hold property in pharmacies in France, has been recently before the Cour de Paris. It seems that a pharmacien who had opened a pharmacy, not being successful, disposed of the business to a company, including unqualified persons, by whom he was employed as manager. This mode of carrying on a pharmacy was, however, objected to by the Société de Prevoyance des Pharmaciens de la Seine, which, more fortunate than the Pharmaceutical Society in this country in similar circumstances, succeeded in obtaining a legal judgment which put a stop to it. The baulked company then proceeded to dispose of the business to a pharmacien, but here the creditors of the founder of the establishment intervened, and on the plea that as the company could not legally carry on the business the first sale was not a valid one claimed the business as part of the defaulter's estate. This claim has not been allowed by the Court, and it would, therefore, appear that in France an unqualified person may become the proprietor of a pharmacy, but that whilst it continues in his possession the business must not be carried on.

* * *

The enormous proportions attained by the glucose industry in the United States, and probably some disquieting rumours that have found currency concerning the wholesomeness of the product, appear to have induced the American Commissioner of Inland Revenue to ask the aid of the National Academy of Sciences in investigating the subject. The Academy entrusted the inquiry to a Committee, which has recently reported its opinion that the processes at present employed in the manufacture of sugar from starch are unobjectionable and leave the product uncontaminated; that the starch sugar thus made and sent into commerce is pure and uniform in composition and contains no injurious substances; and that although possessing, at most, only two-thirds of the sweetening power of cane sugar, nevertheless, starch sugar is not inferior to it in healthfulness, no evidence having been met with that maize starch sugar, either in its normal condition or when fermented, has any deleterious effect upon the constitution even when taken in large quantities.

* * *

In a paper contributed to the new number of the *Journal de Pharmacie*, M. Lepage mentions that in the performance of his duties as an inspector of pharmacies he has frequently met with specimens of aqueous extract of cinchona which failed to give evidence of containing more than traces of alkaloid. Seeking an explanation he found that in order to meet a requirement on the part of certain physicians that the extract should be completely soluble in water it was frequently prepared with cold water instead of the boiling water ordered in the Codex. In a similar manner the alcoholic extracts of belladonna and henbane are said to be supplanted by what are really aqueous extracts, containing hardly any alkaloid.

* * *

According to *Nature* it was announced at the last meeting of the Vienna Physical Society that Professor von Wroblewski has succeeded in effecting the solidification of hydrogen.

* * *

The gold medal offered annually by the Paris Society of Pharmacy for the best thesis on a subject belonging to natural or chemical science has recently been awarded to M. Anthoine for a memoir on "The Anhydrides and Mixed Anhydrides of Acetic Acid and Chlorated Acetic Acids."

* * *

The *Bulletin Commercial* publishes a curious genealogical fragment, based upon extracts from municipal archives, showing that during six consecutive generations of a family named Baudot, the occupancy of a pharmacy in Langres (department of Haute-Marne) has passed from father to son without any break. The family occupation extended over nearly two centuries.

* * *

We regret to say that information has been received of the death on the 28th of January, from bronchitis, of Mr. Henry Edward Davies, who was elected an annuitant in 1883.

* * *

The Third Junior Pharmacy Ball took place at Willis's Rooms, on Wednesday last, and was in every respect successful, the company numbering about three hundred and sixty. The toasts were proposed by Professor Attfield, F.R.S.

* * *

The annual dinner of the Chemists' Assistants' Association is to take place at the Holborn Restaurant on Wednesday, February 20. S. R. Atkins, Esq. (Vice-President of the Pharmaceutical Society), in the chair. Information as to tickets, which should be applied for at once, will be found in an advertisement on another page.

* * *

The next meeting of the Chemists' Assistants' Association will be held on Wednesday, 13th inst., at 9 p.m., when a paper on "The Human Eye" will be read by W. J. Frankish, Esq., M.R.C.S.E.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, February 6, 1884.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Messrs. Andrews, Bottle, Butt, Churchill, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Squire, Symes, Williams, Woolley and Young.

The minutes of the previous meeting were read and confirmed.

Members of the Council who Retire.

The lot having been taken in the usual manner to determine the seven members of the Council who should retire in May next, the following names were drawn:—

Atkins.	Radley.	Savage.
Borland.	Robbins.	Woolley.
Butt.		

The following, who remained in by lot last year, now retire by rotation:—

Churchill.	Schacht.	Williams.
Gostling.	Squire.	Young.
Greenish.		

The following remain in office another year:—

Andrews.	Hampson.	Richardson.
Bottle.	Hills.	Symes.
Carteighe.		

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following pharmaceutical chemists, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Allsworth, Norman ....London.
Dymond, Thomas Southall......Enfield.
Gulliver, Walter Frederick......London.
Ivatt, Albert......................Cambridge.
Jones, Frank......................Royton.
Jones, William....................London.
Longtoft, William ....London.

Chemists and Druggists.

The following registered chemists and druggists, who were in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Brookes, George ....Llandudno.
Robb, John ....Cardiff.

ASSOCIATES IN BUSINESS.

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

Minor.

Bradford, George Henry.........Bridlington Quay.
Hill, Richard Mainprize ....Scarborough.
Innes, David.......................Stalybridge.
Penberthy, Henry Broad ......Sidmouth.
Quick, William Thomas ....Lympstone.
Sanderson, Edward John ......Hazel Grove.
Winter, Joseph ....Llandudno.

Modified.

Bottomley, Lawrence W. ......South Shields.
Bush, William ....London.
Castell, George Gower...........Sydney, N.S.W.
Phillips, Charles ....Birmingham.
Strode, Thomas ....London.

ASSOCIATES.

The following, having passed the Minor examination and tendered their subscriptions for the current year, were elected "Associates" of the Society:—

Buchanan, John ....Bonnyrigg.
Cairns, John ....Kelso.
Coats, John Thomson ....Edinburgh.
Dorning, Herbert Rigby.........Chorley.
Flett, Arthur ....Edinburgh.
Harrison, John......................Lincoln.
Hogg, Henry Scott ....Glasgow.
Jack, James ....Arbroath.
Mackenzie, James Calder ......Grantown.
Millhouse, Edward ....Grantham.
Smith, Charles Albert ....Leeds.
Steward, Josiah William.........Bridgnorth.
Tookey, Edwin James.............Birmingham.

APPRENTICES OR STUDENTS.

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

Adams, Anthony Allan ....Salcombe.
Anderson, James Grant ....Aberdeen.
Andrew, John Herbert ....Oldham.
Arnold, John Julius ....Brighton.
Atherton, Henry C.................Tunbridge Wells.
Atkinson, William George......Ulverston.
Baker, Sidney George ....High Barnet
Baker, Walter James ....Dorking.
Barker, George.......................Mirfield.
Bowie, Alexander... ....Kincardine.
Brook, Thomas Turner ....Elland.
Brown, George Henry ....Gravesend.
Burden, Chas. Hy. Brown ......Bude.
Carter, Benjamin...................Falmouth.
Clarke, William Ernest ....Aberystwith.
Clayton, William Arthur.........Sheffield.
Cleghorn, James ....London.
Cox, Charles Earnshaw ....Doncaster.
Croxford, William Charles......Brentford.
Davenport, Richd. Cartwright...Talgarth.
Davies, Charles Gardiner ......London.
Dryden, Thomas ....Landore.
Dunn, George Marchant.........London.
Eatough, Nicholas William.......Blackburn.
Essery, William George ....Plymouth.
Fish, Benjamin, jun. ....Barrow-in-Furness.
Forby, Archibald....................Downham Market.
Fowle, Sydney ....London.
Francis, James B. ....Wrexham.
Freshney, John William S........Lincoln.
Gibson, William Thomas.........Collingham.
Gott, Alfred Thomas ....Bradford.
Gray, Alfred Francis ....Leicester.
Gregory, George Henry ....Lincoln.
Griffiths, Charles Henry ....Manchester.
Hanson, Arthur ....Queensbury.
Hickinbottom, John William...Sleaford.
Higson, John Russell ....Ruthin.
Hislop, James Andrew ....Hawick.
Hoblyn, Edward Robert.........Exeter.
Hooper, William Henry ....Okehampton.
Jenkins, Thomas ....Aberdare.
Johnson, Frederick David ......Beverley.
Jones, Thomas ....London.
Jopling, William ....Bishop Auckland.
Kidd, George Thomas ....Stowmarket.
Lakeman, Nicholas Frank ....Modbury.
Lawton, Charles Edward ....Lockwood.
Madge, Thomas William ....Shaldon.
Manley, William James ....Torquay.
Mills, George ....Southsea.
Morgan, William Thomas ....Llandovery.
Morris, Caleb Gwion ....St. Clears.
Newbould, Victor Emanuel ...Sutton.
Newman, Richard Seymour ...Hanley.
Nicholson, John ....Broughton-in-Furness.
Pain, Percy ....Cambridge.
Parkinson, William ....Blackburn.
Perren, Herbert Joseph ....Brighton.
Phillips, Daniel ....London.
Phillips, George ....Dowlais.
Pimm, Henry Arthur ....Torquay.
Pollard, Walter Henry ....Reading.
Prentice, Bertram ....Edinburgh.
Ralling, Ernest Lewis ....Colchester.
Retallack, William Cyrus ......St. Austell.
Robertson, George ....Bridge of Allan.
Shaw, Harry..........................Wakefield.
Simpson, Frederick Charles ...Pershore.
Smith, John Henry ....Coventry.
Southwell, Charles Bullock......Bridgnorth.
Spratling, Walter...................Boston.
Spry, Richard ....London.
Spurway, Edgar ....Kidderminster.
Stevens, Arthur ....London.
Stewart, Robert McAll ....Penryn.
Taylor, William C. C. ....Saltburn-by-Sea.
Taylor, William Edward.........Basingstoke.
Thornhill, Ernest ....Brighton.
Williams, William ....St. Clears.
Willson, John Wherry............Peterborough.
Wilson, John..........................Aberdeen.
Wilson, Kendrew John ....Thirsk.
Woolley, Edward James.........Manchester.

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

Restorations to the Register.

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

James Palliser Douglas, 99, East Street, Southampton.
Willam Hudson, The Willows, Upper Mitcham, Surrey.

The Registrar's Report.

The usual report by the Registrar upon the numerical strength of the Society, the statistics of the examinations and the Registers, was laid upon the table and ordered to be published. The report is printed on pp. 632 and 633.

Reports of Committees.

FINANCE.

Upon the motion of the President, the report of this Committee was received and adopted, and sundry accounts were ordered to be paid.

Mr. Schacht congratulated the Council that the President had arranged to take the chair on the previous day at the meeting of this Committee, and had thus conveyed to the Committee his approbation of the suggestion recently made that the President or Vice-President should take the chair at all meetings of the Finance Committee. It occurred to most then present that it was very desirable, if the President could make it convenient to do so, that he should take the chair, because he could carry on with more perfect continuity than any one else the story of the expenditure of the Society. Many reasons might be mentioned for the desirability of this arrangement, but he would only mention one, viz., that from time to time many questions of expenditure came forward which had to be dealt with on the authority of the President in the first instance; they would come before the Committee afterwards, and it was very desirable that the President should be present and give such explanations as might appear necessary. Hitherto the President had generally given his attention to the

Benevolent Fund Committee, which sat at the same time, but it appeared to him that that Committee might be quite as well presided over by the Vice-President.

The PRESIDENT said he had no doubt that the Vice-President and himself would be able to arrange satisfactorily for the work of these two Committees.

BENEVOLENT FUND.

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

£10 to a former member, aged 68 (who has had nine previous grants), suffering from chronic disease. Sussex.

£10 to the widow of a registered chemist and druggist, aged 38. Applicant had £10 in February, 1883. Husband died in 1882 leaving her with seven young children, one of whom has since died. Essex.

£5 to the widow of a registered chemist and druggist, aged 60. Applicant has had four previous grants, is in ill-health and dependent for support upon two sons; has also two daughters. Middlesex.

£10 to a registered chemist and druggist, aged 74. Had a grant of £10 in May last. Too old and feeble to earn anything. Sussex.

Several other applications had been received, which the Committee declined to entertain.

The Secretary had reported that he had expended fifteen out of the twenty guineas granted last month for the purpose of securing the election of a child to the London Orphan Asylum, and had been successful. The death of Mr. Davies, one of the annuitants, had been reported.

The Council went into committee while an explanation was given as to one of the applications which had not been entertained. In the course of the discussion which ensued, several members commented on the new regulations introduced with regard to signing the papers of application, the opinions expressed being very divergent. The only point necessary to refer to is one mentioned by Mr. Butt, viz., that applicants should not rest satisfied with the two signatures actually required, but should get their applications supported as influentially as possible.

On resuming, the report and recommendations were, on the motion of the Vice-President, unanimously adopted.

Donations to the Benevolent Fund.

The PRESIDENT announced the receipt of the following handsome donations:—

Mr. Buck, Stamford Hill, £105.
Miss Humpage, in memory of her late father, Mr. Benjamin Humpage, Chiswick, £50.
Mr. Charles Maw, Aldersgate Street, £105.
Mr. C. T. Maw, Aldersgate Street, £26 5s.

The special thanks of the Council were voted to the donors.

LIBRARY, MUSEUM, LABORATORY, AND HOUSE.

Library.

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

Attendance.		Total.	Highest.	Lowest.	Average.
December	Day	328	26	2	14
	Evening	138	20	4	9
Year 1883	Day	6011	40	0	20
	Evening	1764	20	1	8

	No. of Entries.		
Circulation of books.	Town.	Country.	Total.
December	130	92	222
Year 1883	1866	1374	3240

Carriage paid.	£	s.	d.
December	1	6	11
Year 1883	20	4	2½

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

Eder (J. M.), The Chemical Effect of the Spectrum, 1883. From Capt. ABNEY [?].

Society of Medical Officers of Health, Transactions, 1882-3. From the SOCIETY.

Meyer (A.), Handbuch der qualitativen chemischen Analyse, 1884. From the AUTHOR.

Attfield (J.), Chemistry, 10th [U. S.] ed., 1883. From the AUTHOR.

Gay (H. F. F.), Étude Micrographique et Spectroscopique des Teintures et des Alcoolatures et en particulier des Teintures d'Opium, 1883. From Professor SOUBEIRAN [?].

Companion to the British Homœopathic Pharmacopœia, 2nd ed., 1883. From Messrs. KEENE and ASHWELL.

The Committee recommended the purchase of the undermentioned works:—

Bleaching, Dyeing, and Calico Printing (Churchill's Technological Handbooks), 1884.

Kohlrausch (F.), Introduction to Physical Measurements, 1883.

Kilner (W. B.), Compendium of Modern Pharmacy, 5th ed., 1884.

Curator's Report.

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

	Total.	Highest.	Lowest.	Average.
Morning	399	37	2	18
Evening	110	16	0	5

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

Specimens of Hydroxylamine, Hydroxylamine Hydrochloride and Hydroxylamine Sulphate. From Mr. W. H. INCE.

Specimens of Chian Turpentine and Mastic from the Island of Scio, a fine specimen of Gum Arabic and of Scammony Resin. From Mr. ZANNI, of Constantinople, presented through Mr. T. GREENISH.

Specimens of Paraffinum Solidum, and Paraffinum Liquidum, Unguentum Paraffinum, and Adepsine. From KARL HELLFRISCH and Co., Offenbach-on-the-Maine.

Specimens of the seeds of Cassia occidentalis and of a root from Africa resembling Pareira Brava. From Mr. G. C. MACWILLIAMS.

Specimens of Tinguaciba Bark and of Bark of the Balsam of Peru tree. From Messrs. T. CHRISTY and Co.

A letter had been received from the Superintendent of the Royal Botanic Gardens, Calcutta, reporting the dispatch of further specimens of cinchona bark, analyses of which were enclosed.

The Professors had reported satisfactorily of their respective classes.

The Committee had considered the question of securing additional premises in Edinburgh, the accommodation being insufficient on examination days, and recommended that a suitable house be secured at the first convenient opportunity.

The PRESIDENT, in moving the adoption of the report, having referred to the value of the specimens of bark which were being presented to the Society, suggested that the Council should go into committee for the purpose of considering the last paragraph of the report, referring to the premises of the North British Branch.

This being acceded to,

The PRESIDENT explained in detail the reasons which had weighed with the Committee in the recommendation it had made. He stated that the present premises in George Street, though in many respects suitable, were defective in regard to the approach, and also in sanitary arrangements, which on days of examination was found very inconvenient. It had been suggested that it would answer the purposes of the Society better to purchase a house suitable to its requirements, and inquiries having

REGISTRAR'S REPORT.

MEMBERS, ASSOCIATES, AND APPRENTICES OF THE SOCIETY FOR THE YEAR 1883.

	Life Members.		Subscribing Members.		Associates in Business.	Associates not in Business.	Apprentices.
	Pharmaceutical Chemists.	Chemists & Druggists.	Pharmaceutical Chemists.	Chemists & Druggists.			
Number in 1882	236	2	1646	777	1107	...	..
„ restored, 1883 ...	...	...	10	2	5	...	...
„ elected, 1883 ...	...	...	50	14	138	...	...
	236	2	1706	793	1250	...	...
Deaths, Secessions, etc. ...	7	...	74	33	72	...	...
Total Strength of the Society	**229**	**2**	**1632**	**760**	**1178**	**827**	**1098**
Summary:—							
1882	236	2	1646	777	1107	824	1037
1883	229	2	1632	760	1178	827	1098
Increase	...	...	...	...	71	3	61
Decrease	7	...	14	17	...	...	...

COMPARATIVE STATEMENT OF THE NUMERICAL STRENGTH OF THE SOCIETY FOR 5 YEARS: 1879-83.

MEMBERS.—PHARMACEUTICAL CHEMISTS.

	1879	1880	1881	1882	1883
Restored to Membership ...	7	4	5	8	10
Elected „ ...	67	65	62	35	50
(Total additions) ...	74	69	67	43	60
Deaths, Secessions, etc. ...	91	82	101	92	74
Decrease ...	17	13	34	49	14
Total Number of Subscribing Members	1742	1729	1695	1646*	1632

MEMBERS.—CHEMISTS AND DRUGGISTS.

	1879	1880	1881	1882	1883
Restored to Membership ...	1	2	3	3	2
Elected „ ...	19	24	18	15	14
(Total additions) ...	20	26	21	18	16
Deaths, Secessions, etc. ...	33	35	38	27	33
Decrease ...	13	9	17	9	17
Total Number of Subscribing Members	812	803	786	777	760

ASSOCIATES IN BUSINESS.

	1879	1880	1881	1882	1883
Restored	3	5	2	4	5
Elected	133†	137	131	115	138
(Total additions) ...	136	142	133	119	143
Deaths, Secessions, etc. ...	70	82	89	81	72
Increase ...	66	60	44	38	71
Total Number of Associates in Business	965	1025	1069	1107*	1178

ASSOCIATES NOT IN BUSINESS.

	1879	1880	1881	1882	1883
Increase ...	19	13	...	7	3
Decrease ...	...	...	23	...	...
Total Number of Associates not in Business	827	840	817	824	827

APPRENTICES OR STUDENTS.

	1879	1880	1881	1882	1883
Increase ...	31	3	...	...	61
Decrease ...	...	...	28	9	...
Total Number of Apprentices or Students	1071	1074	1046	1037	1098

LIFE MEMBERS.

	1879.	1880.	1881.	1882.	1883.
Pharmaceutical Chemists	**241**	**237**	**238**	**236**	**229**
Increase	...	...	1	...	...
Decrease	2	4	...	2	7
Chemists and Druggists	**2**	**2**	**2**	**2**	**2**

* 1 who paid as an Associate in Business, afterwards passed the Major, and was elected a Member.
† 134 were elected, but 1 afterwards passed the Major, and was elected a Member.

ANALYSIS OF EXAMINATIONS FOR THE YEAR 1883.

FIRST OR PRELIMINARY EXAMINATION

Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year	Average Number of Candidates at each Examination.	Average Number of Rejections at each Examination.	Percentage of Rejections.
1539	770	769	4	384·75	192·25	49·96

MAJOR, MINOR, AND MODIFIED EXAMINATIONS.

ENGLAND AND WALES.

Number of days on which the Board met for conducting the Major, Minor, and Modified Examinations... 26
Average attendance of the Members of the Board of Examiners at each Meeting ... ... 15·38

Examinations.	Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of Rejections at each Meeting.	Percentage of Rejections.
Major	100	50	50	6	16·66	8·33	50·0
Minor	632	235	397	6	105·33	66·16	62·8
Modified	9	6	3	4	2·25	·75	33·3

SCOTLAND.

Number of days on which the Board met for conducting the Major, Minor, and Modified Examinations... 12
Average attendance of the Members of the Board of Examiners at each Meeting ... ... 8·5

Examinations.	Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of Rejections at each Meeting.	Percentage of Rejections.
Major	11	5	6	4	2·75	1·50	54·54
Minor	134	59	75	4	33·50	13 75	55·97
Modified	1	1	0	1	1·00	0·00	00·0

THE REGISTERS OF PHARMACEUTICAL CHEMISTS AND CHEMISTS AND DRUGGISTS, 1883.

Additions during the year:—

Number of persons who have passed the—		
Modified Examination		7
Minor „		294
Major „	55*	
Number of persons registered on payment of the Registration Fee, having been in business before August 1, 1868............................		14
Number of persons restored to the Register on payment of a fine		18
Placed on the Register by virtue of restoration to membership—Pharmaceutical Chemists .		5
		338

* These having already been included in the number who passed the Minor, do not increase the numbers on the Register.

Erasures during the year:—

Deaths:—	
Notices from Registrars	138
Other sources	60
Erased at the request of registered persons themselves...	7
Increase of numbers on the Register.	133
	338

Number of Pharmaceutical Chemists on the Register, December 31st, 1882	2,248	
„ „ Chemists and Druggists	11,417	
		13,665

been made, it was found that the Society would be put to little or no extra expense by so doing; whilst if a larger house than was at present requisite were acquired, no difficulty would be found in sub-letting a portion of it.

Mr. YOUNG gave further information of a similar character.

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

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor, reporting upon the progress of cases in his hands. In most cases great difficulty had been found in obtaining the evidence required. Two other cases of alleged infringement of the Pharmacy Act had been considered, and it was recommended that the Solicitor be instructed to commence proceedings.

The Council went into committee to consider the report.

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

LAW AND PARLIAMENTARY.

The report of this Committee stated that at the last meeting the President and Vice-President of the Chemists and Druggists' Trade Association had been present by invitation when the provisions of the Bill were discussed and explained. The Secretary had been subsequently directed to write to the Secretary of the Trade Association, inviting the Executive to appoint a small deputation to join one from the Council in waiting on the Lord President of the Privy Council. A reply had been received stating that the matter would be brought before the Executive of the Trade Association at its next meeting on the 8th inst.

The Council went into committee to discuss the report.

On resuming, it was received and adopted.

REPORT OF EXAMINATIONS.

January, 1884.

SCOTLAND.

	Candidates. Examined.	Passed.	Failed.
Minor (22nd)	14	8	6
„ (23rd)	14	10	4
„ (24th)	13	9	4
	—41	—27	—14

PRELIMINARY EXAMINATION.

	Candidates. Examined.	Passed.	Failed
January 8th.	278	127	151

Six certificates received in lieu of the Society's Preliminary examination.

1 College of Preceptors.
3 University of Cambridge.
2 „ „ Oxford.

Mr. SCHACHT said some figures had been put into his hands with regard to the last Preliminary examination, to which he should like to call attention. They showed that the examination was extremely exact for its purpose, inasmuch as a candidate whose general education had been good, who had been well trained, but who went in for this examination without any sort of special training, succeeded in obtaining nearly the maximum number of marks.

Mr. HILLS was much interested in this report (published on p. 613), but regretted to find that arithmetic was still the plucking subject. He considered it the most important subject of the three, seeing how requisite it was that prescriptions should be exactly dispensed, even from the point of view of the safety of the public. He found that out of 151 failures no less than 65 were in arithmetic alone.

CORONER'S JURIES.

The PRESIDENT said the Council had no doubt read a note in the Journal containing some strong statements made at a coroner's inquest with regard to the exemption of pharmaceutical chemists from service on such juries. Without going into details he might say that on his attention being called to the subject he at once communicated with the Solicitor, who, subsequently, had an interview with the Coroner, and there was every reason to hope that the contingency referred to would not arise. Of course he would not assert anything positively, but the opinion of the Solicitor was, that in the case of pharmaceutical chemists the exemption was complete, and if any pharmaceutical chemist should get into any difficulty on this point he hoped he would at once communicate with the Secretary.

Mr. SAVAGE said he had written to the gentleman referred to on seeing the report in the local paper, telling him that it was his duty to see that his name was not included in the list of persons liable to serve on juries.

The PRESIDENT remarked that coroners did not summon by any jury list; they could summon any householder, or even a person in the street, if necessary; but in the case of pharmaceutical chemists the exemption clause contained the words "all inquests whatsoever," and they claimed to be exempt. He would therefore mention that pharmaceutical chemists were exempt, not for their own personal convenience, but that the safety of the public might not be endangered during their absence from their pharmacies.

Mr. ANDREWS said he was summoned a short time ago on an inquest and the coroner told him that he did not read the Act in the same way as he (Mr. Andrews) did. On that occasion he remained at the request of the coroner as a matter of courtesy; but there was no doubt that coroners did not consider that their courts were governed by the same rules as applied to ordinary jury service.

The PRESIDENT said that was quite correct; and, curiously, the exemption of medical men, solicitors, barristers and others, only extended to ordinary juries; but in the case of pharmaceutical chemists and solicitors' clerks the clause contained the words "all inquests whatsoever," and he, therefore, thought they were exempt from service.

ADDENDUM.—Page 612, col. i, line 6, in the list of examiners present at the meeting of the Board in Edinburgh, *after* Gilmour, *insert* Kinninmont.

EVENING MEETING.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT, IN THE CHAIR.

The Fourth Evening Meeting of the Session was held, on Wednesday, February 6, the chair being taken at half-past eight o'clock.

The minutes of the previous meeting were read and confirmed.

Two papers were then read, constituting Parts IV. and V. of a Report on the Pharmaceutical Preparations of Nux Vomica, which were entitled—

IV. THE PREPARATION OF A STANDARD EXTRACT OF NUX VOMICA.

V. THE PREPARATION OF A STANDARD TINCTURE OF NUX VOMICA.

BY WYNDHAM R. DUNSTAN AND F. W. SHORT.

The papers are printed on pp. 621 and 622, and gave rise to the following discussion:—

The VICE-PRESIDENT said that the papers had struck him as essentially valuable on account of their practical nature. However important it was that, at times, they should pass into the region of abstract speculation and original research in pure chemistry, he took it that it was highly important in that room that they should have papers which were essentially practical. It further occurred to him that the papers were a very valuable contribution upon the subject of preparations of absolutely definite or standard strength. They had been going on in the belief that the preparations which they had been dispensing had approximated to a greater degree of uniformity than they evidently possessed. The authors set forth a by no means difficult process by which they could obtain an extract containing a total of 15 per cent. of the alkaloids strychnine and brucine and a standard tincture containing 1 grain of total alkaloid to the ounce. The obtaining of such preparations was in itself an important contribution to pharmaceutical science.

Mr. Schacht said that within the last few weeks it had been his duty, in the ordinary course of business, to prepare a fresh batch of the extract of nux vomica and he had availed himself of the valuable suggestions contained in previous papers written by the same authors. Instead of using pure spirit, he had employed the proportion of spirit and water which they had recommended as the best solvent for the powerful ingredients of nux vomica. He operated upon a quantity of seven pounds of nux vomica, and he proceeded by the old-fashioned process of softening the material by steam and then drying it and putting it into a mill and grinding it. By this means he easily obtained a very nice powder, and this was exhausted by percolation in the most simple of all apparatus. The percolation was continued until there was no sign of colour, or very little. His experience had differed somewhat from that of these extremely careful experimenters. He had found that something like 43 pints of the diluted alcohol were required to exhaust the 7 pounds of nux-vomica. That the materials were thus very nearly exhausted he found by putting them afterwards into boiling alcohol, and thoroughly boiling them, the result of which process was that he got only 3 drachms more out of the whole 7 pounds. The operation yielded 36 pints of tincture, and that being evaporated under conditions for saving the spirit yielded him ultimately 14 ounces of extract. Unfortunately, the process was not completed until Friday last, and the time which had elapsed since had not sufficed for him to be able to ascertain the proportion of alkaloids in a satisfactory way. He almost thought that a larger proportion would be yielded than Mr. Dunstan had found in the other cases. If it was true that nux vomica contained nearly 3 per cent. of total alkaloids, 7 pounds ought to yield about 3·42 ounces total alkaloids. If the extract contained the whole, then 14 ounces ought to contain 3·42 ounces of alkaloid, nearly 3½ ounces, which was about 24 per cent., and therefore a good deal more than 15 per cent. He had no intention of criticizing the results in the paper. They were, no doubt, extremely accurate, but he should like the authors to say whether the practical experiments of a commonplace pharmacist corresponded with their own. Mr. Dunstan had a proper anxiety to indicate a standard strength for the extract, but if he took a certain quantity of tincture of known alkaloidal value and evaporated it to an extract which should have a strength corresponding to a standard, how did he manage when he got it to that condition beyond which it must not be evaporated? He might add something to dilute it, but that would be the admission of a practice which he (Mr. Schacht) should not like to encourage. The dilution of a specific preparation seemed to be a dangerous thing to admit with authority. On the other hand, supposing that the extract, when prepared by commonplace pharmacists, contained 20 per cent., he should like to know what right anybody had to say that it should contain only 15. He must ask that the question of the standards be an open question. Again, supposing that the extract contained even 15 or 20 per cent., he thought that the Pharmacopœia authorities ought to modify in another edition that portion of the book which gave the doses. The Pharmacopœia declared a dose of extract of nux vomica to be from ½ a grain to 2 grains; but 2 grains of an extract, which contained 20 or 24 per cent. of strychnine and brucine, was a little outside what it was wise to prescribe upon authority.

Mr. Martindale said that he supposed that the papers were written in prospect of the introduction of a new Pharmacopœia. The standard strength which Mr. Dunstan proposed was that of 1 grain to the ounce. He (Mr. Martindale) had hoped that they were coming somewhat more nearly to the metrical system. One grain to the ounce was not a good proportion. He recommended 1 in 500, or something like that. In the new Pharmacopœia they ought to approximate more nearly to a scientific scale of weights and measures rather than continue the old system.

Mr. Robbins said that in reading the paper he had thought that a smaller quantity of spirit might be employed. He had found in practice that less than the usual quantity might be used. If he had been going to make the experiment of Mr. Schacht he should have divided the nux vomica into four parts, and placed each part in a separate percolator. After passing a relatively small quantity of menstruum through the first percolator he would use the percolate as a menstruum for the second, and so on until practical exhaustion was effected. The advantage of adopting the method which he advocated was that in the case of many substances almost a fluid extract would be obtained at the beginning, and all that would be wanted would be to get out the washings carefully from the different percolators. That being a solution which did not contain a very large quantity of extract it could be evaporated by itself, and the whole extract would be produced almost without any heat at all. By this process a very much smaller than the usual quantity of spirit would be sufficient. He adopted the process many years ago, and he had always found it successful.

Mr. Giles said that experience had taught him that a discussion on percolation was very much like percolation itself; it went on for ever. As to the details of the paper, he thought that it was relatively excessively immaterial whether the standard taken was 15 or 25 per cent., and whether they adopted the metrical system or the old system of ounces. But he did think that there was something in the paper which marked it as an era in pharmacy. It was the first overt step which had been taken in the direction of standardizing the important pharmaceutical preparations to which allusion had been made. It required very little prescience to foresee that the special feature of pharmacy in the future would be the standardizing of its preparations. Medical science had become more scientific, and in becoming more scientific it had become more exact; and it demanded a corresponding precision on the part of pharmacy. If pharmacists failed to supply that demand, they must consent to admit themselves a failure; and he believed that the consequences would be that medical practitioners would be thrown back, in spite of themselves, upon the alkaloids, although he and most practitioners believed that the pharmaceutical preparations of the drugs were more efficacious than the alkaloids. If that was done, it would, he thought, amount almost to the abolition of pharmacy, and in the place of pharmacists there would be mere dispensers of drugs who would be simply carrying on the most mechanical and the least honorable parts of the functions of pharmacists, namely, the dispensing of medicines from things which they had bought elsewhere. He thought that that would be very much to be deplored, and that the Society ought to encourage in every way measures which would tend to prevent that result, and unquestionably the development of the idea of standardizing pharmaceutical preparations was a means by which that should be achieved. He was sure that they would feel that it was a very satisfactory thing to have had a series of such excellent papers which had culminated in the very practical one which had been read that evening. The papers which had been brought forward lately had been produced by the alumni of the Society. He trusted that, quite independently of any organization or anything else, there might be a prosecution of further research in the same direction by Mr. Dunstan and his very able and careful coadjutors. He did not know that anything had given him greater pleasure than seeing the subject taken up in such a masterly way, and pursued with so much perseverance as was exhibited in the present series of papers. He had no doubt that the present paper would make its mark in pharmacy, and that the result of it would be seen in some shape or form in the forthcoming edition of the Pharmacopœia.

Mr. Bland asked whether there was any means of getting rid of the fixed oil which extract of nux vomica contained. He had found it to be a great nuisance. He believed that it was one of the principal causes of the greasy deposit which was generally found in the bottles if the tincture was kept.

Mr. Greenish said that he concluded that Mr. Dunstan used the powdered nux vomica of commerce.

Mr. Dunstan: Yes.

Mr. Greenish, continuing, said that Mr. Schacht appeared to have ground the nux vomica for himself. That being the case, he should quite expect that Mr. Schacht's result would be a larger quantity of extract than Mr. Dunstan obtained. He could not regard the powdered nux vomica of commerce as the best form from which to prepare the extract.

Mr. Tanner said that he had long regarded the powdered nux vomica of commerce as being a true and genuine article. Mr. Schacht obtained something over 10 per cent. of extract. He (Mr. Tanner) generally obtained 10 per cent. of extract in operating by the Pharmacopœia process upon powdered commercial nux vomica. This quantity agreed very closely with what Mr. Schacht obtained from the material he ground himself. With regard to the adoption of the metrical system, 1 grain to the ounce, taking the specific gravity of nux vomica, was not very far from a quarter per cent., and, therefore, it would be easily expressed metrically.

Mr. Groves said that it was very important that so dangerous a body as nux vomica should become the subject of titration. The doctors in his neighbourhood did not demand titrated drugs. Perhaps in this enlightened centre there was some demand for them. It seemed to him that the only way of titrating a body to obtain a standard article would be to prepare two substances, one decidedly above the standard and one decidely below, and then, after arithmetical calculation, to mix the two to bring the bulk to the proper standard. The paper did not discriminate between the strychnine and the brucine; it simply indicated the total alkaloids. He did not think that the object in view would be gained until such a discrimination was made. He might be allowed to express his sincere admiration of the labours of the authors. They had brought great credit to themselves and shed a lustre on the School of the Society.

Mr. Schacht said that he took no means whatever to separate the fat; but it must be remembered that he made his preparation with a spirit which was not quite as strong as the Pharmacopœia directed.

Mr. Dunstan, in reply, expressed his gratitude for Mr. Schacht's elaborate criticism, because it came from such a distinguished practical pharmacist. With regard to the percentage of alkaloid in the extract, he must know how much alkaloid was contained in the nux vomica or in the percolate before he could say what would be the probable amount in the extract. He should predict that the extract would contain about 15 per cent., but he would very gladly assay it for Mr. Schacht. Nux vomica beans usually contained from 2½ to 3 per cent. of alkaloid. The Bombay beans contained from 3½ to 4 per cent., but they very seldom came into retail pharmacy. Mr. Schacht had used much more spirit than was recommended in the paper. Nux vomica was not a very expensive substance, and Mr. Short and he had thought that the leaving in of a grain or a grain and a half of the alkaloid was not a very important matter. The fourth fraction mentioned in the paper yielded 3 grains of total alkaloid. The fifth fraction would have given still less. There was no objection to the use of more spirit except on grounds of economy. Mr. Schacht had asked what was to be done when, after evaporation, the extract was too strong in alkaloid. Mr. Short and he had noticed in preparing extracts that the proportion of extractive matter to alkaloid appeared to be fairly constant in different specimens of nux vomica containing varying amounts of alkaloid, so that the standard extract was never too soft or too hard for use.

Mr. Schacht asked how they stopped at the exact moment when the extract contained the proper amount of alkaloid. The extract might be too soft.

Mr. Dunstan said that, practically, that would never take place if their directions were followed. The finished extracts contained exactly the same amount of alkaloid, and if their process were followed, would never be too soft.

Mr. Giles said he understood that Mr. Dunstan found that some nux vomica contained 3·3 per cent. of alkaloid, and some contained 2·6 per cent. of alkaloid; but, as a matter of fact, the one which contained 3·3 per cent. yielded extract in about the proportion of 3·3 per cent.; and the one which contained 2·6 per cent. of alkaloid yielded extract in about the proportion of 2·6 per cent.

Mr. Dunstan said that that was exactly what he meant. It was a very fortunate thing that it happened to be so in the case of nux vomica, for it had lightened their work. If it had been otherwise other considerations would have had to be taken into account. Mr. Schacht had asked why 15 per cent. had been chosen, and why the strength of commercial specimens should be taken into account. The reason was that in the case of potent drugs, like extract and tincture of nux vomica, it would be extremely dangerous to change their alkaloidal strength. Some medical men would still go on prescribing the same quantities, and serious results would ensue. He believed that some difficulty occurred in the United States through an alteration of the strength of the preparations of opium. He agreed with Mr. Martindale's remarks with reference to the metrical system, but he had reason to believe that they would not see the metrical system introduced in the next Pharmacopœia. For that reason he had described the process in "official phraseology." As to the actual method of preparing the extract, of which Mr. Robbins had spoken, he (Mr. Dunstan) did not think that it was very material what process of extraction was used, and it might be very well left to the manufacturers, but the method that they had proposed seemed to be a desirable one for use on a small scale. He must thank Mr. Giles for the kind way in which he had spoken of their work. It seemed to him extremely important to have pharmaceutical preparations of definite alkaloidal strength, especially in the case of such a drug as nux vomica. He hardly agreed with Mr. Greenish with reference to the powdered nux vomica. Mr. Short and he had examined a great number of commercial specimens, both powdered and unpowdered, and they found that the percentages of alkaloid coincided pretty closely. One might safely say that powdered nux vomica was free from adulteration. Mr. Groves had raised the important point of the discrimination of the alkaloids. There were certain practical difficulties in the way of proposing a separation for general use. A skilled chemist would be required to work so delicate a method, and, although the proportions of brucine and strychnine varied somewhat in different samples, the medicine was given in such small doses that the variation was unimportant. As to the fixed oil, the extract prepared with the diluted spirit would contain less of the oil than the extract prepared with rectified spirit according to the British Pharmacopœia.

The President said that, like Mr. Giles, he hoped that the work which had been done by those two eminent workers, who had so well proved their qualifications, might be continued in other directions. He was proud to see that not only the work had been done by students of the Society's School, but that it had been done partly with the aid of the excellent research fund of the British Pharmaceutical Conference.

A paper was then read on—

The Estimation of the Alkaloids in the Root of the Atropa Belladonna.

BY WYNDHAM R. DUNSTAN AND F. RANSOM.

The paper is printed on p. 623, and gave rise to the following discussion:—

Mr. Luff said that in the assay of a substance it was extremely important that the workers should ascertain that the alkaloid which they extracted was pure. He did not think that the authors had made good that point. They took a certain amount of pure atropine and boiled it with spirit and chloroform, and extracted the alkaloid, and found the same amount as that with which they started; but they had not shown that it was the same alkaloid. His experience was that they could not boil an alkaloid in spirit without decomposing it. Saponification took place, and the alkaloid decomposed into another base and possibly an acid. An organic analysis was required to prove whether the alkaloid was the same as that with which they started. The percentages of carbon, hydrogen and nitrogen must be determined. Some years ago Mr. Groves left some aconitine in contact with ammonia and it disappeared. Dr. Wright and he (Mr. Luff) showed in later years that the aconitine had been converted into benzoate of ammonia and into another alkaloid, namely, aconine. The aconine might be about the same weight as the aconitine originally operated upon, because it had taken up water, and the water which was accreted might make up for the benzoic acid which was excreted. The aconine had, however, entirely different physiological functions from the aconitine, and was barely poisonous at all. He had taken a tolerably large dose of it. The experiments in the paper were comparative ones, and the old saying that comparisons were odious might be applied to them. During the two years that Dr. Wright and he were working upon alkaloids, he made more than two hundred organic analyses, which had never been mentioned in the papers, simply for the purpose of seeing whether the alkaloid they were working upon was a pure one or not.

Mr. Gerrard said that he was glad to hear the paper read that evening, more especially as he had taken considerable interest in the extraction of the alkaloids and active principles of plants; and he was now engaged in a research upon belladonna which was being aided by a grant from the Pharmaceutical Conference. He took exception to the remarks made by Mr. Luff as to the saponification of atropine when it was brought into contact with alcohol. He believed that there was no change whatever, and that manufacturers employed hot alcohol for the purpose of extracting atropine and hyoscyamine from the belladonna plant. He should have liked to hear from Mr. Dunstan that he had made some comparative experiments with other solvents than mixtures of alcohol and chloroform, for instance, with alcohol alone, for it seemed to be demonstrated in the paper that the more he increased the alcohol in the mixture the greater was the solvent power upon the alkaloidal constituents. The advantage shown in the paper was that by Mr. Dunstan's method there was not so much colouring matter got out as when alcohol alone was the solvent; but, notwithstanding that, he was of opinion that alcohol alone was the best solvent for the extraction of the alkaloids from the belladonna plant. In this opinion he was backed up by experiments which he had made. In the paper it was remarked that other workers assumed their products to be pure, while the authors had proved their own to be so. He should like to ask the authors of the paper what evidence they had upon that point. When the root was extracted with chloroform and alcohol there was a small amount of brown colouring matter, and even when that was shaken again with water there was some colouring matter in the aqueous solution. Therefore he considered that the figures which were given could not be taken to represent absolute atropine. The authors also stated that they used no precipitants, and that was claimed as one advantage of the process. But what was ammonia but a precipitant of an alkaloid. In another part of the paper it was shown that a solution of iodine in iodide of potassium had been used as a precipitant. Within the last year he had examined a considerable number of samples of belladonna root and leaf by a very simple method. He exhausted the belladonna with boiling alcohol, and removed the alcohol by evaporation or distillation. Of course the residue was highly coloured, and contained a good deal more than atropine and hyoscyamine. He diluted with sufficient water to obtain a clear solution. The clear aqueous solution was poured off, and the residue was well washed. A considerable quantity of the colouring matter was thus got rid of, and he then had the salts of atropine in a pale brown solution. To this solution he added ammonia in excess, and shook it with a good volume of chloroform, chloroform being by far the best solvent of free atropine. On the separation of the chloroform, and after evaporation, he obtained his residue of alkaloid containing colouring matter. Whatever was alkaline in that residue must be alkaloid, and the alkaloid must be atropine or hyoscyamine. He prepared a standard solution of sulphuric acid, 100 parts of which should exactly neutralize 1 grain of atropine. He added the dilute sulphuric acid to the residue until he got a slightly acid reaction. Every hundred minims of the dilute acid equalled 1 grain of atropine or hyoscyamine, as the case might be. The results of that process were as scientifically exact as it was possible to be, and he claimed that the process was far more accurate than the process of weighing and re-precipitation and so on, which was given in the paper. He noticed an average loss of about 5 per cent. by the reconversion. He should take it that that 5 per cent. of loss represented something more than alkaloid, and therefore he concluded that the substance was some impurity. He trusted that his criticisms would be well received, as they were given in the best spirit and with the simple object of evolving the truth.

Mr. Tanner asked why the authors chose a mixture of chloroform and alcohol as a solvent for the alkaloids of belladonna root. It seemed to him that chloroform *per se* would not dissolve the alkaloidal salts. He thought that it was pretty well recognized that the state in which the alkaloid existed was one of combination with organic acid. Therefore he was unable to see the object of employing chloroform. That body was a very good solvent for most alkaloids when uncombined, but it was contrary to his experience that it was a solvent of alkaloidal salts. The solvent action in the process appeared to have been produced entirely by the alcohol.

Mr. Dunstan, in reply, referring first to the remarks made by Mr. Luff, said that, of course, the use of iodine and potassium iodide did not absolutely ensure against an alteration of the alkaloid. The alkaloid might have been altered, but, on the other hand, it was extremely improbable in the present case that an alteration had taken place; and before they assumed that such alteration did actually occur some experimental evidence must be adduced. The evidence which was possessed at the present time was against any such assumption. A strong evidence in support of the non-decomposition of the alkaloid was found in the fact that the crystalline form of the residue at the end of the process was the same as the crystalline form of the pure alkaloid taken at first. If the resulting alkaloid was a different one, it would probably have some crystalline form different from the original one. Again, it was very improbable that any alkaloid would be altered, and especially that it would be saponified, without an alteration of weight. Mr. Gerrard admitted that the use of alcohol alone extracted more colouring matter than a mixture of chloroform and alcohol, and that was one reason why alcohol only had not been used in the process described in the paper. The extraction of the greater quantity of colouring matter involved difficulties later on. Mr. Gerrard's method seemed to be an extremely long one, and involved several processes of purification and repurification, and that appeared to be due to the fact that alcohol alone was employed as an extractive agent.

Mr. GERRARD said that the steps of his process were much shorter than those of Mr. Dunstan's process.

Mr. DUNSTAN said that surely nothing could be simpler than extracting the belladonna root with a mixture of alcohol and chloroform, shaking the mixture with water and then extracting the pure alkaloid with chloroform after the addition of ammonia. He did not deny that Mr. Gerrard's process was one of value, but it seemed to him that the process described in the paper was much shorter, and recommended itself by the fact that less colouring matter was extracted than when alcohol was used alone, and that the pure alkaloids were actually isolated and weighed, not inferred from the titration of an impure residue with an acid. That was really the point at the bottom of the paper. Mr. Gerrard, in further criticizing the process in detail, had said that the aqueous solution, which was obtained after shaking the chloroform-alcohol mixture with water, was coloured, and that the colour was not got rid of on agitating with chloroform. He (Mr. Dunstan) admitted that, but when ammonia was added, and subsequently the chloroform, it was found that the whole of the colouring matter remained in the ammoniacal solution and the chloroform separated practically colourless. Upon the spontaneous evaporation of that solution the alkaloids were got in a crystalline condition. Mr. Gerrard had gone on to criticize the results of the estimation of the pure alkaloids in the residues. As a chemist, Mr. Gerrard must know that it was impossible to get results within a milligramme, and it was obviously unfair to convert the numbers into percentages. The differences were only experimental errors, and the fact that a process of precipitation had been gone through must be taken into consideration. Mr. Tanner had referred to the solubility of alkaloids and alkaloidal salts in chloroform. No general rule could be laid down upon that point. In the case of the nux vomica, the alkaloidal salts could be extracted by chloroform alone, provided sufficient chloroform was used. In the case of belladonna the same result could be obtained, as the alkaloidal salts were also soluble in chloroform. This was referred to in the paper in connection with the first experiments.

The PRESIDENT said that this paper furnished another evidence of good work, and, he might say, of a great deal of work. It contained the result of a very long series of investigations. He could not but feel that a very large amount of experimental proof must have preceded the production of the paper. He had been very much struck by the observation of Mr. Luff with regard to the probable changes and the saponification of the alkaloid by the alcohol. He supposed that it must be admitted that the experiment which Mr. Luff tried upon himself was a fairly strong one. No doubt the point would be noticed by Mr. Dunstan in his further inquiries.

The last paper read was—

A NOTE ON A CASE OF SOPHISTICATION OF AMERICAN OIL OF TURPENTINE.

BY BOVERTON REDWOOD, F.I.C., F.C.S.

This paper is printed on page 665.

Mr. DUNSTAN said that Professor Redwood placed some of the residue in his hands on the previous morning, that he might find out its nature. In a rough experiment which he made he found that on treatment with solvents it yielded a substance which from its physical properties appeared to be pimaric acid. That acid was, he believed, yielded by two species of pines, namely, *Pinus pinaster* and *Pinus maritima*; and he believed that both those trees were found in South Carolina, where turpentine was produced. The quantity of residue which he had to work with was too small to enable him to speak very definitely.

Mr. DUNSTAN also called attention to the Government flashing point apparatus, which was on the table.

Mr. HOLMES, calling attention to various botanical and other specimens exhibited on the table, said that the samples of cinchona bark and the very fine selections of cinchonas had been recently presented by the Government. They came from the Darjeeling plantations, and represented the remainder that were not sent on the former occasion. The Society now possessed a tolerably complete set of the plants which yielded India barks and also of the barks themselves. There were also specimens of the solid and liquid paraffins, which had been recently introduced into the German Pharmacopœia. These were well worthy of attention.

The next meeting was announced for March 5.

Parliamentary and Law Proceedings.

THE SALE OF POISONS.—PROCEEDINGS AGAINST CHEMISTS AND DRUGGISTS.

At the Worcester City Police Court, on Tuesday, Mr. Edward John Kitson, chemist and druggist, Broad Street, was summoned, on adjournment, for selling poison contrary to the provisions of the Pharmacy Act, on December 19. Mr. Quarrell appeared for the defence.

Mr. Power, chief of police, stated that on January 22 last the case came before the Court, and he was then asked by Mr. Quarrell to produce a certain Order in Council which Mr. Quarrell alleged was published in the *Gazette* in 1869. He was now prepared to proceed with the case. There was no desire on the part of the prosecution to proceed against Mr. Kitson, but the only object was the safety of the public.

Richard Eadon, waiter, repeated his evidence as to the purchase of the poison, the subject of the summons. He went to Mr. Kitson's shop on the day named and obtained two pennyworth of chloride of lime and a packet of "rat killer." Witness was not asked to sign a book.

Cross-examined: Witness did not ask for poison but "rat killer." The packet was labelled "poison."

William George, a porter, who, it will be recollected, was tried for attempting to commit suicide by taking poison, deposed that he asked the last witness to fetch some mice poison for him. He did not say what he wanted it for. He admitted having taken the contents of the packet. He afterwards suffered from "pains all down the spine." He did not closely observe the packet. He remembered that it was labelled poison.

Police-Constable James spoke to going to the house of the last witness, finding him very ill, and restoring him by means of an emetic.

Dr. Swete stated that he analysed a small quantity of the rat killer remaining, which was brought to him in a bottle. He found it to contain strychnine.

Cross-examined: There was only a small quantity of strychnine.

Mr. Power produced a copy of the *London Gazette* for December 29, 1869, including preparations of strychnine as "poison" under the Act.

For the defence Mr. Quarrell submitted that the poison alleged to have been improperly sold, being a compound, and not a preparation, was exempt from the Act, and that the day before the alleged offence was committed, the defendant gave strict orders to his assistants not to sell any poison without duly registering it. A register of sales commenced on the previous day and continued ever since contained no register of the sale of rat killer on December 19, and no rat killer was sold on that day to any person answering to the description of Eaden.

Ernest Turner, one of the defendant's assistants, gave evidence bearing out this defence.

Being permitted to make a statement to the Bench, Mr. Kitson denied that rat poison was sold during his presence either on the 18th, 19th, or on any subsequent day in December, or up to the present time, without registration. He had given strict instructions to his assistants not to sell "rat killer" or any other poison without registering it, and he believed they had honestly carried them out.

Inspector Sommers said that on the morning Mr. Kitson came to the office of the chief of police and demanded the name of their informant in the first prosecution against him. He said he believed it was one of his assistants, and he had discharged that young man. Witness informed him that the police received information by letter. It was not written by any one connected with his establishment.

The Mayor said this prosecution had been instituted on public grounds. There was no desire to deal harshly with Mr. Kitson, as the magistrates had always known him as a respectable citizen.

A fine of 10*s.* 6*d.* and costs, £1 11*s.* 6*d.*, was inflicted.

At the Worcester City Police Court, on Tuesday, William Morris, chemist and druggist, was summoned for that on January 21 last, he unlawfully sold some prussic acid, being a poison named in the first part of Schedule A in the Pharmacy Act, 1868, to Eliza Ross, who was then a person unknown to him, not being introduced by some person known to him.

The Chief of Police (Mr. Power) said this was a somewhat peculiar case, for the purchase of the poison could not be proved, because the person who purchased it poisoned with it herself and her child. For the purpose of proving the case, however, he had given notice to the defendant to produce his register of the sales of poisons. There was no doubt an entry of the sale was made at the time, but he contended that it had not been made in compliance with the Act, the proper safeguards not having been taken.

Inspector Sommers stated that on the evening of the 22nd ult., he went to defendant's shop, and asked him to produce his poison register. Witness found in it an entry of the sale of sixpennyworth of prussic acid on the 21st to "Mrs. Jones, Carden Street." In reply to questions the defendant said he knew the woman well, that she was a charwoman, and had been a frequent customer at his shop.

In answer to the Bench, the defendant denied having described the purchaser as a charwoman.

William Ross, husband of the deceased woman, said his late wife never acted as a charwoman or went by the name of "Mrs. Jones."

Mr. Power deposed that, at the inquest held by the City Coroner on the bodies of the woman and the child, Mr. Morris said, in reply to the Coroner, that he had no doubt the deceased was the same person who made the purchase in question at his shop.

William Ross, being recalled and shown the entry in the defendant's register, denied that it was in the handwriting of his wife.

Mr. Power remarked that the defendant acted illegally in not acquiring sufficient information about the woman to conform with the terms of the Act.

In defence, Mr. Morris explained that he had known the deceased as a frequent customer at his shop for twelve months, and that he had often sold her quantities of laudanum which she had never improperly used, and he therefore contended that he had sufficient knowledge of her within the meaning of the Act.

A fine of £1 1*s.* and 13*s.* costs was imposed.—*Worcester Daily Times.*

Poisoning by Prussic Acid.

On Tuesday, February 5, an inquest was held at Norwich touching the death of Mr. F. W. Skipper, who had been found dead in his bedroom.

Mr. F. Bailey, surgeon, deposed to making a *post-mortem* examination of the body, and to deceased having died from taking prussic acid. Deceased had been in a low state of mind for some time past. The prussic acid produced was of Scheele's strength. Witness saw deceased on Saturday night, and from the appearance of the body when he made the *post-mortem* examination he thought he had been dead about sixteen hours. Witness believed deceased was at his club on Sunday night until ten o'clock.

Mr. Octavius Corder, pharmaceutical chemist, said the bottle he now produced was brought to him by Mr. Morse, who had found it on the washstand in deceased's room. There was now remaining in the bottle about forty drops of acid, which was quite sufficient to kill two adults. It was unusual to sell such a poison to any person, unless to a medical man. There was no seller's name on the bottle, and there was no mark upon it that could afford him any clue as to who sold the poison. The leather tied over the stopper of the bottle was an old piece of binding, and not like the leather placed on the bottle by a chemist. In his opinion the bottle was not sold by a chemist.

The Coroner said they had no need to go into the question as to where the bottle came from, even if he had information about it, but if it was ever found out who sold it, he should think it a proper case for the magistrates to deal with. He should send his notes of the inquiry to the Secretary of the Pharmaceutical Society, in London, whom he had always found ready to assist him.

The Jury returned a verdict "That deceased met his death by taking prussic acid, whilst in an unsound state of mind."

Decision under the Dental Act.

At West Ham, on Wednesday, February 6, the case of "Canton v. Holford" came before Mr. Phillips for judgment, in which Thomas Constantine Holford, a chemist and dentist, practising at 342-4, High Street, Stratford, was summoned by Frederick Canton, the hon. secretary of the British Dental Association, for having on November 14 last used the initials "L.D.S.," being the distinction of a qualification or certificate in relation to dentistry or dental surgery, which he did not possess, contrary to section 4 of the Dental Act, 1878, 41 and 42 Vic., cap. 33. The case is of some importance to the medical profeseion generally, as it is the first action decided under the Dental Act of 1878, which was framed on the lines of the old Medical Act of 1858, the 40th section of which corresponded with the 4th section of the Dental Act, under which these proceedings were taken, the *maximum* penalty imposable being £20. On the 25th of November, 1878, the defendant applied to Mr. William John Clark Miller, the registrar of the General Council of Medical Education and Registration, for registration under Clause A of the 6th section of the Dental Act, he signing himself "L.D.S., Ont.," but registration was refused. On April 15 following defendant applied for registration as having been in practice before July 24, 1878, and was registered under Clause C of the 6th section of the Act. Fraud was not alleged by the prosecution, who admitted that the defendant was a licentiate of dental surgery of the Medical College, Ontario, but they contended that by the use of the simple "L.D.S.," without the affix "Ont.," or "Ontario," Mr. Holford had made himself amenable to the Act. Mr. Phillips gave judgment at great length. Having reviewed the circumstances of the case, he said he had come to the conclusion that the title "L.D.S." simply was one which would only be granted by the medical authorities in this country, and that the defendant therefore had committed an offence within the meaning of the Act in using the designation of a qualification which he did not possess. He thought the defendant would have been within his right if he had used the letters "L.D.S., Ontario," but having omitted the addition, he had committed an offence. Taking into account, however, that this was the first case under the Act, and having regard to the fact that defendant was an "L.D.S.," though of Ontario, he should not impose the full penalty of £20, but a fine of £2, and the usual costs.—*Times.*

Correspondence.

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

The Examination of Chemicals.

Sir,—I shall be much obliged if you will allow me space to reply to Mr. Nicholson's remarks upon the above subject.

Liquor Potassæ.—Mr. Nicholson's calculation is quite correct, "20 ounces of pot. bicarb. would require 14·8 ounces of slaked lime to combine with the whole of the carbonic acid," but he seems to have overlooked the fact, that, when solution of potassium bicarbonate is boiled, carbonic acid is evolved. I find that under the circumstances named by me over one-fourth is so driven off. The remainder requires about 11 ounces of calcium hydrate. I used freshly slaked lime prepared from marble; still 12 ounces leaves but a small margin for the possible deterioration of the lime, etc.; the substitution of sixteen for twelve would give a better working formula.

The quantities mentioned did not apply to the cold process. I have lately made some in this way, using equal quantities of slaked lime and potassium bicarbonate. I found, however, that to complete the process, with such occasional agitation as I gave, required six weeks. With frequent systematic shaking much time might be saved.

Should the official formula for liquor potassæ at any time be altered, I hope the strength will be 5·6 per cent. KHO; as pharmacists would then have the usual volumetric solution always at hand, and the alteration could scarcely influence the present dose, etc.

Peroxide of Hydrogen.—Although this compound in strong solutions is very unstable, I am not by any means sure that a 3 per cent. or 10-volume solution is so much so as Mr. Nicholson's remarks would lead us to expect. Perhaps his paper (the publication of which is unfortunately delayed until next month) may contain some evidence on this point.

The test I used was that mentioned by Mr. A. H. Mason (*Pharm. Journ.*, [3], vol. xi., p. 705). He thus describes it: "A given volume is taken, and placed in a tube with excess of potassic bichromate. On agitation over mercury a volume of oxygen is evolved, which, supposing 1 c.c. of H_2O_2 has been taken, expresses its strength in so many volumes. Thus 1 c.c. of a 10-volume solution would yield 10 c.c. of oxygen at 0° C. and 760 mm."

To me this test offers the great advantage of being independent of any unstable reagent. But where a large number of samples have to be examined titration by means of potassium permanganate is undoubtedly more convenient.

I was rather surprised by Mr. Nicholson's statement as to "the volume strengths being properly only half of what" I stated; inasmuch as the bichromate was to all appearance unaltered and was capable of decomposing a further quantity of peroxide. The reaction differs according as the bichromate or the peroxide is in excess, but when 5 c.c. of a 3 per cent. or 10-volume solution of peroxide is mixed with 15 c.c. of volumetric solution of bichromate a brown coloration ensues; this disappears, more or less rapidly, according to the temperature, oxygen being evolved and the bichromate assuming its normal condition.

The following facts will, I think, disprove Mr. Nicholson's statement that "half of the oxygen liberated is due to the bichromate." A solution of bichromate was carefully standardized so that it should completely oxidize an equal volume of an acid solution of ferrous sulphate (the burette and reservoir containing this latter solution were supplied with an atmosphere of hydrogen). To 15 c.c. of the bichromate solution, 5 c.c. of solution of peroxide was added. When the reaction was complete, the solution was gently warmed, to free from dissolved oxygen, and the ferrous solution slowly added; 15 c.c. was required before potassium ferridcyanide indicated any trace of a ferrous salt in a drop of the mixed solutions. To another 15 c.c. of bichromate six separate lots (5 c.c. each) of peroxide were added, allowing sufficient time to elapse before each addition; the bichromate required 14·7 c.c. ferrous solution. As this experiment had been conducted in an open vessel, I thought that perhaps the deficient bichromate had been carried away mechanically during effervescence; the experiment was therefore repeated in a loosely covered flask with 10 c.c. bichromate solution, and five lots (in all 25 c.c.) of peroxide; 9·8 c.c. of ferrous solution was required. Finally, the two solutions were again titrated and found to be unaltered.

Of course where an acid solution of potassium bichromate is employed the reaction is different.

Citrate of Magnesia.—Mr. Nicholson's remark on soda water, that "it is well for the general consumer" it is not what its name would imply, refers equally to this preparation. Should Mr. Nicholson, for a moment forgetful of his chemistry, apply to a pharmacist for citrate of magnesia and be supplied with an article rightly so-called, he would probably find that, however much more worthy it was of its name, it was not so pleasant in use as our old friend "known to the public as citrate of magnesia," or "citrate of magnesia so-called," as it is frequently labelled. As to its further composition Mr. Nicholson's assumption is correct.

Liq. Sodæ Effervescens.—That manufacturers should be asked to make, and pharmacists to keep in stock, four preparations, where they now have one, I do not consider a practical suggestion. Better far to have the plain aerated water and to send out when requested suitable doses of sodium bicarbonate. Mr. Nicholson misreads me as to the quantity of chalk present in town water. I reckoned it in terms of sodium bicarbonate, $NaHCO_3$, and not as sodium carbonate Na_2C,O_3 as he states. By town water I meant London water, and under "liq. potassæ effervescens" so called it. The result arrived at was from my own experiments; observations, extending over many years, show that the variations have been very slight. I think from the large range (0·1 to 1·5 Na_2CO_3) Mr. Nicholson gives, he must refer in some cases to water supplied to provincial towns. As 1·5 grains $NaHCO_3$ equals 0·95 grain Na_2CO_3 the sample referred to by me would be well within Mr. Nicholson's experience.

St. John's Wood. W. H. Symons.

Errata.—In Mr. Dott's article on "The Salts of Narcotine," p. 581, col. ii., line 18 from bottom, *for* "9·740 grs. lost 1·48 grs.=1·48 per cent." *read* "9·740 grs. lost 0·145 gr. =1·48 per cent. In "The Month," p. 604, col. i., line 17, *for* "granulated zinc," *read* "granulated nickel;" col. ii., line 6 from bottom, *for* "reduced," *read* "produced;" p. 605, col. 1., line 15, *for* "vitality," *read* "volatility."

J. T. Liverseege.—(1) See *Pharm. Journ.*, Oct. 28, 1882, p. 346. (2) The chloroform of the tincture is thrown out of solution when mixed with water. (3) Yes. (4) Mix the hyd. amm. with the vaselin and then add the acid.

J. Wood.—We believe the work can be obtained from Messrs. Chatto and Windus, price about 4*s.* 6*d.*

"*Arbitrator.*"—We cannot recommend any particular book for the purpose.

J. C. A.—A paper entitled "Some Experiments on Oil of Lavender," by Mr. Shenstone, will be found in the *Pharm. Journal* for September 9, 1882, p. 207.

W. T. Elliott.—We are unable to explain the reference.

J. Brown.—The inflammation is due to the rapid oxidation of the organic matter.

R. Hawkes.—See a paper on the Cultivation of Medicinal Plants at Market Deeping (*Pharm. Journ.*, [3], xii., 237).

J. C. Harvey.—The passing of the examination in question does not entitle you to carry on the business of a chemist and druggist.

W. Wilkinson.—*Eranthis hyemalis* (Winter Aconite).

Communications, Letters, etc., have been received from Messrs. Paterson, Smith, Fletcher, Dott, Lawrence, Crowder, Wilkinson, Patman, L. S., H. C., Inquirer, Minor.

NARCOTINE AND ITS DERIVATIVES.*

BY D. B. DOTT.

Narcotine was discovered in 1803 or 1804, by Derosne, but it was supposed to be a salt until its basic nature was demonstrated by Robiquet, in 1807. Narcotine exists in abundance in all kinds of opium; indeed, it is the only alkaloid besides morphia which opium yields in large quantity. Unlike morphia, however, it is a feeble base, not decomposing solution of chloride of ammonium when warmed therewith. Narcotine is interesting on account of the variety of compounds which have been prepared from it, and because of the light which has been thereby thrown on its constitution. The true composition of narcotine was not known until Matthiessen and Foster, as the result of numerous analyses, gave the formula $C_{22}H_{23}NO_7$, which has since been confirmed by Hesse. There is no proof that narcotine possesses a phenolic function, in respect of combining with alkalies like many other alkaloids, unless its ready solubility in alcoholic potash be evidence to that effect.

There is some difficulty in systematically arranging the different decompositions of narcotine, but probably the homologous series—

Trimethyl-nornarcotine	$C_{22}H_{23}NO_7$
Dimethyl-nornarcotine	$C_{21}H_{21}NO_7$
Methyl-nornarcotine	$C_{20}H_{19}NO_7$
Nornarcotine	$C_{19}H_{17}NO_7$

is most naturally first considered. The first member is ordinary narcotine. The second and third are formed by the action of hydrochloric acid, which eliminates first one and then another methyl radical as chloride, while the nornarcotine is only produced by the action of fuming hydriodic acid. The reaction cannot be carried further.

It is by oxidation that most of the derivatives of narcotine are formed. The oxidation is best effected by the action of manganese dioxide and sulphuric acid.

$$\underset{\text{Narcotine.}}{C_{22}H_{23}NO_7} + O = \underset{\text{Opianic acid.}}{C_{10}H_{10}O_5} + \underset{\text{Cotarnine.}}{C_{12}H_{13}NO_3}.$$

Matthiessen and Foster found that narcotine heated above 200° C. *per se*, or for a longer time in contact with water, splits up into meconin and cotarnine; and gave the equation—

$$\underset{\text{Narcotine.}}{C_{22}H_{23}NO_7} = \underset{\text{Meconin.}}{C_{10}H_{10}O_4} + \underset{\text{Cotarnine.}}{C_{12}H_{13}NO_3}.$$

Hesse, however, found that by the action of baryta water on narcotine hydrocotarnine is formed:—

$$C_{22}H_{23}NO_7 + H_2O = \underset{\text{Hydrocotarnine.}}{C_{12}H_{15}NO_3} + \underset{\text{Opianic acid.}}{C_{10}H_{10}O_5}.$$

He therefore inferred that narcotine is decomposed by water in the same way, and not according to Matthiesson and Foster's equation. As hydrocotarnine has since been found among the products of the action of water upon narcotine, it has been admitted that Hesse's reaction is probably correct.

$$C_{22}H_{23}NO_7 + H_2O = C_{10}H_{10}O_5 + C_{12}H_{15}NO_3, \text{ and}$$
$$C_{10}H_{10}O_5 + C_{12}H_{15}NO_3 = C_{10}H_{10}O_4 + C_{12}H_{13}NO_3 + H_2O.$$

Hydrocotarnine ($C_{12}H_{15}NO_3$) was obtained from opium liquors by Hesse, who has so greatly enriched our knowledge of the educts of opium. It is found in very small amount, but may easily be prepared artificially by the action of nascent hydrogen on cotarnine. Hydrocotarnine is a monacid base, melting at 55° C. By ferric chloride and other oxidizers it is converted into cotarnine.

Cotarnine, when crystallized from benzene, has the composition $C_{12}H_{13}NO_3 . H_2O$, the molecule of water not being separable without simultaneous decomposition of the base. The platinochloride may, however, be obtained anhydrous, by exposure for a sufficient time over sulphuric acid. By the action of dilute nitric acid cotarnine is converted into cotarnic acid:—

$$\underset{\text{Cotarnine.}}{C_{12}H_{13}NO_3} + HNO_3 + H_2O = \underset{\text{Cotarnic acid.}}{C_{11}H_{12}O_5} + \underset{\text{Methylamine nitrate.}}{N(NCH_6)O_3}.$$

Among the products of the oxidation of cotarnine is *apophyllic acid* ($C_8H_7NO_4$), discovered by Wöhler. It is a monobasic acid, with m.p. 205° C., but has been little investigated.

Both cotarnine and hydrocotarnine yield substitution products with bromine. When bromocotarnine hydrobromide is heated above 200° it melts, gives off hydrogen bromide and methyl bromide, forming the base tarconine, $C_{11}H_9NO_3$. Jörgenson, however, had previously described a base, homologous with that of Wright, which he called "tarconine." By treating an alcoholic solution of narcotine hydrochloride with iodine, Jörgenson obtained what he calls narcotine tri-iodide, $C_{22}H_{23}NO_7 . HI_3$. When boiled with alcohol the compound is said to undergo a "remarkable alteration," the tri-iodide of a new base being formed, *i.e.*, "tarconine," which has the composition of cotarnine less two atoms of hydrogen. The following equation is Jörgensen's:—

$$3(C_{22}H_{23}NO_7.HI_3) + H_2O = C_{12}H_{11}NO_3.HI_3 + C_{10}H_{10}O_5 + 4HI + 2(C_{22}H_{23}NO_7,HI).$$

Dr. Wright informs me that he was not acquainted with Jörgensen's paper when his own was written in 1877; otherwise he would not have adopted the name "tarconine." We are of opinion that Jörgensen's conclusions require confirmation. If correct, his base will, probably, require to be renamed "methyl-tarconine."

E. v. Gerichten has recently confirmed the accuracy of Wright's formula for tarconine, and has obtained several new bases from the bromo compound of that alkaloid. The principal bases are—*Nartine* ($C_{20}H_{16}N_2O_6$), formed by heating bromotarconine in a sealed tube with hydrochloric acid; *capronine* ($C_{21}H_{18}N_2O_6$) and *tarnine* ($C_{10}H_9NO_3$) are produced when bromotarconine is heated with water to 150°–160° C. Both nartine and tarnine yield pyridine by appropriate treatment. We know nothing of the constitution of cotarnine, except that it contains this pyridine nucleus and a methyl residue.

Opianic acid ($C_{10}H_{10}O_5$) is, undoubtedly, the most important of the narcotine derivatives. It is obtained in delicate white crystals. It forms salts, having the general formula $C_{10}H_9M'O_5$, the acid being monobasic. The action of hydrochloric and hydriodic acids is similar to that on narcotine, methylnoropianic acid and noropianic acid being produced. When opianic acid is heated with excess of strong solution of potash, meconin and hemipinic acid result.

$$\underset{\text{Opianic acid.}}{2C_{10}H_{10}O_5} = \underset{\text{Meconin.}}{C_{10}H_{10}O_4} + \underset{\text{Hemipinic acid.}}{C_{10}H_{10}O_6}.$$

* Abstract of a paper read before the Edinburgh University Chemical Society, January 9, 1884.

Under the influence of nascent hydrogen, opianic acid is reduced to meconin—

$$C_{10}H_{10}O_5 + H_2 = H_2O + C_{10}H_{10}O_4.$$

When heated with bichromate and dilute sulphuric acid, it is oxidized to hemipinic acid—

$$2\,C_{10}H_{10}O_5 + O_2 = 2\,C_{10}H_{10}O_6.$$

By the action of soda-lime on sodium opianate, *methylvanillin* is formed, which, when boiled with hydrochloric acid, yields vanillin, identical with that obtained from the pods of *Vanilla planifolia.* These important reactions are indicated by the following equations:—

$$C_{10}H_{10}O_5 = CO_2 + C_9H_{10}O_3, \text{ and}$$
$$C_9H_{10}O_3 + HCl = CH_3Cl + C_8H_8O_3.$$

Meconin ($C_{10}H_{10}O_4$) appears to exist in opium, and is formed from opianic acid as above described. It crystallizes in brilliant prisms melting at 110° C. By treatment with hydriodic acid, one methyl radical is removed, but nor-meconin has not been prepared, which would require the replacement of two methyls. By fusion with potash protocatechuic acid is obtained.

Hemipinic acid ($C_{10}H_{10}O_6$) was discovered by Wöhler, in 1844. It crystallizes in rhombic prisms, melting at 180° C. It is a dibasic acid forming salts of the formula $C_{10}H_8M_2O_6$. When heated with potassium hydroxide and water to 220°, it is converted into protocatechuic acid, $C_6H_3(OH)_2COOH + H_2O$. Hence, hemipinic acid may be regarded as carboxylated dimethyl-protocatechuic acid.

These are the principal derivatives of narcotine, but there are many more of less importance which we have not mentioned. Their relation to one another is better seen from the following formulæ:—

$$C_6H_2\left\{\begin{array}{l} O\,.\,CH_3 \\ O\,.\,CH_3 \\ COH \\ CO\,.\,OH \end{array}\right. \qquad C_6H_2\left\{\begin{array}{l} O\,.\,CH_3 \\ O\,.\,CH_3 \\ CO\,.\,OH \\ CO\,.\,OH \end{array}\right. \qquad C_6H_2\left\{\begin{array}{l} O\,.\,CH_3 \\ O\,.\,CH_3 \\ \left.\begin{array}{l} CO \\ CH_2 \end{array}\right\rangle O \end{array}\right.$$

Opianic acid. Hemipinic acid. Meconin.

$$C_6H_3\left\{\begin{array}{l} OH \\ OH \\ CO\,.\,OH \end{array}\right. \qquad C_6H_3\left\{\begin{array}{l} O\,.\,CH_3 \\ OH \\ COH \end{array}\right. \qquad C_6H_3\left\{\begin{array}{l} O\,.\,CH_3 \\ O\,.\,CH_3 \\ COH \end{array}\right.$$

Protocatechuic acid. Vanillin. Methyl-vanillin.

It will be observed that methyl-vanillin is dimethyl-protocatechuic aldehyde. The fact that this compound is obtained from opianic acid, and protocatechuic acid from hemipinic acid, shows that the carboxyl group removed in each case occupies the same position in the benzene chain. Now Barth has shown that protocatechuic acid is 1 . 3 . 4 dihydroxybenzoic acid, whence we know the positions of the aldehyd and methoxyl groups of opianic acid; but it is not evident which position the carboxyl group occupies. Wegscheider has undertaken the solution of this problem, and is presumably still engaged on his researches. Until the question of the constitution of opianic acid is completely answered, as likewise that of the constitution of cotarnine, it will be impossible to fix the true formula of narcotine. Although much information has been gained by recent researches, we are not yet in possession of that knowledge without which a synthesis of the alkaloid is hopeless.

ABRAHAM MUNTING,*

Dutch Medico-Botanist,

DE VERA ANTIQUORUM HERBA BRITANNICA.

BY JOSEPH INCE.

This strange old Latin book, illustrated with many fine botanical engravings, is rare; and the excellence of the plates has caused the work to be much sought after by artists.

It will compete in wordiness of style, and tendency to digression with any similar production of a mediæval writer; but yet it contains no more than a pardonable allowance of self-congratulation.

The author is convinced that he has hit upon a discovery of importance; and he never fails to thank God as the revealer of secrets that it was permitted to him personally to solve the mystery which for so long had obscured the virtues of a marvellous plant, and hid them from the knowledge of mankind.

The copy which, through the kindness of Mr. W. Dunstan, I have had the pleasure of reading is adorned with the usual allegorical frontispiece dear to the collector of such art curiosities, and frequently abstracted; as well as by a fine portrait of Henricus Casimir, of Nassau, to whom, and to many other illustrious persons, the treatise is dedicated.

The author defends his dedication and reasons that it is by no means inappropriate; for not only have the great busied themselves about plants, but have honoured certain herbs and preparations by the bestowal of their family cognomen. Gentian was was so called after its discoverer, Gentius, king of Illyria; Mithridates, king of Pontus, christened the Mithridate; whilst other royal personages followed his example.

Women even, Cicero instances as having been concerned in botanical nomenclature; for did not Artemisia, wife of Mausolus, king of Caria, bequeath her own name to a well-known medicinal plant.

The Roman emperors were not unmindful of the study of herbs, or slow to recognize their remedial efficacy. Our Lord himself, while rejecting the title of Emperor or chief, was not unwilling to accept that of the Healer; and sent Luke, the beloved physician, to preach the gospel in Antioch. It cannot, therefore, be deemed idle compliment to inscribe a book, containing the history of a plant, to princes and potentates.

Having thus cleared himself from the charge of flattery, Munting proceeds to address the reader in curiously phrased Latin and to cite his authorities. Laudatory verses are printed *in extenso* ; and then he settles down to his task, and to the composition of his first chapter. "In which is treated of the wonderful power of God, of his ineffable goodness and clemency; of the excellence and weakness of man; of the name of Britannica, its signification, honour and justness; also of the vain boast of some claiming to have made its discovery."

Much learning is expended in quoting ancient

* De Vera Antiquorum Herba Britannica ejusdem efficacia contra Stomacaccen, seu Scelotyrben Frisiis et Batavis de Scheurbuyck Dissertatio Historico-Medica auctore

Abrahamo Muntingio
Groninga-Frisio
Medicinæ Doctore, atque in Patria Groningæ et Omlandiæ Academia Botanices Professore, Amstelodami, apud Hieronymum Sweerts. 1681.

Aloidarium. Historia. 1680.

authorities as to the exact plant to which the term Britannica may be ascribed; but at length, Galen and Dioscorides are cited, who declare that while the Britannica has astringent leaves, good for wounds and much resembling those of *Lapathum agreste*; yet this plant has distinctive characters and the leaves are darker and more dense. It might without rashness, be taken for a species of Lapathum; and might be supposed not to have Frisia (Friesland) as its sole habitat, but to be common in other places.

The author immediately attempts to clear up the doubt by an elaborate description of the whole family of Lapathi, and tell us what Pliny said about it. When the statements of Hippocrates, Dioscorides, Galen and others have been examined, it remains that *Herba Britannica* is a plant which differs from the long list of those enumerated. Various authorities are then adduced in proof of the discrepancy of opinion which exists upon the determination of the true plant. Paulus Ægineta states that it resembles both in shape and general appearance the *Rumex sylvestris*. Oribasius, that it has leaves like *Lapathum sylvestre*, but darker and more hairy. The stem is not large; the root is black; and that the plant has an astringent taste. A crowd of other testimony is brought forward, the names of the writers being now almost forgotten, to support the same view. Petrus Andreas Matthiolus, a great authority, declares that Britannica is neither Bistort nor Tormentilla. Moreover, it is not Cochearia. The knowledge of the plant was lost in the time of the Goths, but was again discovered in that of the Gauls. Its virtues are alexipharmic and antiscorbutic. Numerous formulæ for its medical exhibition are introduced, amongst which are a decoctum, simple and compound; a syrup, gargle, dentifrice, electuary, extract, plaster, ointment, and many other recipes based on the polypharmacy of the period.

Seeing then that *Britannica vera* may be confused with certain other plants, Munting proceeds to give botanical details concerning all those for which it may be mistaken, and concludes his treatise with a description of the method of preserving, training and propagating the whole series. Very beautiful illustrations accompany the text and add much to the artistic value of the book, though strict criticism would hardly defend so elaborate a digression.

Thus we have plates of *Rhabarbarum rotundifolium verum* et *Fimbriatum*, *Lapathum Chinense longifolium*, *L. sativum antiquorum*, *Britannica Americana*, *Lapathum hortense*, *L. vulgare*, *L. unctuosum*, *L. acutum*, *L. longifolium crispum*, *L. sanguineum*, *L. planum paludosum*, *L. vulgare minus*, etc. *Oxylapathum tuberosum Americanum*, *Acetosa vulgaris*, *Acetosa Hispanica maxima*, and others; engravings of which will interest the botanist and the designer.

The treatise on aloes is also profusely illustrated. Many others, writes Munting, have attempted to describe the plant which forms the subject of the treatise, but all without success, and he first was permitted to reveal its true nature for the benefit of others.

Its discovery is thus narrated. There is a Herb called by some *Barba sylvana*; by others. *Plantago aquatica*. A certain noble maiden informed him of marvellous cures effected by this plant. The symptoms of the maladies so treated and relieved seemed to point but to the use of one plant, which he knew by reputation but which he had never seen at home, namely, the *Britannica*. His hope was disappointed, for when one day in the month of June he had diligently examined the plant said to have been employed, he found that it differed in many respects from the object of his search, and was probably that mentioned. In the year of grace (*Salutis anno*) 1672, July the ninth, there was a rumour, not a false one, that the enemy was nearing his native town (Groningen) and he was quietly engaged in punting about the marshes seeking herbs. He observed one of a dark black colour; not unlike Lapathum in appearance, often indeed seen by him before, but not in its native place, with the seed and some remaining flowerets. Immediately he ordered his boat to be stopped at the margin of a ditch, and the plant as being quite new, to be most carefully taken up by the roots. Then he perceived that the root was very black, a point which he examined with great care. When well washed it retained nearly all its colour, and his fingers were stained with a certain blackness. It possessed a wonderful astringency, and hence he no longer doubted that he had discovered the "true and legitimate Britannica of the Ancient Frisians." When, however, a very short time after, he beheld the enemy coming nearer, and that the advanced cavalry were taking him as it were in the flank; in order that he should not fall into their hands, he hastened home, all the same taking with him various plants and adorning his hat with their leaves as a symbol of imminent victory.

"Thus as if splendid with trophies I entered safely into the city." The field in which the plant was found was partly waste, and partly cultivated. It was marshy, and the soil was black. The adjacent village was called Wester-Broek (p. 80).

Next follows a lengthy, and many winding discourse about the character of the earth, and the names applied to it by Latin authors. None but an antiquarian enthusiast would be content to extract the small residue of fact which lies buried under the author's interminable sentences; the reader will be pleased to find that the word *cespes* may rightly be considered to mean turf or bog-land (p. 110).

"In this soil therefore I beheld growing in the water, on a first view as it were common, and not certainly *Rumex sylvestris*; very like *Oxylapathum*, a plant such as I had never seen in all my peregrinations." This is Munting's summary of the description of the ancients.

Britannica is a herb which has roots, stems, leaves, flowers and all seeds, very like *Lapathum agreste*, except that the roots are black; the leaves more oblong; and the leaves more black: stem, not much larger; all the rest similar (*consona*) as I have said.

The whole plant in all its parts has not an ordinary astringent power, but a remarkable one, and with a certain wonderful and strong power of penetration; for astringent remedies put forth (exhibit) this power almost on the superficies, and by their very astringency hinder penetration, and block up ingress. These points are further elucidated and much enlarged; the etymology of the word is discussed, but it is allowed to be immaterial whether the plant be called Britannica, Brittannica or Britanhica. Not till nearly two hundred pages have been exhausted do we come to the author's opinion that the plant about which he wrote so much was

Britannica Antiquorum vera
sive
Lapathum longifolium nigrum palustre.

It is stated to be infallible in scurvy, maladies of the stomach, wounds and serpents' bites. It obviously was of use as a peg on which to hang much learned disquisition.

The reader would perhaps like to see a specimen of the author's style:—

"Hisce tamen auspiciis faventibus, diversis in locis tam palustribus quàm Frisii maritimis omne Plantarum genus sedulò perscrutari aggressus sum, nullumque planè inexcussum omisi, nullis quoque sumptibus, vel laboribus gravatus fui, verum omne studium, omnemque operam adhibui, ut hanc Britannicam Herbam in Lucem rursus revocarem. Quod si idem et alii quoque facerent, non suæ tantum, verum et aliorum mortalium vitæ consulerent, deque posteris præclarè mererentur, atque hinc præterea famam assequerentur æternam.

"Si quidem ejusmodi beneficium posteri cum laude auctoribus perpetuò acceptum referrent. Hoc tamen mihi si non licuit, id saltem quod potui omni studio, atque industriâ præstare conatus fui; juxta illud, quærite et invenietis, pulsate et aperietur vobis; Rursum, Vitulâ meâ nisi arassetis, non invenisseris. Nec falsò joculari jactatur adagio, Vaccæ lac dare non propter cornua, verum illas mulgendas esse. Scriptum enim est: Petite et dabitur vobis."—P. 79.

Students of the literature of the 17th century may read the description of the siege of Groningen (p. 135), but we may say with Munting: verum ut redeam, unde digressus fui, tempus me vocat.

We may conclude by giving the laudatory verses written by Theod. Uchteman in old French.

"A Monsieur Munting, Docteur et Professeur en l'Academie de Groninge et Omlande, de la Medicine (*sic*) et Botanique sur son livre de l'Herbe Britannique.

"O Medicin divin, Prince des Iardiniers
Que Febus te couronne avec ses cerds Lauriers.
Qui monstrés le premier par ta sage pratique
Quel soit l'echantillon de l'Herbe Britannique.
Par tant de siecles de tous scavants ignoré.
Pour ce labeur ton nom sera tousiours doré."

The curious use as well as absence of accents will be noticed. I have ventured to translate the lines, thus:—

Divine Physician, Prince of Gardeners! may
Apollo surely crown thee with his bay,
Whose wise research has first show to our ken
Herba Britannica's true specimen.
Ignored for ages by all savants olden
For this work shall thy name be always golden.

THE CRYSTALLIZATION OF PHOSPHORIC ACID.*

BY P. L. HUSKISSON.

The crystalline form of phosphoric acid was first noticed by Süersen, Steinacher and Stromeyer, who obtained it in well defined crystals by evaporating a solution of the acid until it had the exact composition of H_3PO_4, a result which was confirmed by Krämer in 1869.

Péligot, in a paper read before the Académie des Sciences in the year 1840, stated that fused metaphosphoric acid, left in a botttle several years, absorbed water and formed at the top transparent crystals of orthophosphoric acid, in the middle, a mother liquid of specific gravity 1·7, and at the bottom, opaque indistinct crystals of pyrophosphoric acid, resembling loaf sugar.

Quite recently, however, Mr. H. P. Cooper, in a paper read before the Pharmaceutical Conference, 1881, stated that he had been unable to start crystallization in a solution of phosphoric acid, even when concentrated to a specific gravity of 1·850, without the introduction of some foreign substance, and used crystals of sulphate of sodium for that purpose.

Having observed certain facts in connection with the crystallization of phosphoric acid, which seemed to point to a different conclusion, the following experiments were made upon the subject.

It ought perhaps here to be mentioned, that during the writer of 1880–81 several bottles of 1·750 acid phosphoric in my father's laboratory, suddenly and without any apparent cause, crystallized, and it was with these crystals that some of the following experiments were made.

Starting with one of these crystals, if it was dropped into an acid of specific gravity 1·750, it was observed that the moment it touched the liquid it began to grow and rapidly filled the flask, evolving at the same time a large amount of heat. The crystals thus formed were in prismatic plates, hard and transparent and at ordinary temperatures easily kept in that state, if enclosed in stoppered bottles.

Experiments were then made with phosphoric acid of different strengths, and an acid of specific gravity 1·750 was the highest and specific gravity, 1·660 the lowest, that could be crystallized at the ordinary temperature. The weaker acids ought at the time of crystallization, to be surrounded by water, as the heat evolved by the first few crystals forming is sufficient to redissolve them and prevent the formation of others. The shape of the crystals from the weak solutions is especially well defined; they are transparent and in prismatic needles.

Endeavours were then mode to start crystallization in an acid of specific gravity 1·750, with a number of other crystals, both of the same and other groups, but without success, the following crystals being used:—

Acetic acid glacial	Cadmium nitrate	Potassium iodide
Alum	Copper sulphate	Potassium nitrate
Ammonium nitrate	Iron sulphate	Potassiumsulphate
Ammonium oxalate	Lead nitrate	Red potassium chromate
Ammonium phosphate	Manganese sulphate	Silver nitrate
Arsenic acid	Mercurous nitrate	Sodium arseniate
Barium nitrate	Oxalic acid	Sodium phosphate
Borax	Phenol	Sodium sulphate
Boric acid	Potassium bromide	Tartaric acid
	Potassium chlorate	Zinc sulphate

It was then tried to crystallize some acid by concentration, evaporating carefully so as to prevent the formation of meta or pyrophosphoric acids; but although acid of the specific gravity 1·860 was obtained, no crystals appeared. Finally some acid of specific gravity 1·750 was evaporated for one hour, keeping it at 160° C. (320° F.), and the evaporation finished *in vacuo*, when some tabular transparent crystals were obtained, which as soon as they came in contact with the air changed their form and became opaque, giving out at the same time a large amount of heat. The different behaviour of this acid, in crystallizing *in vacuo* while stronger acids in the air refuse to do so, is due to the fact that the acid absor bs water very readily.

When these crystals are dropped into acid phosphoric of specific gravity 1·750 no action takes place, nor can crystallization be in any way induced at that strength; but at a gravity of 1·800 it will take place readily after a short time.

It is interesting to notice that if a crystal of the former acid be placed in some phosphoric acid of specific gravity 1·800, nothing results; but if a few drops of water be added so as to reduce the strength, crystallization immediately begins.

As the attempt to crystallize phosphoric acid of specific gravity 1·750 with sulphate of sodium failed, two samples of specific gravities 1·800 and 1·850 were prepared, and into each a crystal of sulphate of sodium was placed, well stirred and left for thirty-eight hours. At the end of

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* Read at a meeting of the School of Pharmacy Students' Association, February 7.

this time both samples were carefully examined, but in neither had any crystals made their appearance.

The results of these experiments indicate—(1) That a solution of phosphoric acid cannot be crystallized by any means when the specific gravity is lower than 1·660 at ordinary atmospheric temperatures. (2) Solution of phosphoric acid of specific gravities 1·660 and upwards will not under ordinary conditions crystallize spontaneously or upon agitation. Neither can it be crystallized by the introduction of sodium sulphate or any other foreign crystal. When a crystal of orthophosphoric acid is introduced, crystallization at once commences. (3) Phosphoric acid having a specific gravity of 1·800 can be crystallized spontaneously by exposing over sulphuric acid *in vacuo*. The crystals then produced are unable to start crystallization in phosphoric acid of lower specific gravity than that from which they have been produced (1·800), and on the other hand the crystals obtained from weaker solutions are unable to induce crystallization in the stronger acid of specific gravity 1·800.

TRUFFLES.*

Among forgotten or forsaken industries in this country is that of gathering truffles. Truffle hunters and their dogs are alike extinct. In the last century, Gilbert White, of Selborne, living among beech woods, received a call in the month of August from a truffle hunter, who showed him several large truffles found that day. He gave some interesting information to the effect that truffles were not to be found in deep woods, but in narrow hedgerows and the skirts of coppices. In a thick beech wood the mass of roots so entirely occupies the ground, that nothing can grow. Sometimes, said the man, the truffles lie two feet under ground, sometimes at the surface, and those that lie deep, he affirmed, were more easily found by the dogs than the others, the shallow-lying ones having little or no smell. The price he asked for his truffles was half a crown a pound; they were in season in different situations nine months in the year, and were least abundant in wet winters and springs.

English truffles are now as much out of date as English wine, and for the same reason—the foreign growth is better, and is more easily obtained, as somewhat recent experiments in this country prove. Like the vine, they were found only in a few districts, requiring not only a warm situation, but a soil containing a considerable percentage of lime—2 or 3 per cent.; limestone soils therefore suited the truffle best. It is a parasitical plant living on the roots of trees. It is in fact a tuberaceous mushroom, which affects trees through the necessities of its growth, requiring, as it does, a large amount of phosphoric acid and of potash, which are supplied in the decay of the leaves annually shed from the trees. In England it is found among the beech woods of the chalk formation in Surrey, Sussex, Hants, and a few other districts, and thus it was erroneously supposed to affect beech trees only; but in France it is found on several limestone formations, and in connection with several sorts of trees, especially the chestnut, pine and oak. M. Chatin, a learned authority on the truffle and on agriculture, has published an exhaustive work on these vegetables from their germination to their appearance in a Perigord pie! Their growth, as a marketable crop, is exceedingly slow, and although the truffle harvest of France, reaped chiefly in a few districts of the South (though the truffle is found in fifty departments), yields 3,500,000 lbs. in weight, the growers receiving for it £400,000, and the retailers £1,000,000; still the crop is of Nature's planting and production, and it has not yet become a subject of cultivation. A good dog, or still better a sow, getting only a chestnut or acorn by way of wages for each find, will enable the hunter of the vegetable to bag 10 or 12 lbs. in one day in a good district, and these are worth £2 on the spot, and £4 or £5 in New York, London, Paris, or St. Petersburg. M. Chatin enlarges both on the dogs and pig, of Perigord. They are indispensable, and the latter are the most useful, being trained not merely to find the truffle but to uproot it and turn it out with their strong snouts, or lay it bare as their previous education may direct them. Dogs are chiefly used in Provence, and their obedience and acuteness are equal to that of the pigs, and their noses are almost as good, but they lack the faculty for uprooting the game. Each animal will scent the truffle from a considerable distance, lead the hunter to it, and stand to it, staunch as a pointer to a bird or hare, till the order is given to advance and take possession.

It is thought in France that truffle growing might be extended like fruit growing in England. Some say that ten times as many truffles might be grown. The difficulties, however, seem great. M. Chatin has not found the spores of this mushroom very manageable. The black truffle of Perigord ripens in October and remains in season through the winter. In the early spring it decomposes and the germs are set free and become mixed with the soil, ready for reproduction, after the manner of cryptogams of this class. White filaments are formed which accumulate into a mass, and from this mycelium the truffles grow, but, says M. Chatin, the tubers are incubated from this filamentous body only after a lapse of several years. The saying, "No trees, no truffles," indicates the position of their growth, and the experience of the Hampshire truffle hunter, that he found them on the borders of copses and hedgerows rather than in deep woods, indicates with accuracy some of the conditions of their growth. They require a light, dry soil, full of vegetable matter, and manured by the fall of leaves; but they are crowded out, like other vegetation, when the wood grows dense. Truffles accordingly are not found in young woods less than from six to ten years old, and the woods usually become too dense for them at thirty or forty years old. M. Chatin recommends the culture of the crop, and feels certain it would pay. He would plough the ground between the rows of young trees in a newly formed plantations, and plant the "tubers" in rows two yards apart, growing grain on the same ground for three or four years. In about six or eight years he would expect an abundant truffle harvest. Assisted by the pigs he would go on reaping a crop from year to year, till it might be necessary to begin upon the trees, thinning the timber for the sake of the truffles! We shall hope with M. Chatin that the supply of truffles may be increased tenfold, though undoubtedly the difficulties of cultivation are greater than in the case of mushrooms, for reasons which are obvious.

* From the *Gardeners' Chronicle*.

THE OPIUM TEST OF THE GERMAN PHARMACOPŒIA.*

The new edition of the German Pharmacopœia describes a method for the estimation of the morphia in opium and in three preparations made from it, and requires that the opium when thus assayed shall yield at least 10 per cent. of morphia. The object of a series of experiments, instituted by Dr. Geissler, was to ascertain to what extent the process was reliable.

The following are the details of the process prescribed by the German Pharmacopœia:—Eight grams of opium are mixed with 80 of water, frequently shaken during half a day (? twelve hours) and filtered; to 42·5 grams of the filtered liquid 12 grams of spirit, 10 of ether and 1 of liq. ammoniæ are added, the mixture is set aside in a cool place (10°–15° C.) and frequently agitated. After the lapse of twelve hours the precipitate is collected on a tared filter 8 centimetres in diameter, washed with a

* Abstract of a paper in the *Pharmaceutische Centralhalle*, 1883, Nos. 16 to 19.

mixture of dilute spirit, water and ether, in successive portions of 2 grams, and dried. It should weigh not less than 0·4 gram.

One part of the morphia thus precipitated dissolves completely in 100 parts of lime water, forming a yellow solution, which is coloured reddish brown by a little chlorine water and blue or green by solution of perchloride of iron.

The method is essentially the one devised by Prollius, and minutely described by Flückiger,* which has been criticized at length by Mylius† and van der Burg.‡

A sample of Turkey opium, guaranteed to contain 10 per cent. of morphia, was obtained from a drug house of high repute, and from it tincture and extract were prepared according to the pharmacopœial instructions.

The opium tested by the official method yielded 4·4 to 4·7 per cent. of morphia; the tincture, 5·2 to 6 2; the extract, 7·9 to 10·4 per cent. By allowing the mother-liquor to stand thirty-six hours longer these figures were increased to 7·7 to 8·1, 7·0 to 8·2 and 10·1 to 10·7 for opium, tincture and extract respectively. A second sample of opium, guaranteed to contain 10 per cent., yielded 8·0 to 8 3 per cent. in forty-eight hours; the tincture from the same gave 7·5 to 8·2 per cent. From a third sample of opium, however, as much as 13·7 to 14·1 per cent. were obtained. The time prescribed by the Pharmacopœia is, therefore, far too short; the amount, also, of morphia obtained from the tincture is larger than the percentage contained in the opium would lead one to expect.

Slight variations in temperature were found to be without appreciable influence on the result and constant agitation was also unsuccessfully tried.

Both Mylius and van der Burg have proved that a correction must be made to compensate for the morphia that remains dissolved in the mother-liquor; this correction is placed at 2·2 to 2·5 per cent. of alkaloid in the opium. If then the Pharmacopœia requires that 10 per cent. of morphia shall be obtained from the opium the quantity of alkaloid contained in the same must be 12 to 13 per cent.

A series of experiments was then undertaken to ascertain whether more morphia was retained in the mother-liquor of the official process than in that of other processes; and this was found to be the case.

The precipitated alkaloid was next tested with lime-water in which it should dissolve completely; this it failed to do, and a closer examination showed that the morphia precipitated by the German official process from infusion of opium contained varying amounts (15 to 18 per cent.) of narcotin; that precipitated from the tincture contained still more, hence the apparent excess of morphia in the latter, to which attention has already been directed. The narcotin was estimated by treating a weighed quantity of the powdered precipitate with *pure* chloroform, drying and weighing.

The author sums up his results as follows:--

The method of the German Pharmacopœia does not separate the morphia completely.

The morphia separated is at least not always pure.

The results are not uniform.

These objections may be urged against every method of estimating morphia that has yet been proposed, but the process of the Pharmacopœa Germanica leaves more in solution than others do and yields a less pure morphia. To comply with its requirements an opium must contain 12 to 13 per cent. of morphia.

In his concluding remarks Dr. Geissler expresses his approval of Mylius's volumetric estimation of morphia,§ but hopes soon to perfect a gravimetric method based upon the solubility of morphia in ammonia.

* *Pharm. Journ.*, [3], x., 254.
† *Archiv der Pharm.*, xv., 310.
‡ *Pharmaceutisch Weekblad*, Nov., 1879.
§ *Pharm. Journ.*, [3], xii., 6.

LUFFA ÆGYPTIACA.*

BY REINHARD J. WEBER, PH.G.

Description.—*Luffa œgyptiaca*, nat. ord. *Cucurbitaceœ*, is indigenous to Egypt and Arabia, and is a large climbing vine, with a thin, but very tough, light green succulent stem, attaining a length of from ten to thirty feet. The leaves are alternate and palmately lobed, of a light green colour and almost destitute of taste. The flowers are monœcious; petals five, united below into a bell-shaped corolla; anthers cohering in a mass; ovary two-celled, style slender, stigmas three. The fruit is elliptical ovate, fleshy and indehiscent, with a green epidermis, longitudinally marked with black lines, varying from ten to fifteen it number; under each of these lines is found a tough woody fibre. The fruit attains a length of from six to twenty-five inches. I have seen a specimen of the fruit grown in Allentown, Pa. which measured thirty-four and a half inches in length, and nine inches in diameter. When the epidermis is removed it presents a layer of interwoven woody fibres, which may be used like a sponge, being hard and rough when dry, and soft when soaked in warm or cold water; they absorb the latter with the same facility as the ordinary sponge, and have the advantage over the sponge not to wear out by ordinary use for a number of years; hence, the name of "Vegetable Sponge," or "wash rag," and its use as a flesh glove. The seeds are numerous, and are almost flat, broadly ovate, three-eighths of an inch long. The testa is of a blackish brown colour and rough, cotyledons almost flat, of a yellowish brown colour and oily.

Analysis.—An infusion of the epidermis of the fruit (1 to 10) was made and tested for tannin, with tincture of chloride of iron, with sulphate of iron, and Russian isinglass, whereby a trace of tannin was shown. One hundred grains of the epidermis, thoroughly dried, yielded fifty-four per cent. of residue; on being incinerated at a low heat, the epidermis (dry?) yielded twelve per cent. of a dark grey ash, one half of which was soluble in water; the ash consisted of silica, carbonates and sulphates of potassium and calcium. The fibrous portion, after being incinerated, yielded sixteen per cent. of ash, partly soluble in water.

The fruit contains a large amount of mucilaginous substance, which yields a white precipitate with solution of subacetate of lead.

An infusion of the fibrous portion, when evaporated to a syrupy consistence, became gelatinous on cooling. The gelatinous mass had all the properties of bassorin, and was free from starch. One troy ounce of the epidermis was powdered, and successively exhausted with benzin, alcohol and water. The benzin solution yielded a small quantity of yellow colouring matter; the alcoholic tincture left chlorophyll and a little extractive, and the infusion gave twenty per cent. of slightly bitter extract.

One troy ounce of the powdered seeds was treated with boiling benzol; the green solution, on being evaporated, yielded two and a half per cent. of a brown, fatty oil, and twelve per cent. of a green mass. The latter, on being treated with very dilute hydrochloric acid, and evaporating the liquid, yielded a minute amount of crystals. Similar crystals were also obtained from the green alcoholic extract of the seeds previously exhausted with benzol. Water afterwards took up nothing of note.

Mode of preparing the fibrous portion.—The fruit is cut longitudinally on one side, stripped of the epidermis, the seeds are then removed, and the network of fibres is washed thoroughly to get rid of the mucilaginous substance and dried. It is then ready for use. This fibrous portion is the only part of the plant, as far as I know, that has ever been in use.

* From the *American Journal of Pharmacy*, January, 1884.

The Pharmaceutical Journal.

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THE LAWS RELATING TO ARSENICAL PIGMENTS AND OTHER POISONOUS SUBSTANCES IN FOREIGN COUNTRIES.

ABOUT twelve months since, a Committee of the National Health Society, appointed for the purpose of considering the injuries arising to health from the use of arsenical and other poisonous pigments in the tinting of wall-papers and textile fabrics and for other industrial purposes, applied through its Chairman, Mr. ERNEST HART, to Earl GRANVILLE to instruct the agents of the Foreign Office at courts on the continent of Europe and in America to report on the legislation affecting this subject existing in other countries. In compliance with this request a circular was immediately afterwards issued from the Foreign Office giving the necessary instructions, and the consequent reports have just been issued in the shape of a paper presented to Parliament by command of Her Majesty. Besides the information relating to foreign legislation having for its object to restrict or safeguard the manufacture, use, or sale of arsenical and other poisonous pigments, which was the special object of the inquiry, there are scattered through the reports various incidental references to regulations affecting the sale of "poisonous substances" in different countries by persons other than pharmacists, which are of special interest at the present moment.

Turning, however, first to the special subject of the return, we find that reports have been received from British representatives at twenty-two different courts. Several of these reports may be at once eliminated from consideration as negative. Thus, in Belgium, France, Italy, Netherlands, Portugal, Servia, Spain, Switzerland and the United States, there are no special laws relating to the use of arsenical or other poisonous pigments. Respecting these countries nothing need be said at present except that in France a circular was sent out some years ago cautioning manufacturers as to the responsibilities incurred in using poisonous pigments, in Greece the use of poisonous colours in confectionery and liqueurs is prohibited, in Italy a law on the subject is being prepared, and in the Netherlands it is considered that the ground is practically covered by penal laws dealing with the selling of merchandize known to be dangerous without a special warning. The list may be further reduced by grouping Baden, Bavaria, Hesse-Darmstadt, Saxe-Coburg-Gotha, and Saxony together with Germany, since practically they are all regulated by an Imperial decree issued in 1882, which forbids the "use of colours containing arsenic for "the preparation of wall-papers, and of colours "containing copper and arsenic for dyeing stuffs for "clothing," and also the sale of articles of clothing dyed with these poisons. In Austria the employment of arsenical pigments for colouring wall-papers, artificial flowers, textile fabrics or papers is prohibited; also the employment of aniline or mineral colours in the manufacture of articles of consumption, or of mineral colours containing copper, arsenic, lead, or zinc in stuffs intended to come in contact with the human body, as well as the application of litharge or bad enamel to table and kitchen utensils. In Denmark the use of arsenical compounds for staining, dyeing or colouring, or preparations of lead for toilet articles, or oxide of zinc in india rubber ware is strictly forbidden. In Roumania there is no provision as to wall-papers, but the use for wrapping purposes of paper coloured with poisonous pigments is prohibited. Russia has stringent statutes against the importation, sale or manufacture of papers or textile fabrics coloured with arsenical pigments, or the importation of aniline colours otherwise than in crystals, or the use of "papier nacre," which is covered with an enamel containing lead. Lastly, Sweden is officially described by its State Board of Health as being just now under the influence of a "fashionable arsenical panic," the force of which may be estimated by the fact that the number of analyses for arsenic indulged in by the Swedish public reaches at least ten thousand annually. In that country, as in others, "different analysts arrive at different results," and, as one analyst, at least, is said to pronounce, without further examination, "every crystallization in the tube, even though it be scarcely perceptible, to be arsenic," it is not surprising that the panic is maintained and that regulations are enforced in a manner that sometimes proves very inconvenient to manufacturers and importers.

With respect to the second topic alluded to, the bearing of which upon the Draft Pharmacy Bill will be evident, it appears that the Hessian Police Code draws a distinction between "direct poisons," which can be legally sold only "apothecaries and druggists," and substances of a "poisonous nature," which may be sold under certain precautions to adults by any grocer holding a special police licence. The list of these "poisonous" articles includes the mineral acids, metallic pigments and certain vegetable substances "commonly used in art and industry." In Russia poisons are divided into four classes, one of them being described as "poisonous and violently acting substances employed in manufactures and not well adapted to criminal purposes." It appears that this class, which includes the mineral acids, oxalic acid, potassium cyanide, sugar of lead, arsenical and copper pigments, etc., may be sold in ordinary business transactions by "merchants of the two guilds," subject to certain conditions, amongst which are the holding of a licence and registry of sales; but at fairs the sale of these "poisonous and violently acting substances" is unrestricted. In Servia poisons and poisonous articles may be sold by "authorized merchants" only to persons who have received special permission from the police to purchase. In Sweden such "poisonous substances as are used for generally occurring technical or domestic purposes," provided certain conditions as to storage are complied with, may be sold by any person legally carrying on business who shall deliver to the authorities a written specification as to the poisonous substances he proposes to keep for sale. But it is worthy of note that the same substances may be sold by a pharmacist, only under much more stringent conditions. One more regulation, issued by the municipality of Bucharest, may be referred to rather for its oddity than its importance. The municipality, believing that cases of poisoning are often produced by the use of poisonous cosmetics, and having received frequent complaints that several hairdressers, perfumers, "and even chemists," of the capital have been selling cosmetics containing lead and mercury for the tinting of the face, and "seeing that several women of the capital make and sell the same poisonous cosmetics," forbids the sale within the limits of Bucharest of any cosmetics, or similar washes, pomades or powders, containing preparations of lead or mercury.

THE CHEMIST AND DRUGGIST IN JAPAN.

A Report upon taxation and land tenure might seem to be a most unpromising exploring ground for information relating to the practice of pharmacy or what most nearly represents it in a particular country; but, nevertheless, the reader of a Report on this subject by Mr. Gubbins, an *attaché* to the English Legation at Tokio, recently submitted to Earl Granville, may find imbedded in it, like a fly in amber, an interesting summary of the conditions under which drugs and medicinal preparations are supplied to the Japanese public. The particulars given correspond fairly well with the statement made in Isabella Bird's recent work 'Unbeaten Tracks in Japan'; but as in the Report they are somewhat more fully stated, and probably few of our readers will have an opportunity of consulting the book, we may be excused for transferring the gist of them to these columns.

According to Mr. Gubbins, the "profession of a druggist" in Japan does not coincide with that of a foreign "apothecary." This latter word, we presume, he uses in its pharmaceutical aspect; for he adds that before the country was open to foreigners, there was no such class, the sale of medicine having been confined to "doctors," who either supplied medicines prepared by themselves according to original recipes or according to prescriptions of others, or, perhaps more commonly, sold medicines already prepared and known to practitioners and patients by the names of "doctors" who compounded them. About the year 1877, apparently in consequence of the encroachment of foreign medical science upon native systems of medical treatment, the supply of medicines became the subject of legislative enactments, and for the purposes of taxation persons engaged in it were divided into three classes,—druggists, retail dealers and itinerant sellers of medicine. It would appear, however, that the members of one only of these three classes, the "druggists," enjoy the privilege of preparing medicines, though this is not made quite clear in the Report; at any rate they differ from those in the other classes in being more heavily taxed, and in paying their taxes into the national exchequer. The taxation is imposed in a form not calculated to encourage the multiplication of specialties, a tax of two yen yearly (about 7*s.* 6*d.*) being payable on each separate medicine prepared and sold by the druggist, besides which he must hold a licence to sell, renewable quinquennially, for which he pays a fee upon taking it out and renewal at the rate of 20 sen (about 9*d.*) for each medicine. The term "prepared medicines" is defined as comprising medicine in a liquid form, and in the form of pills, ointments and powders. The details of the composition, weight and taste of each separate medicine, of its alleged medicinal properties and of the dose have to be furnished to the Home Office at the time of making application for a licence to sell it; power being reserved to the Home Office to refuse a licence in the case of any medicine which might be considered dangerous. Even here the limit of taxation to which the Japanese "druggist" is liable is not reached, for he has to attach to all drugs sold a stamp representing 10 per cent. of their price, which is fixed by Government. The pettiness of this tax may be estimated from the fact that the first item of the regulation provides that on medicines of the price of 1 sen (less than a halfpenny) a stamp of 1 rin (about one-twentieth of a penny) shall be affixed. The penalties for breaches of these regulations range between 7*s.* 6*d.* and £3 15*s.*, the latter penalty being for the sale of unstamped medicines. In a recent report Mr. Consul Robertson made the remark that patent medicines, or drugs put up in a popular form, are greatly in vogue in Japan, and that a good many imported articles go into consumption in this shape. He also stated that an intimation that a tax would be imposed upon these remedies had already seriously affected the business, and was thought likely to operate still further to its disadvantage. The Japanese authorities, however, do not appear to share this anticipation, since the financial budget for the present year includes an estimated increase of revenue from this source amounting to

600,000 yen, or about £110,000. The tax paid by "apothecaries" and "medicine pedlars" is a local one, and is in the form of an annual licence for which the fee is £3 15*s*.

An Evening Meeting of the North British Branch of the Pharmaceutical Society will be held in the Society's Rooms, 119A, George Street, Edinburgh, on Wednesday next, when the papers read will be on "The Composition of Potassæ Sulphas cum Sulphure," by Messrs. Maben and Deehan, and on "The Morphology and Physiology of the Cell," by Mr. Patrick Geddes. The chair will be taken at 8.30.

* * *

We learn from the New York *Pharmaceutische Rundschau* that a Bill has been introduced into the House of Representatives at Washington and ordered to be printed which would provide for the preparation of a legally authoritative National Pharmacopœia of the United States. It proposes that with this object the Finance Minister should appoint two officials of the United States Marine Hospitals, the War Minister two officials of the Military Medical Department, and the Minister of Marine two officials of the Naval Medical Department, in order to carry out the work, and that these officials should invite the American Medical Association and the American Pharmaceutical Association each at its next annual meeting to select three of its members to form a Committee to act jointly with them in preparation of such a work. The Joint Committee would be empowered to elect a President and a Secretary from its midst, and to supply any deficiency in its number by the election of new members. The printing and publishing of the official Pharmacopœia would be in the hands of the Committee and the work would have to be revised every ten years. The Bill also provides for a grant of five thousand dollars for payment of the expenses necessarily incurred in carrying out the measure.

* * *

The Registration of Firms Bill, referred to last week as having been read a first time in the House of Commons, has now been issued and proves to be similar to the Bills introduced in previous years. It provides that every firm carrying on business in the United Kingdom under a firm-name which does not consist of the full or the usual names of all the partners or all the acting partners without any addition, and every person carrying on business under a firm-name consisting of or containing any name or addition other than the full or usual name of that person, shall effect registration in a prescribed manner. The register, which is to be open to public inspection for a small fee, is to show the firm-name, the nature of the business, the place or places of business, and the full name, usual residence, and other occupation of any of the person or persons carrying on or intending to carry on the business. Upon any change occurring in the constitution of a firm the members of the firm as reconstituted would have to furnish information as to the change within a month; any change in the firm-name would involve fresh registration *de novo*. It will be evident that the existence of such an Act would in certain cases greatly facilitate the performance of the duties of the Registrar under the Pharmacy Act.

A Bill, introduced into the House of Commons by Mr. Kennard, having for its object to repeal such sections of any Act of Parliament as enable mixed traders, other than duly licensed victuallers, to deal in the retail sale of spirits and liqueurs, contains a provision that nothing in it shall affect or apply to —among other things—"the sale of medicated or methylated spirits, or spirits made up in medicines and sold by medical practitioners or chemists and druggists." The juxtaposition of the first two articles mentioned, and indeed the tenour of the whole clause, is suggestive of a very limited acquaintance on the part of those who drafted the Bill of the conditions under which either medicated or methylated spirit is sold.

* * *

As the esteemed editor of our medical contemporary, the *Lancet*, appears to be engaged in studying the proclivities of various journals, as indicated in the announcements made in their advertising pages, we hope he will not overlook one in the columns of his own journal for last week, in which a surgeon, enjoying the possession of commanding premises at the West-end, advertises "a fine opening for a chemist's business or *surgeon's retail*."

* * *

The commercial samples of liquid starch sugar, or "glucose," examined by the Committee appointed in the United States to investigate the subject, to which reference was made last week, were found to contain from 34·3 to 42·8 per cent. of dextrose, 0 to 19·3 per cent. of maltose, 29·8 to 45·3 per cent. of dextrin, and 14·2 to 22·6 per cent. of water. The samples in the solid form—"grape sugar"—ranged in composition from 72 to 73·4 per cent. of dextrose, 0 to 36 per cent. of maltose, 4·2 to 9·1 per cent. of dextrin, and 14 to 17·6 per cent. of water. Three specially prepared samples of "grape sugar" contained respectively 87·1, 93·2 and 99·4 per cent. of dextrose, the last being "crystalline anhydrous dextrose." The ash in the "glucoses" varied between 0·325 and 1 per cent., and in the "grape sugars" between 0·335 to 0·75 per cent. The reporters add that in the United States starch sugar is chiefly used in making table syrup and artificial honey, in brewing and vinegar making, as well as in the adulteration of cane sugar and as a substitute for it in confectionery and canning fruits. It is estimated by the Committee that the industry in the United States gives employment to twenty-nine factories, which together represent a capital of £1,000,000, consume about forty thousand bushels of maize daily, and produce "glucose" and "grape sugar" to the value annually of £2,000,000.

* * *

We are requested to state that in consequence of the great demand for tickets, the annual dinner of the Chemists' Assistants' Association, which takes place at the Holborn Restaurant on the 20th inst., will be held in the Venetian Room (Grand Entrance), and not in the Duke's Saloon as advertised.

* * *

At the next meeting of the Chemical Society, on Thursday, the 21st inst., there will be a ballot for the election of Fellows, and a paper will be read on "An Analysis of Spotley Bridge Spa Water," by Mr. H. Peile.

Transactions of the Pharmaceutical Society.

In the List of Apprentices or Students, page 630,
Wilson, John........................Aberdeen,
should be
Wilson, John........................Wolverhampton.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, February 6; the President, Mr. James E. Brunker, M.A., in the chair.

Present:—Mr. H. N. Draper, Vice-President, and Messrs. Allen, John Evans, Grindley, Hayes, Hodgson, McIlwain, Dr. R. Montgomery, Dr. Aquilla Smith and Professor Tichborne.

The Registrar read the minutes of the last meeting, which were confirmed.

A letter was read from Dr. Kaye, Q.C., clerk to the Privy Council, enclosing an Order of Council confirming the resolution of December 5, 1883, relative to the time to be spent in learning practical pharmacy.

The President: The new regulation requiring four years to be spent in the learning of practical pharmacy came into force from January 1 last, and is now law.

A communication was received from the Attorney-General for Ireland, forwarding his replies to the following queries:—

"*Queries* submitted to counsel on behalf of the Council of the Pharmaceutical Society of Ireland:—

"The Council have been entrusted with the duty of administering the Pharmacy Act, Ireland (38 and 39 Vict. c. 57), and have been empowered to make regulations which, subject to the approval of the Lord Lieutenant and Privy Council (sec. 17) have the force of law. The Council have found difficulty in construing the legal interpretation of the term 'person keeping open shop,' how far it may extend, or how it may be limited (*vide* sec. 30).

"On this point counsel's opinion is sought. The following case now before the Council illustrates the difficulty. Candidates presenting themselves for the licence of the Society must produce certain certificates from a pharmaceutical chemist or apothecary keeping open shop (*vide* p. 55 of the Society's Calendar). A Mr. Hardy, a licentiate of the Society, seeks for recognition of his certificates under this regulation, but under the circumstances detailed below. A firm named Beater and Co., carrying on business at 17, Lower Sackville Street, as 'general druggists,' have entered into an arrangement with Mr. Hardy, who is one of the partners of that firm, under which he rents from the firm a portion of the premises in which the general drug business is carried on, as a compounding department. It appears that the profits of the compounding department are exclusively enjoyed by Mr. Hardy; but it also appears that the department is only a portion of the general business shop, and that there is a common entrance to both, the name on the door being 'Beater and Co.' The case in question is a comparatively unimportant one, but will govern others which may arise. Counsel will please advise—

"1. Whether the singular 'person' can be held to imply and include 'persons' under the Irish Pharmacy Act, or if there is any general interpreting Act in the Irish statutes affecting the point? Counsel's attention is directed to an English case, The Pharmaceutical Society of Great Britain *v.* the London Supply Association, 5 Q. B. D., p. 310, which was finally adjudicated on in the House of Lords. It is necessary to keep in mind that the Irish Act, though closely following the Pharmacy Act (Great Britain), 1868, is not, owing to antecedent circumstances, on all fours with it. In Great Britain any person before the passing of the Pharmacy Act could compound physicians' prescriptions; while in Ireland the right to compound prescriptions formerly enjoyed by apothecaries only is now extended to licentiates of the Pharmaceutical Society and to no others.

"2. Can physicians' prescriptions be legally compounded in Ireland by a firm of whom one or more members are not qualified pharmacists; or does the licence only extend to the individual licensee who conducts his business on his own premises and for his own profit?

"3. Can a firm in general business or co-operative society conduct a dispensing department under the management of a qualified pharmacist within their own premises, even though such qualified manager is the ostensible owner of said department?

"4. Can Mr. Hardy in the case specially referred to be regarded as a pharmaceutical chemist legally keeping open shop in the terms of the Society's regulation referred to?"

"*Opinion*: Having regard to the Statute 13 and 14 Victoria, chap. 21, sec. 4, words in the singular used in a statute include the plural and therefore 'person' includes 'persons.' As regards Mr. Hardy's case, having regard to the fact that he is the sole proprietor, as I understand, of the dispensing portion of the business, I think he may be fairly regarded as 'keeping open shop' within the meaning of the regulation at page 55 of the Calendar.

"As regards the second question in the case, in my opinion if a firm, not being an incorporated company, consists of persons, some of whom are not properly qualified pharmacists, such firm cannot legally compound prescriptions. In such case the licence granted only extends to the person to whom it is granted, so as to authorize him to conduct business on his own premises.

"As regards the third question in the case, I assume it refers to the case of firms or societies incorporated under the Companies Acts or otherwise. As regards such companies, having regard to the decision of the House of Lords in the case of the Pharmaceutical Society of Great Britain *v.* the London and Provincial Supply Association, Limited, 5th Appeal Cases, p. 857, they may keep and conduct a dispensing department provided the person actually managing and conducting such department is himself a properly qualified chemist.

"Reply to fourth query as to Mr. Hardy: I think he can."

The President: This reply is in some respects a rather serious thing for the Society, and shows the necessity for pressing for an amendment of the law. It appears to be an extraordinary anomaly that Brown, Jones or Robinson if they form an incorporated society can do what none of them individually can do by himself.

Mr. Draper: It is a *reductio ad absurdum.*

Dr. Aquilla Smith: The whole thing amounts to an evasion of the Act of Parliament.

Mr. Hayes: I suppose Sir John Arnott and Co. could set up a dispensing establishment in their house.

Mr. Draper: They could, because they are a limited liability company.

The President: Among the proposed amendments in the Act we have propositions touching this very point. The English Society have in their draft Bill a similar clause, which, it is to be hoped, will be passed into law. I have written to the President of the English Society asking for a copy of their draft Bill of this year, as I do not know whether any change has been made in it since last year. The first practical result of the communication we have received is that we must inform Mr. Hardy that, as the law has been interpreted to us, the course which he has adopted is not contrary to law. In Mr. Hardy's last communication to the Council he took exception to some remarks that I had made at a meeting of the Council and required me to withdraw them. I have nothing to withdraw. What I said I still adhere to, namely, that

Mr. Hardy had made elaborate preparations to evade the law, whether successfully or not remained to be seen. It appears now that he is so far successful, according to the way in which the law has been interpreted. I withdraw nothing that I have said. I do consider it an evasion of the law.

Mr. Grindley said he was averse to giving Mr. Hardy any answer in the matter.

The President said it was only right that a copy of the queries and answers should be sent to Mr. Hardy. Of course a lawyer's opinion did not settle the law. That could only be done by the decision of a Court of Justice; but he thought it would be unwise for the Council to go into Court with that opinion staring them in the face.

Mr. Allen: Can a person situated as Mr. Hardy is call his portion of a shop a "dispensing establishment?" It is really an establishment in itself according to the position which Mr. Hardy takes up. Questions may arise in the case of apprentices, as to what department they were engaged in.

The President said there was a clause in the proposed amended Bill empowering the Registrar of the Society to send to any questionable establishment a notice requiring the *bonâ fide* proprietor to state within a limited time who he is. For default in the making of that reply a penalty was provided; and also for carrying on business, and acting as owner, during default in making such reply a penalty was provided. This would be a most useful clause.

It was then resolved, on the motion of Mr. Hayes, seconded by Mr. Evans—

"That a copy of case and replies be forwarded to Mr. Hardy."

A letter was read from Mr. Robert J. Downes, suggesting alterations in the bye-laws of the Society.

The letter was referred to the Law Committee.

The next business was the consideration of a report from a deputation which had recently waited on the Chief Secretary for Ireland in reference to the amendment of the Pharmacy Act.

The President said they might take the report which appeared in the *Freeman's Journal*, of what occurred at the deputation, as it appeared to be the most accurate. All who attended the deputation must have been pleased at the favourable reception which they got from Mr. Trevelyan. He appeared to have gone thoroughly into the questions, and took up the points that were presented to him at once. He (the President) had not expected that before they left the room they should have received what was tantamount to a pledge, that, as far as possible, what they asked for would be carried out. The Chief Secretary asked them to put in writing exactly what they wanted, and the sooner that was done the better. He (the President) had drafted the heads that had already been agreed on by the Council, and had written to the President of the English Society, asking for a copy of the Bill which his Council were promoting, in order that the two Societies might, as far as possible, work on the same lines. If Government should bring in Bills for the two countries at the same time it was probable that the two Bills would be identical in some points. It was desirable to have a meeting of the Pharmacy Act Amendment Committee as soon as possible, in order to prepare the written statement for which Mr. Trevelyan had asked; it was also advisable that that statement when agreed upon should be printed, and copies of it sent to Irish members of Parliament.

Professor Tichborne said it would be very wrong to force a Bill through Parliament without consulting and getting the opinions of the members of the Society generally. The Council would not be bound to follow out whatever might be agreed to at a general meeting; but they were bound to place not only their own opinions but those of members of the Society generally before the Chief Secretary.

On the motion of Mr. Allen, seconded by Mr. McIlwaine, it was resolved that the Pharmacy Act Amendment Committee be requested to draw up, for the information of the Chief Secretary for Ireland, a *résumé* of the views of the Council as to the amendment of the present pharmacy laws.

A report was submitted by a committee to whom the subject of the supply of the *Pharmaceutical Journal* to the members of the Society had been referred. It was recommended that, as the finances of the Society did not justify so large an expenditure, the proprietors of the Journal should be asked—(1) if any further reduction could be made in the cost of supply; (2) whether in the event of the Society discontinuing the present arrangement they would supply the Journal to such members as desired to have it, on the same terms as at present, on being guaranteed a certain number of subscribers. The report stated that the latter of these courses was the one which the Committee would prefer.

After some discussion,

On the motion of Professor Tichborne, seconded by Mr. Hayes, it was ordered that the inquiries suggested by the report should be made before it was adopted.

Mr. John Armstedt Ray, of 15, Nassau Street, Dublin, was elected a member of the Society.

Mr. Hodgson made a statement, the effect of which was that £160 worth of stock had been sold out to meet the expense of fitting out the Society's new premises; that £128 had been expended; and that one bill remained unfurnished, the amount of which would probably not exceed £30.

Some accounts having been ordered to be paid, the Council adjourned.

The following gentlemen passed the examination for the licence as Pharmaceutical Chemist, held on January 2 and 3, and were registered as such on February 6:—

James Guiler, 25, High Street, Belfast,
William James H. Madden, Circular Road, Dublin,
David Stranaghan, 141, York Street, Belfast.

Provincial Transactions.

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION OF GREAT BRITAIN.

A meeting of the Executive Committee was held at the office of the Association, 23, Burlington Chambers, New Street, Birmingham, on Friday, February 8, at 12.45 p.m.; Mr. John Harrison (Sunderland), President, in the chair; Mr. Cross (Shrewsbury), Vice-President.

Present—Messrs. Andrews (London), Arblaster (Birmingham), Barclay (Birmingham), Chapman (Scarborough), Churchill (Birmingham), Hampson (London), Holdsworth (Birmingham), Jervis (Sheffield), Jones (Llanrwst), Mackenzie (Edinburgh), Mason (Liverpool), Parker (Nottingham), Paterson (Aberdeen), Southall (Birmingham), Symes (Liverpool), Williams (Manchester), Yewdall (Leeds), and the Solicitor.

The minutes of the previous meeting of the Executive were read and confirmed.

The Secretary said in accordance with the instructions of the Executive he made arrangements for a deputation from the Association to wait upon the Commissioners of Inland Revenue at Somerset House, for the purpose of urging upon them the advisability of issuing an order making it compulsory on Excise officers, when purchasing spirit for analysis, to leave with the seller a portion of the spirit sold. The interview took place on September 25 last, and the following general order had since been issued from the Inland Revenue Office:—

"Ordered—

"That the attention of the service be directed to the following matters:—

"First. Samples of methylated spirit or finish.—Officers purchasing samples of methylated finish or methylated spirit from persons not licensed to retail methylated spirit are to obtain not less than one pint and a half, and this quantity is, in the presence of the trader, to be divided into three equal portions in accordance with the general instructions on the subject of samples. Sound corks are to be used and tied down with string, the knot being placed in a notch in the top of the cork and sealed. One of the subdivided samples to be offered to the trader (who should be informed that a sample will be tested as to the amount of resin, if any, dissolved therein), and a second is to be retained by the purchasing officer, and the remaining sample is to be sent at once to the laboratory for analysis.

"Any such purchase is to be reported without delay in order that the trader may receive early notice of any offence against the law.

(Signed) "CHAS. B. FORSEY."

The report of the Finance Committee was then received and adopted.

The Secretary was then instructed to prepare a statement showing the cases of prosecution and defence in which the Association had taken part, since its formation in 1876, together with the total expenditure during the same period, and to issue a print of the same with the annual report in May next, accompanied by a circular appealing for additional support for the Association.

The President said that at the last meeting of the Executive a deputation was appointed to wait upon the Pharmaceutical Council in reference to the proposed amendments of the Pharmacy Act. That the interview had taken place on November 6 last, and that the proceedings, at the request of the President of the Pharmaceutical Society, were not reported. At that interview a long discussion took place on the amendments proposed by the Executive of the Association to the Draft Pharmacy Bill prepared by the Pharmaceutical Council, when it was ascertained that the Council had already settled the lines of the measure with the Privy Council. Since that time, he and the Vice-President had, at the request of the President of the Pharmaceutical Society, again waited upon the Law and Parliamentary Committee of that body in reference to the matter, and a communication had been received from the Society which the Secretary would now read.

"Pharmaceutical Society of Great Britain,"
"17, Bloomsbury Square, London, W.C.,
"*January* 24*th*, 1884.

"The Secretary,
"Chemists and Druggists' Trade Association of
"Great Britain, Birmingham.

"Dear Sir,—It has been decided by the Council that it is desirable to ask the Privy Council to receive a deputation to urge the importance of introducing a Bill to amend the Pharmacy Act this session.

"With reference thereto, I am instructed to invite the Executive Committee of your Association to appoint a small deputation to accompany a deputation from the Council of this Society, and possibly others, to the Lord President of the Privy Council in support of legislation on the basis of the Bill now in the hands of the Government. "I am, yours faithfully,

(Signed) "ELIAS BREMRIDGE,
"*Secretary and Registrar.*"

After a very long and full discussion the following resolutions were passed:—

"That a small deputation be appointed to accompany a deputation from the Council of the Pharmaceutical Society to the Lord President of the Privy Council in supported of legislation on the general basis of the Bill to amend the Pharmacy Act now in the hands of the Government."

"That the deputation consist of the President, Vice-President, Mr. Barclay and the Secretary."

"That the officers of the Association, together with Messrs. Arblaster, Barclay, Hampson and Holdsworth, be appointed a committee to watch the progress of the Bill to amend the Pharmacy Act Amendment Bill in its passage through the Legislature."

It was moved by Mr. Mackenzie, seconded by Mr. Chapman, and unanimously resolved—"That the Eighth Annual General Meeting of the members of the Association be held in London on Tuesday, May 20 next, and that the arrangements for the same be left in the hands of the London Committee."

Mr. Jervis gave notice that at the next Annual Meeting he intended to bring forward a resolution proposing to amend Rule 6, so that for the future the officers of the Association should be elected by and from the Executive Committee instead of by the Annual Meeting as heretofore. He said he thought that it was very advisable that the Annual Meeting should elect the Executive Committee, but that, in his opinion, the Executive should be permitted to elect their own officers.

Mr. J. C. Arnfield was then appointed Local Secretary to the Association for Ashton-under-Lyne and district, *vice* Mr. William Bostock, resigned, and Mr. R. Newby, Local Secretary for Truro and district, *vice* Mr. Serpell, resigned.

A communication was read from Mr. Pipe, of 1, King's College Road, London, N.W., enclosing a donation of a guinea to the funds of the Association, and thanking the Executive for defending him in the action under the Sale of Food and Drugs Act recently brought against him by the parish authorities, and a similar communication from Mr. Sidney Allchin, of England Lane, London, N.W., enclosing a donation of five guineas towards the funds of the Association.

The President called attention to the retirement of Mr. A. H. Mason from the Executive Committee, as he was now about to leave this country for Canada, and bore testimony to the important services rendered by that gentleman to the Association.

On the motion of the President a resolution was passed acknowledging the value of the services rendered by Mr. Mason, and expressing a wish for his future welfare.

Several letters were read from members of the Association, and instructions given to the Secretary as to the manner in which he should deal with the same.

ABERDEEN CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A meeting of this Association was held on Friday, January 25, in the Chemistry Class-room, Marischal College, when Professor Brazier, F.C.S., Aberdeen University, delivered a lecture on "Vacuum Tubes."

In introducing the subject, reference was made to the phenomena of induction and electro-magnetism; then followed a description of the intensity coil, and a comparison was drawn between it and the electrical machine with reference to the subject in hand. The Professor then proceeded to illustrate the lecture by showing his splendid collection of tubes, pointing out any peculiarity connected with each. The fluorescence of quinine, the probability of producing light by means of tubes, and the phosphorescence displayed by several, after the current had ceased, were briefly touched upon. After further consideration of the subject, he remarked that although many of the experiments shown appeared of no practical use, still it was very probable that further investigation might prove them to contain the germs of future important discoveries.

Bailie Paterson, at the close of the lecture, in a few felicitous remarks, proposed a vote of thanks to Professor Brazier, which was heartily accorded.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The seventh meeting of the sixth session was held in the Pharmaceutical Society's rooms, 119A, George Street, Edinburgh, on Wednesday evening, January 30, at 9.15; Mr. Claude F. Henry, President of the Association, in the chair.

The minutes of the previous meeting having been read and confirmed, the Chairman called upon Mr. John R. Hill to read a paper on the "Official Alkaloids."

After giving a brief historical *résumé* of the various and important discoveries in alkaloidal chemistry since Sertürner in the year 1804 discovered the alkaloidal properties of morphia, Mr. Hill, taking the official alkaloids in their chronological order, proceeded to describe their chemistry and preparation, and illustrated his subject with a number of experiments, showing the principal reactions with colour reagents and precipitants, and described by means of graphic formulæ the artificial formation of bodies analogous to alkaloids.

The Chairman, in proposing a vote of thanks to Mr. Hill, referred to the amount of valuable information which he had brought before the meeting, and illustrated as the paper was by such elaborate experiments, he was confident it had been both interesting and instructive to the members.

Mr. MacEwan seconded the motion, which was cordially awarded.

A discussion followed, in which Messrs. Crowden, Thomas, Stephenson and Turnbull took part.

Mr. Hill briefly replied.

A number of queries were then submitted and replied to by Messrs. Hill, MacEwan, Robbie and Turnbull.

The Chairman having intimated that at the next meeting Mr. Wm. Pirie will read a paper on "Mineral Waters," the meeting adjourned.

The first annual *soirée* and assembly of this Association was held on Friday, the 1st inst., in the large hall of the Literary Institute, South Clerk Street, Edinburgh. The hall was effectively decorated with flag trophies, bannerets, etc., and when the company, numbering about two hundred, had assembled, it presented a very gay appearance. At half-past eight o'clock, the chair was taken by the President of the Association (Mr. C. F. Henry), who was accompanied to the platform by Dr. Inglis Clark, Messrs. Aitken, Beaumont, Fidler, MacEwan, Robertson, Turnbull and others.

After reading letters of apology from Mr. John Nesbit, (President of the North British Branch) and Mr. J. R. Young, the Chairman proceeded to give a welcome to the guests. In the course of his remarks he stated that the annual reunions which the Association had previously had were found to draw out only a portion of the young pharmacists of Edinburgh and district, while ladies were entirely excluded. It was with the hope of further extending the brotherly feeling which the Association could lay fair claim to have engendered in local pharmacy that the reunion had been remodelled. He now gave the ladies a hearty welcome in the name of the Association and hoped they would thoroughly enjoy the evening's entertainment which the Committee had provided. He concluded by remarking that the reunion was not merely an Association meeting, but was intended for all connected with pharmacy, and he hoped all would co-operate with the Association in making future reunions successful.

After tea had been served, a lengthy programme of vocal and instrumental music was gone through, humorous readings being also contributed.

After the completion of the programme, Mr. MacEwan in the name of the Association thanked the ladies and gentlemen who had contributed to the evening's enjoyment. The Committee had endeavoured to make the meeting an enjoyable one, and he was sure all could say it had been a success. At future meetings their efforts would be extended and everything done to make the reunions a feature in Edinburgh pharmacy.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The second monthly meeting of the session was held in the Owens College on Tuesday evening, January 29. Mr. F. Baden Benger, F.C.S., in the chair. There was a good attendance.

The Chairman, in opening the meeting, congratulated those present on being able to assemble in one of the lecture theatres of the college amongst so much that was interesting to pharmacists, and reminded them that they were indebted for this privilege to the Council of the Owens College, who were anxious to afford every facility to those who would avail themselves of the splendid opportunities for the study of materia medica and pharmacy now provided. He then called on Mr. W. Elborne to read his paper on—

Cinchona Barks.

BY WILLIAM ELBORNE,

Assistant Lecturer on Materia Medica and Pharmacy, Owens College.

The author, having described the important genus *Cinchona* botanically, stated that upwards of thirty-six species of *Cinchona* had been distinguished, but that only about a dozen furnished the barks of commerce. These were principally natives of the western mountainous regions of South America.

The chief varieties were enumerated as follows:—

			Their characteristic alkaloids.
I.	*C. officinalis*,* var. *a. Condaminea*, *b. Bonplandiana*, *c. crispa*	yielding pale or crown bark	Quinine.
II.	*C. Calisaya*,* yielding yellow bark		Quinine, Cinchonine.
III.	*C. Ledgeriana*, yielding Ledger bark		
IV.	*C. succirubra*,* yielding red bark		Cinchonidine.
V.	*C. lancifolia*,* yielding soft Colombian, Carthagena or Caquetta bark; *C. cordifolia*, yielding hard Colombian bark		Quinine.
VI.	*C. Pitayensis*, yielding Pitayo bark		Quinidine.
VII.	*C. nitida*, *C. micrantha*, *C. Peruviana*	yielding Huanuco, Lima or grey bark	Cinchonine.
VIII.	*Remijia pedunculata*, *Remijia Purdieana*	yielding Cuprea bark	Quinine, Quinidine, Cinchonine, Cinchonamine.

The methods of collecting bark in the native forests of South America having been described, the author traced the history of Cinchona cultivation in India, Jamaica and Ceylon, giving statistics of the areas under cultivation, etc. Of the countries where bark is cultivated Ceylon was, perhaps, the most important, although great efforts in the same direction were being made in Bolivia, Java, Jamaica and Southern India.

* The official barks of the British Pharmacopœia.

The manner of growth and the operations of collecting and harvesting the "cultivated barks," whereby the yield of alkaloids was greatly increased, were then alluded to. They comprised two different systems, viz., "mossing" and "coppicing."

The "mossing" system consisted in longitudinally stripping eight-year old trees of their bark at intervals of about two inches apart, winding moss all round and tying it on with fibre. At the end of six or twelve months the strips of bark left untouched at the first stripping were removed, and the intervals they occupied were mossed. At the end of twenty-two months, on an average, the spaces occupied by the bark originally taken are found to be covered with renewed bark, much thicker than the natural bark of the same age, and this renewed bark can be removed and a fresh process of renewal again be fostered by moss. The enrichment of the renewed bark is said to be at the expense of the bark outside the mossed region, and also that the renewal is prevented or much retarded by the least injury to the cambium. The protection from light afforded by the moss has also been proved to increase the supply of alkaloids.

The "coppicing" system consists in cutting down the trees near the ground and allowing one or more of the young crops of the shoots which rise from the stumps to grow. The trees are barked at the proper season by coolies, to whom the felled stems and branches are made over as soon as they are cut. Provided with a stout knife, the coolie first marks the bark off into long narrow strips by putting his knife under it and pressing upwards. The end being freed, the remainder of the strip readily comes off; the bark is then laid to dry in sheds fitted with shelves.

The author next proceeded to describe the characteristic appearances of the above series of barks, drawing special attention to their "fracture." He stated that the manner in which the cinchona barks break transversely, or their fracture, depended upon their anatomical structure, and afforded an important criterion of the quality of the bark; the best characteristics by which barks containing much quinine might be distinguished were the *shortness* of the fibres which covered their transverse fracture and the facility with which they might be detached. Thus when dry *Calisaya* was handled a quantity of minute splinters ran into the skin causing much irritation; this forms one of its distinguishing marks. The following is a table of the official barks compared with the corresponding cultivated bark:—

	Barks of South American origin.		Cultivated barks (India, Ceylon, Jamaica, etc.		
	How found in commerce.	Remarks.	How found in commerce.	Remarks.	
C. Calisaya .	Flat pieces	Trunk bark, outer layers removed, consists of *liber*, yellow colour, upper surface marked with digital furrows, under surface with long wavy fibres (thickness of hair). Fracture short, finely fibrous. Bark at present very scarce.	. . . .	Cultivation unsuccessful, consequently abandoned.	
	Quills	Bold, outer surface cracked at intervals of 1 inch, remains of lichens, short yellow fracture.			
C. officinalis .	Quills only	Thin, slender, interspersed throughout with cracks and numerous lichens.	Quills only	In pieces less quilled than the South American, thicker, outer surface, perfectly clean (grown under moss), no lichens, inner surface of a light fawn colour. Jamaica variety black, very corky, no lichens (var. *crispa*).	Yield 6–8 per cent. total alkaloids. *C. succirubra*, best bark for pharmaceutical purposes.
C. succirubra .	Flat pieces	Trunk bark, corky layers not removed. About 1 inch in thickness, very dull red colour, contains scarcely any alkaloid (having been converted into red colouring matter by prolonged action of light). Mostly exported to France.	Quills only	The very large quills taken from stems, red colour internally, remains of lichens. The smaller quills plump, red colour, clean outer surface, no lichens (mossed bark). Also in thin papery quills, purplish colour externally.	
	Quills	Large, red colour, remains of lichens.			
C. lancifolia .	Flat pieces	Trunk bark, consists of liber with silvery remains of mesophlœum. Long fibrous fracture. This bark, together with flat pieces of *C. micrantha*, sold as flat Calisaya in commerce.		Not cultivated.	
	Quills	Very large, outer layers generally removed, yellow colour.			

The various processes for estimating cinchona barks were then described, the paper being illustrated throughout with specimens of barks and alkaloids from the Materia Medica Museum, Owens College.

After the reading of the paper a discussion ensued in which the Chairman and Mr. Hermann Woolley took part.

Mr. Elborne having replied, the Chairman, in moving a cordial vote of thanks to Mr. Elborne for his most interesting paper, said he would take that opportunity of expressing the pleasure he felt in seeing so many young men present. During the sixteen years he had acted as Honorary Secretary of that Association lectures had been given and classes had been held with varying success. The tide of interest had ebbed and flowed; sometimes the classes had been very numerously attended and then there would come a dull and spiritless time. He hoped the present meeting augured well for the success of the pharmaceutical courses now being established in connection with the college, and that they were now entering on a period of something like enthusiasm. In glancing at the results of the educational efforts of the Manchester Association as a whole, he found many sources of satisfaction. A large number of students had derived valuable assistance in their studies, and some had become prominent men. Happily most of these were still living, and their modesty would be offended if he mentioned their names; but there was one, the late Dr. Carruthers, whose sad fate they all lamented, and whose memory they honoured. He remembered in the early days of the Association, a young apprentice from a country town came to him for the keys of the materia medica cabinet belonging to the Association, a very poor affair compared to the museum now open to students in the college, but still worth the young man's while to come a railway journey to see and work at. That apprentice was now a Doctor of Science of the London University, a recognized authority in chemistry, and, he was happy to add, still a pharmacist. There was probably not an apprentice in that room who could not do as much if he worked as hard, for it was by no royal road that this country apprentice had risen.

Mr. Robinson, of Pendleton, in a few appropriate remarks congratulated the meeting on the good attendance that evening, and had great pleasure in seconding the vote of thanks to Mr. Elborne for his admirable paper, which was carried with acclamation.

The Chairman then announced that two papers had been promised for the March meeting, but that February was still open. He nevertheless hoped one or more contributions would be received in due time.

The meeting then terminated.

OLDHAM CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The annual meeting of the above Association was held in their room, Church Institute, on Thursday evening, February 7. Mr. Martin, President, occupied the chair.

The Secretary (Mr. C. G. Wood) read the report of the year, which stated that the society was in a prosperous condition. There had been classes held each Tuesday evening on the subjects of Chemistry, Materia Medica, Pharmacy, etc.; these had been well attended. The classes are conducted under the superintendence of the President. A portion of study for preparation at home is given each week, and the practical portion of Chemistry is worked by the members themselves at the meetings. There have also been numerous papers read by several friends and by many of the members, the attendance at the meetings being highly satisfactory.

The Treasurer (Mr. Swinburn) was then called upon to give his financial statement, which showed that the Association was in a prosperous condition, as after all expenses had been paid there was a fair balance in hand. It ought to be stated here that the expenses are borne by the members themselves, with the exception of one donation from the Local Secretary of the Pharmaceutical Society.

The President then delivered his address.

After some preliminary remarks, he referred to the presence of a delegate from the Association at the last meeting of the British Pharmaceutical Conference, and then continued:—"But the mere fact of sending a delegate is not what we want; we want to profit by his attendance, we want to know how with our small ability we can help in the forward march of progress. Some people may be disposed to laugh at and ridicule this idea, but it is a square matter of fact idea nevertheless. Most of the subjects recommended for investigation are far above our attainments, but there are some which are quite in our province as willing students,—I mean such things as the best excipients for B.P. pills, the most satisfactory basis for ointments, or some such subject as the deposit in tr. quiniæ comp. In these cases we can all work together and, each taking one particular section of the subject, make himself master of that, and report his results to a general committee, who could tabulate the whole, and thus a quantity of useful information could be collected that doubtless would be of use to more advanced workers. There are other ways in which associations such as ours can be of service to the pharmaceutical body. For instance, the local papers which contain items, useful or interesting to chemists, might be sent to the trade journals, for they cannot be expected to hear of everything that occurs, and thus inquests, the cases of malicious or accidental poisoning, the doings of illegal traders, or of those of our own body who disgrace us would have the full benefit of publicity, a thing too often wanting, There is another point on which I should like to speak, and that is the future of the chemists of this country. I, for one, take no gloomy view of the situation; things are bad, I know, but I believe that we are in a state of evolution, and that the fittest will survive, and the weakest go to the wall. No doubt it is bad for the weak ones, but good for society at large. The name of chemist will be all the brighter and more respected when evolution has obliterated that dreary type of druggist, the huckstering rule of thumb man, whose highest aim in life was a cheap thing in hair oil or glue, who fixed his simple faith on mucilage or ext. gentian. as an excipient for pills, and who dispensed a mixture when he got one on the happy-go-lucky plan of dropping the ingredients into a bottle, filling up with water and letting them take their chance. The chemist of the future will be a chemist in more than name, an enlightened educated man, respected by the medical profession and cultivating new fields of enterprise brought to light through increased knowledge. And it is to this type we must try and attain, and it is for this reason that I throw in my lot with the Pharmaceutical Society, as I believe their efforts will bring about this desirable state of things. Many of you, I know, already subscribe to the Society, and I should be glad if the rest would do the same, for your help is useful, and in years to come, when you are in business for yourselves, the volumes of the Journal will prove a useful library for reference."

After the election of the following officers and revision of rules, the meeting terminated:—Mr. Martin, President; Mr. W. Buckley, Vice-President; Mr. C. G. Wood, Secretary; Mr. Swinburn, Treasurer. In each case the officer of last year was re-elected.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, February 7. Dr. W. H. Perkin, F.R.S., President, in the chair.

The President announced that a ballot for the election of Fellows would take place at the next meeting of the Society (February 21).

The following certificates were read for the first time:—Messrs. F. W. Brown, J. E. London, G. A. Parkinson, G. Tunbridge and T. U. Walton.

The Secretary then read a paper—

On the Expansion of Liquids, By D. MENDELEJEFF; translated from the Russian by B. BRAUNER.—Though every liquid has its own peculiar coefficient of expansion a general expression for the expansion of all liquids has long been a desideratum. The generalization now given by the author is founded on the additional experimental material collected by chemists chiefly for the purpose of studying the specific volumes of liquids at their boiling temperatures. In the present paper only the physical side of the question is discussed. Most of the data are derived from Thorpe's paper (*Chem. Soc. Journ. Trans.*, 1880, p. 141). The uniformity in the expansion of liquids, shown by the examples given in numerous tables, may be represented by the formula—

$$V=\left(1+\frac{K}{n}t\right)^{n}$$

which is the same as that giving (according to Gay Lussac's law) the expansion of gases. For gases, $n=+1$; for liquids, $n=-1$. The expression for liquids becomes therefore $V=(1-Kt)^{-1}=\frac{1}{1-Kt}$, and as the specific gravities are inversely proportional, if D = density at t and Do the density at 0°, then $D=Do\ (1-Kt)$. The author then gives several examples of the close agreement obtained with the above formula and the experimental results of Thorpe. Thus with phosphorus tribromide according to Thorpe—

t=	40°	60°	80°	100°	120°	140°
V=	1·0348	1·0530	1·0720	1·0916	1·1123	1·1340
V calculated	1·0348	1·0531	1·0721	1·0918	1·1123	1·1325

($K=0·000841$). The author discusses the varying values of K in the exceptional case of water at different temperatures. The results of the paper may be summed up as follows:—In the expansion of liquids a peculiar regularity and a quantitative uniformity are observed, and the equation given above may be taken as an approximation to reality, K being a constant coefficient characterizing each liquid, as the specific gravity, the boiling point, etc. The author proposes to call K the determinator of expansion, and suggests that a determination of its value under different conditions is extremely important for the mechanics of liquids. The expression given above, although many liquids deviate slightly from it, is by itself sufficient in the majority of physico-chemical investigations, just as Gay Lussac's law is sufficient for most physico-chemical work with gases.

Dr. Morley said if the expression held with two liquids it ought to hold with mixtures. He examined some time back the expansion of hydrocarbons from petroleum and found that K first increased, then decreased; such a phenomenon could not be explained if the law was rigorously true.

Dr. Armstrong read an extract from a letter of Dr. Thorpe, who had seen the paper, in which he expressed his satisfaction that the physical data which he had been at some trouble to obtain should have formed the basis of such an important paper.

The President then called on Mr. R. Meldola to read a paper entitled—

Researches on Secondary and Tertiary Azo-Compounds. No. II.—The author describes in this paper, in continuation of his former researches, the action of diazotized paranitranilin upon tertiary monamines. In the case of dimethylanilin the resulting product is paranitrobenzenazodimethylanilin $NO_2C_6H_4N_2C_6H_4NMe_2$, and this on reduction by ammonium sulphide furnishes the corresponding amido compound. The amido group in the latter is easily diazotized and can be combined with phenols so as to form a new series of secondary azo compounds. Para-amidobenzenazodimethylanilin is a most delicate test for nitrous acid; when diazotized and then neutralized with ammonia a fine blue colour appears. By this test 1 part of sodium nitrite in 64,000 of water has been detected. The next portion of the paper deals with the action of diazotized metanitranilin upon primary, secondary and tertiary amines. The nitroazo compounds of the meta series could not be reduced by ammonium sulphide without complete decomposition, so that this method could not be applied for the preparation of secondary and tertiary azo compounds as in the para series. The β-naphthylamine compounds both of para- and meta-nitrodiazobenzene cannot be further diazotized by the action of nitrous acid, but furnish nitroso derivatives. From this fact the author concludes that an amido group is no longer present in these compounds, and assigns to them the constitutional formula—

$$C_6H_4\begin{cases} NO_2 \quad H \\ \qquad\quad\ | \\ N - NC_{10}H_6NH(\beta) \\ |\underline{\qquad\qquad\quad}| \end{cases}$$

A comparison of the melting points of the β-compounds both of the para and meta series also favours the view that they are differently constituted to the true nitroazo compounds derived from α-naphthylamin.

Dr. Armstrong thought the constitution suggested by the author highly probable; he had noticed with the naphthols the very marked difference between the α and β bodies.

Mr. Meldola, in answer to several questions, said that all the bodies were more or less coloured, but the more complex the body became the duller the colour seemed to be; there seemed to be a tendency to become bluer as the complexity increased. The difference between the α and β compounds seemed to depend on the fact that the most readily displaced hydrogen atom in the latter compounds was the contiguous ortho atom, so that we were really dealing with an ortho compound.

The Secretary then read a communication entitled—

Note on the Nitrogenous Matters in Grass and Ensilage from Grass. By E. Kinch.—The object of the author was to determine whether during the fermentations to which grass and other fodder crops are subjected in order to produce ensilage, the albumenoids undergo any change into other nitrogenous bodies not possessing the physiological functions of albumenoids; for although the exact nutritive value of these non-albumenoid nitrogenous bodies is as yet unknown, it is certain that they can only replace the true albumenoids in food to a limited extent. The sample of grass was taken during the filling of the silo, on July 17, 1883; the grass was coarse and contained notably thistles and *Ranunculi*; it was passed through a chaff-cutting machine. The weight on the silo was about 50 pounds per square foot. The ensilage was taken out on December 8. It was brown, scarcely acid, and had but little odour; it soon, however, developed a smell of acetic acid, which was subsequently replaced by that of butyric acid. It was readily eaten by cattle when mixed with dry fodder. The author gives detailed analyses of the grass and ensilage. The albumenoids were determined by the phenol, the copper hydrate, the mercuric hydrate and the lead hydrate methods. The most striking change was in the relative quantities of the albumenoids and non-albumenoids. In the grass the non-albumenoids formed but 9 per cent of the total nitrogen; in the ensilage the non-albumenoids had increased to 55 per cent. of the total nitrogen. So that during the fermentation in the silo nearly half the albumenoid nitrogen had been converted into non-albumenoid. Whether such changes in the nitrogenous matter always take place or, as is likely, are diminished in extent by increasing the pressure to which the fodder is subjected, and what nitrogenous bodies are produced, are questions which the author hopes to answer in a future paper.

Professor Church said that he had found it advantageous to add a little metaphosphoric acid, when employing his phenol process, if the material was at all alkaline.

Mr. Vincent mentioned some experiments in which cows had been fed alternately on ordinary food and on ensilage. The weight of the cows remained constant, but when fed on ensilage the cows furnished on an average two gallons of milk more per diem. He also could confirm the fact that ensilage from clover has a most powerful odour of butyric acid.

Mr. Warington said that it was hardly possible to overrate the practical importance of ensilage. As far as he knew, Professor Kinch had been the first to determine the relative quantities of albumenoid and non-albumenoid nitrogen in ensilage. There had been many analyses of grass and ensilage published, but no one yet had really made a quantitative experiment, *i.e.*, weighed all the grass which went in and the ensilage produced. We were also very much in want of analyses of foods as to the relative quantities of albumenoid and non-albumenoid nitrogen which they contained.

Mr. Friswell suggested that the experiment quoted as to the increase of quantity of the milk was of but little value unless the quality of the milk, as ascertained by analysis, was known.

Dr. Armstrong said it would have been interesting to know the quantity of nitrogen liberated by hypobromite.

Mr. Lloyd had endeavoured to investigate the form taken by the nitrogen, but had hitherto been unsuccessful. If too much pressure was used much nutritive juice was squeezed out of the grass. The great aim should be to avoid an acid fermentation.

The Secretary then read a paper on—

The Influence of the Temperature of Distillation on the Composition of Coal Gas. By L. T. Wright.—The author distilled a carefully mixed sample of Newcastle coal in a small iron retort; the charge was 2·24 lbs and the distillation occupied twenty-five to forty-five minutes. Four experiments were made at various temperatures; with the lowest temperature 8250 cubic feet of gas per ton of coal were obtained of 20·5 candle power; at the highest temperature 12,006 cubic feet, illuminating power 15·6. The gas in the first case contained 38·09 per cent. H, 8·72 per cent. CO, 42·72 per cent. CH_4; 7·55 per cent. other hydrocarbons and 2·92 per cent. N. The gas obtained at the highest temperature contained 48·02 per cent. H, 12·96 per cent. CO, 30·7 per cent. CH_4, 4·51 per cent. hydrocarbons, 2·81 per cent. N. The author discusses the influence of marsh gas, carbonic oxide, etc., on the illuminating power of the gas, and criticizes the experiments of Frankland and Thorne. In the second part of the paper the author gives some analyses of gas drawn from retorts at different stages of the ordinary process of gas manufacture. The results confirm those obtained by Dr. Henry.

Professor Foster said that apparently no analysis of the coal was given. He also gave an account of some experiments, which he had made, of passing steam over coke and thus liberating the nitrogen contained in it.

The Society then adjourned to February 21, when a ballot for the election of Fellows will be held.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the Chemists' Assistants' Association, held on Wednesday, January 30, Mr. C. Parkinson, President, in the chair, a paper was read on—

Turpentine.

BY F. HARRIS ALCOCK.

The introduction consisted of a general sketch of the Coniferæ and a description of the chief characteristics of that order, together with the numerous trees yielding turpentines. Special reference was made to the botanical sources, habitats, and characters of the pines which yielded the ordinary turpentine oleoresin. The methods of obtaining the oleoresin from the tree, both in the Landes department and in America, were fully described, and notes were read from various works bearing on the subject of extraction. The characters physical and chemical of the French and American turpentine were briefly described, and a complete description for obtaining the different oils from these sources was given, together with the mode of rectification, properties, composition, uses and adulterations of the oil. Of the last-named particular mention was made of the following, and the usual methods of detection enumerated:—Fixed oils, water, resin spirit or oil, undistilled turpentine, rosin, and petroleum spirit. With regard to petroleum spirit, mention was made of the recent correspondence and editorial jottings in the *Pharmaceutical Journal* on this subject. Dr. Armstrong's method for the detection of this adulterant, as was brought forward by him at a meeting of the Society of Chemical Industry, June 5, 1882, was fully explained, as also Mr. Boverton Redwood's suggestion with regard to the effect of this admixture on the flashing point test. A sample of turpentine oil examined by the author some time ago was found to be largely adulterated with petroleum spirit. Its presence was suspected because it was found that when used, mixed with paint, it caused severe illness to some individuals who happened to be in the house where it was being used. The sample had the odour and taste of turpentine oil and a specific gravity of ·8424. Ten c.c. evaporated over a water-bath were dissipated with the exception of 0·054 gram residue (of a light yellowish-green colour), in fifteen minutes. The liquid had a boiling point of 80° C. which gradually increased as the volatile portion distilled over, going towards the end of the process as high as 160° C. The residue in the retort was of an orange colour and resinous. Ten c.c. of the liquid distilled below 100° C. yielded about 3 grams weight of a colourless liquid which possessed only a faint smell of turpentine oil and was slightly fluorescent and had a smell which suggested petroleum spirit. By way of comparison several authenticated samples of oil of turpentine were obtained from different sources and subjected to the same treatment under the same conditions in order to satisfy the author that the oil of turpentine under examination was sophisticated, with the following result:—

	Quantity.	Sp. gr.	Residue.	Time to dissipate.	Boiling point.	Odour of distillate.	Remarks.
			Grm.	Min.			
A.	10 c.c.	0·8424	0·054	15	80° C. ending at 160°	Petroleum-like.	Adulterated samples.
B.	10 c.c.	0·8572	0·021	30	153·5° C.	Turpentine-like.	Re-rectified from KHO.
C.	10 c.c.	0·8807	0·328	63	158·° C.	,,	Old sample.
D.	10 c.c.	0·8746	0·048	45	155·° C.	,,	Ordinary sample.

The above data would enable one to pronounce unhesitatingly sample A as being impure, or, at least, what oil of turpentine should not be. If more of material were at hand the method to be adopted would be to obtain by fractionation what seemed to be "benzoline" or petroleum spirit and proceed with the distillate according to Dr. Armstrong's method.

In the discussion which followed, the President, Messrs. Braithwaite, Burnett and Millhouse took part.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association took place on Thursday, February 7, Mr. T. S. Dymond, Vice-President, in the chair.

The minutes of the previous meeting having been read and confirmed, a note was read on "The Crystallization of Phosphoric Acid," by Mr. P. L. Huskisson, which will be found printed on p. 644.

This paper was followed by a discussion in which the Chairman, Secretary, Messrs. Ince, Lowe and Short took part, and a vote of thanks was passed to Mr. Huskisson.

Mr. H. Allen, the Reporter on Physics, then made a report upon "Holtz's Electrical Machine and some of its Modifications." The report was illustrated by experiments and a number of machines of different forms were exhibited, the most noteworthy among which were the Voss machine, which was lent by Messrs. Becker, of Covent Garden, and the Wimshurst machine, both of which were shown in working order. A discussion ensued, in which the Chairman, Secretary, Dr. Jackson and Mr. Lowe took part.

The meeting then adjourned.

SOCIETY OF ARTS

Recent Improvements in Photo-Mechanical Printing Methods.

The second of the course of Cantor Lectures upon this subject was delivered by Mr. Thomas Bolas on Monday the 4th inst. It was devoted specially to the various methods of preparing type blocks from line drawings and half-tone subjects and some experiments were made illustrating the formation of Woodburytype blocks by which the gradation of tone in a subject could be represented. A sheet of gelatine paper, coated with albumen and sensitized with bichromate of potash, was exposed behind a negative for some time to a strong light. The sheet was then taken away and a thin layer of a prepared ink placed upon it; afterwards, upon being soaked in warm water, the insoluble gelatine retained the ink, whilst the soluble portion was washed away. The transfer thus obtained consisted of a fatty relief, which left an imprint upon the stone or on the lead, afterwards to be prepared by treatment with acid for use as a type block. Some illustrations were handed round showing the difference between those of 1851 and 1883. Those illustrations of the earlier date, which the lecturer regarded as the commencement of a new era in regard to printing, consisted of a mere outline, simply showing the position and figure of the subject, whilst those of 1883 had less outline, but were rendered life like by the shadows and perfect gradation of tone. Reference was then made to a method employed for some time in Australia, by which a sheet of glass covered with a layer of wax was used as a transfer and hydrofluoric acid as the biting agent. In the course of the lecture, Mr. Bolas drew attention to the use of rollers, remarking that the leather roller employed for ordinary lithographic purposes was useless in the preparation of photo-lithographic prints, and recommending that velvet rollers should be used, as the fibres of the velvet remained separate; he also stated that he believed letterpress printers would soon begin to use indiarubber in preference to the composition rollers. In order to give the same sharpness of outline to a large number of copies, the lecturer considered it necessary to take a fresh transfer from the first block and use the second transfer to obtain the type-block. At the conclusion of the lecture, Mr. Bolas noticed the method used by Ives to obtain the type-block. If a thick sheet of metal, the surface of which is cut by fine groves into small pyramids, be pressed against an ordinary type-block, a perfect impression is obtained from the flattening of the points of the small pyramids; it is found best to insert a thin piece of paper between the two plates to avoid damage to the type-block. During the lecture, Mr. Bolas showed a number of photo-lithographs sent from all the principal printing firms, and endeavoured to point out the peculiarities which each expressed.

The third and last lecture of the series was delivered on Monday the 11th inst. Mr. Bolas commenced by describing a modification of Ive's process. A plaster cast of the photograph is taken, and upon the wet relief a thin layer of collodion is spread, to which a little gelatine is added to give more consistency. After a little while the film is stript off and a perfect transfer is thus obtained. Regretting that he had no time to speak upon the subject of chromophotolithography, the lecturer passed on to the cavity or intaglio process. Any method by which a fatty transfer is obtained can be used for the intaglio process, the only alteration necessary being that a reverse transfer is required. Though a much better style of prints can be obtained by this process, yet the expense of working is so much increased, that it can only be used when a higher class of work is required. A transfer is taken, and from this an imprint is pressed upon grained paper; this is laid down on a copper plate and etched; or sometimes a block of wood with prepared surface is used instead of the copper plate. Reference was then made to the graining, Mr. Bolas saying that Mr. Woodbury had produced grained photo-prints by mixing a gritty substance with the gelatine, though his productions were somewhat spoilt by the use of a lead instead of a copper plate to print from. Good results, however, have been obtained by the Waterhouse process; the peculiarity of this method is the scattering over the wet relief of a quantity of fine sand, coated with stearin or wax to prevent it sticking to the gelatine. Great advance had been made in the transfer of photo-prints in pottery. The plates for printing are made in the same manner as for ordinary lithograph or typograph work, but it is necessary that they should be more deeply marked, in order to allow a larger body of ink to remain upon the pottery. There are two ordinary methods in vogue for the transfer from the plate to the pottery; one is to take a transfer with a thick viscid ink upon thin tissue paper; the inked paper is then attached to the pottery, and after a time the paper is washed off with warm water, leaving the ink upon the pottery; according to the other method the transfer is effected by means of glue. A good transfer is obtained also by producing a design upon a bitumen plate with thick viscid ink; upon exposure, the uncovered bitumen becomes hardened, whilst a depression is formed by the subsequent removal of the inked portion.

Obituary.

JOHN HUTTON BALFOUR, M.D., F.R.S.

On Saturday last Scotland lost by death one of her most eminent scientific sons in Dr. John Hutton Balfour, Emeritus Professor of Botany in the University of Edinburgh. Professor Balfour was an Honorary Member of the Pharmaceutical Society of Great Britain, the North British Branch of which was indebted to him for many courtesies shown whilst he was Regius Keeper of the Botanic Gardens, and especially in liberally supplying the Board of Examiners with fresh and preserved botanical specimens for examination purposes.

John Hutton Balfour was born in Edinburgh in 1808. He was early sent to the High School and matriculated at the University when thirteen years of age. First at St. Andrew's University and afterwards in Edinburgh his studies seemed to show a bent for the church; afterwards, however, he inclined towards medicine. But according to a writer in the *Scotsman*, from whom we borrow some details, his ultimate career was largely influenced by a course of lectures on botany delivered by Professor Graham in the University of Edinburgh in the summer of 1826. Having completed his medical studies he passed the College of Surgeons in 1831, received the degree of M.D. in 1832 and became a Fellow of the College of Surgeons in 1833. After some infirmary work in Edinburgh he visited Paris, returning to his native city and settling down as a medical practitioner in 1834. Two years subsequently he helped in founding the Botanical Society, to which he contributed so many of his memoirs, and in 1838 he rendered a similar service to the Botanical Club. Already, in 1840, he was a successful "extramural" lecturer on botany, and, in 1841, upon Dr. (afterwards Sir William) Hooker being appointed Director of the Royal Gardens at Kew, Dr. Balfour succeeded him in the chair of botany in the University of Glasgow, which he filled for thirty-four years. In the same year he became Regius Keeper of the Royal Botanic Gardens and Queen's Botanist in Scotland. Upon his retirement from the chair in 1879, Professor Balfour was succeeded by his second son, Isaac Bayley Balfour, who, only a few days since, was appointed to the Sherrardian Chair of Botany in the University of Oxford. The late Professor held several other offices and received many evidences from various bodies as to the high estimation in which he was held.

Professor Balfour was a somewhat prolific writer and several of his works, such as the 'Manual of Botany,' 'Elements of Botany,' and 'The Plants of the Bible,' are well known. Besides the larger works, he contributed a great number of memoirs on botanical subjects, several of which touched upon the domain of materia medica. Among these may be mentioned communications upon *Aconitum ferox*, *Narthex Assafœtida*, the Ordeal Bean of Calabar, *Atropa rhomboidea*, *Cephaelis Ipecacuanha*, etc.

SAMUEL FRANCIS ELLIMAN.

It is with deep regret we record the death, on the 25th ult., of Mr. S. F. Elliman, of Slough. Whilst riding across Englefield Common, in company with a friend, his horse suddenly bolted, and Mr. Elliman losing control over the animal was thrown and killed on the spot. Cut off in the prime of manhood, in the midst of a career of very varied usefulness, his loss will be keenly felt by a wide circle of friends both connected with, and outside pharmacy.

Mr. Elliman was apprenticed at the age of 17, to Mr. R. Griffith, pharmaceutical chemist, of Slough. At the expiration of his indentures in 1867, he sought experience in various pharmacies in Scarborough, Geneva and Paris. He was in the latter city during the greater part of the Franco-German war, only quitting it just in time to escape the horrors of the siege.

During the Session 1872–73, Mr. Elliman was a student in the School of Pharmacy, and in January of the latter year qualified himself as a Pharmaceutical Chemist. In the Laboratories, at Bloomsbury Square, he was deservedly popular, and few of his fellow-students will fail to recall his ardent love for physical phenomena, and the generous enthusiasm with which he was wont to describe to others the results of his own patient observation.

After spending some time at Nice and Florence, Mr. Elliman returned to Slough, and commenced taking an active part with his brother in the development of the business of Elliman, Sons and Co. In the intervals of business he found time to attend the lectures at the School of Mines, where he obtained a first-class certificate, and he spent some months in the physiological laboratories at South Kensington, under Professor Huxley, making himself practically acquainted with comparative anatomy. It was here he conceived the idea of illustrating anatomical subjects by means of stereoscopic photography. A few months' practice sufficed to enable him to master the most recent and approved photographic processes, and in the autumn of 1881 he proceeded to Lyons, where, by permission of Professor Chauveau, he was enabled to take photographs of the anatomical preparations used to illustrate the lectures at the Ecole Vétérinaire. On his return home he placed specimens of his work in the hands of Professor Flowers, who expressed his unbounded admiration of the conception and of the skill with which his idea had been carried out.

It was only a few hours before his death that Mr. Elliman was at the annual *soirée* of the Windsor and Eton Scientific Society, where holding in his hand a beautifully prepared skull, he explained to delighted groups of listeners, the marvellous construction of the human ear.

In his native town Mr. Elliman took a leading part in all movements calculated to promote the interests of education in its widest sense. He had provided, at his own expense, a gymnasium and swimming bath for the young men and boys of the neighbourhood, and was an energetic member of the Local Board and British School Committee.

Notice has also been received of the death of the following:—

On the 15th of November, 1883, at Melbourne, where he had gone in the hope of recovering his health, Mr. John Sydney Ashweek, Pharmaceutical Chemist, late of High Street, Gravesend.

On the 10th of December, 1883, Mr. John Andrews, Chemist and Druggist, Tarbolton, Ayrshire. Aged 57 years.

On the 9th of January, 1884, Mr. Charles Marshall, Pharmaceutical Chemist, London Road, Reigate. Aged 40 years.

On the 10th of January, Mr. George Alfred Lockwood, Chemist and Druggist, South Street, Moor, Sheffield. Aged 52 years.

On the 15th of January, Mr. William Walton, Pharmaceutical Chemist, City Road, Old Trafford, Manchester. Aged 42 years.

On the 16th of January, Mr. Herbert Joseph Abington, Chemist and Druggist, High Street, Ringstead. Aged 75 years. Mr. Abington had been a Member of the Pharmaceutical Society since 1873.

On the 20th of January, Mr. James C. Larkworthy, Chemist and Druggist, Spring Grove, Isleworth. Aged 82 years.

On the 20th of January, Mr. Richard Reckerby Sheppard, Chemist and Druggist, South Road, Sheffield. Aged 57 years. Mr. Sheppard became a Member of the Pharmaceutical Society in 1882.

On the 21st of January, Mr. John Brown, Chemist and Druggist, Eccles, Lancs. Aged 62 years.

On the 21st of January, Mr. Albert Hounsell Biggs, Chemist and Druggist, Pimlico Road, S.W. Aged 46 years.

On the 25th of January, Mr. George Hayward, Chemist and Druggist, Croydon. Aged 36 years. Mr. Hayward had been an Associate of the Pharmaceutical Society since 1870.

Correspondence.

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

The Pharmaceutical Society.

Sir,—I hardly like to confess it, but I am beginning to be a little bit ashamed of owning any connection with such a milk and water affair as the Pharmaceutical Society is getting to be. I have been asked sometimes what good has the Society done for the chemists and druggists, and upon my word I have found it difficult to reply, but it seems to me the answer will soon be easy enough and short,—"None."

There is a great talk about the advancement of pharmacy and the benefit of the public; but when the interests of the trade or the privileges of its members are concerned, or putting in force the Sale of Poisons Act against illegal traders in a large way, why then we do not hear quite so much.

If a twopenny-halfpenny shopkeeper sells a few pennyworths of precipitate, or a poor beggar with a wife and three or four children, struggling for a living and trying his hardest to pass his exam., keeps a shop to enable him to exist in the meantime, he gets a letter from the Society's lawyer with a demand on him for £5. But if a man in a big shop sells cyanide of potassium by the pound to all comers he is not interfered with; or if one of the stores sells chloroform without a poison label, we are told that being a "limited company" they are outside the provisions of the Act," and consequently no action is taken in either case, simply because the parties can fight. Or if a coroner acts in an insulting and threatening manner towards a pharmacist,—instead of taking it up and telling the man that the Society will stand by him and defend his rights, the lawyer points out to the coroner the clause giving exemption, and we have a sort of thankful note in the Journal "that there is reason to hope that the threatened contingency will not arise," with a kind of half-apology for our claiming exemption at all.

I am altogether disgusted that the Council do not speak out firmly on this and other subjects; if they did so they would be much more likely to have the support of the trade, and to be respected by the outside public, both official and non-official, and to be listened to with attention, both in the matter of the Pharmacopœia and the Pharmacy Act amendment, than they are now when they go cap in hand to the Government and the doctors, asking as a favour what they ought to demand as a right.

I do not suppose you will print this in the Journal, I only wish you would, for I know many would agree with me.

Cheetham Hill. W. WILKINSON.

[*** The strength of a chain is measured by its weakest link, and the foregoing letter may serve to illustrate one of the influences which tend to minimize the efficiency of the Pharmaceutical Society as a representative body. We publish it, however, less for the sake of obliging the writer than because we are convinced he would not in his present state of mind regard its suppression as a kindness.—ED. PH. JOURN.]

THE SUPPLY OF PRUSSIC ACID.

Sir,—In the *Pharmaceutical Journal* of February 2, "N. B." finds fault with chemists for selling prussic acid to customers other than medical men. I do not agree with his views. Hundreds of drugs that are in daily demand are poisonous, and if a person contemplating suicide can not procure prussic acid, it is perfectly easy for him to get other poisons, such as laudanum, chlorodyne, strychnine, vermin killers, oxalic acid, carbolic acid, vitriol, etc., which are the drugs more usually resorted to for committing suicide. Of course we can caution purchasers as to their poisonous nature; but if they insist on having them, and that for likely purposes, and promise to use them with caution, we cannot refuse to supply them. "N. B." might as well argue that cutlers should not sell razors or knives lest they be used for murderous purposes, or even ropes, for many have followed the example of Judas and hanged themselves with halters.

Further, prussic acid is frequently used for toilet purposes. If we refer to the query columns of ladies' journals we find that it is often recommended for whitening or bleaching the skin; cyanide of potassium is also mentioned for the same purpose. Prussic acid is often required for poisoning dogs, cats, and other animals. I have sold many a half ounce of it for this purpose.

SAMUEL LAWRENCE.

Sir,—The repeated cases of poisoning through carelessness on the part of chemists and druggists in the supply of poisons to the public especially such articles as "prussic acid," induces me to ask you to add my letter to that of "N. B.," as a protest against its sale.

We all know that it is quite legal for any registered person to sell the article in question, provided the necessary signatures are obtained; but, nevertheless, it does seem to me a most unwise (I may say penny wise and pound foolish) policy to supply it to any other person than a medical man, even for the purpose of poisoning dogs.

A case under my notice will illustrate the danger fully. A few days since, a gentleman, entirely unconnected with the trade or medical profession, told me that he had in his possession an ounce bottle filled with Scheele's acid, describing it accurately to me, which he had procured from a druggist, two months ago, for the express purpose of *then* destroying his cat. It is needless to say, the cat is still alive and the poison ready at hand "if required for an insane purpose."

In my apprenticeship, I was taught never to sell the article, but to offer to poison the animal myself, if animal it was required for. I always considered this a very wise policy, and certainly it brings just as much remuneration, if not more. If all druggists would adopt this simple practice we should hear of many less cases of poisoning by prussic acid.

Mr. Morris, of Lowesmoor, could have hardly thought much of what he was doing, when he sold the fatal acid to his customer for the purpose of "cleaning clothes." The poor excuse for its purchase ought to have been apparent at once! I must repeat "N. B.'s" words—"Signing the poisons sale-book will not prevent suicide."

The supply of prussic acid to the public is, therefore, extremely injudicious. Its use is principally for the purpose of taking life, and if druggists allow its sale so readily, Government should interfere and prohibit its sale entirely, for the sake of the community.

228, *South Lambeth Road.* A. E. BERTIE SMITH.

THE PRELIMINARY EXAMINATION.

Sir,—I looked with some curiosity for the result of the new arrangement for the Preliminary examination, and was, I must confess, considerably surprised to see Mr. Hodgson's note expressing satisfaction with the result. It may be satisfactory to the examiner, but I doubt whether the candidates themselves share the feeling. On referring to the Journals of last year I find an average of 13½ questions set at each exam., *i.e.*, Latin, 4¼, Arithmetic, 5, English, 4¼; but last month, under the new rule, 19 questions were set, of these 5 were Latin, 7 Arithmetic, 7 English.

Last year an average of 50⅐ passed, and 49⁶⁄₇ failed. Last month 45⅝ passed and 54⅜ failed. Now, although the candidates were allowed an extra hour and half they had 5½ more questions to answer, and of these two were in arithmetic, the subject that has always caused most failures.

I was under the impression that the extension of time was solely to prevent the candidates being hurried, but the above data would point to raising the standard for the Preliminary exam.

I trouble you with this note in order to point out to intending candidates that they must look out for extra work as well as extra time.

L. S.

"*Student*."—(1) Beale's 'How to Work with the Microscope' (Harrisons) or Carpenter's 'The Microscope' (Churchills). (2) An acquaintance with the language is required, not with any special book. (3) The preparation to which you refer is now so well known by the name commonly applied to it, that the use of the name, though incorrect, is to a certain extent justifiable. With those who object to the misnomer it is a common practice to attach to it a qualifying indication. (4) Yes, for the present.

J. R. Hill.—Copies of the Return may be obtained from Messrs. Hansard, Great Queen Street, London, W.C.

"*Doubtful*" is referred to the rule as to anonymous correspondents and to a Latin grammar.

"*Minor*" is recommended to consult the advertisement pages, as we cannot undertake to recommend particular tradesmen.

H. C.—The answer would depend upon the composition of the ink, of which you say nothing.

E. V. Z.—Probably indigo would be the best dyeing material. See the article on Dyeing in Ure's 'Dictionary' or Crace-Calvert's work on the subject.

"*Student*" (Christchurch).—(1) Dissolve the hyd. perchlor. in the spirit, add the ether and then the boracic acid in fine powder. Solution will not take place, so the bottle must be shaken before use. (2) Use carbolic acid in crystals. If the mass be dry, use as an excipient glycerine of tragacanth; if moist, powdered tragacanth. (3) Dissolve the phosphorus in benzol; powder the strychnine with the ferrum redact., and add the zinc. valer. As an excipient use glycerine of tragacanth. (4) Dissolve the salicin in a little aq. chloroformi; powder the quinine and add a little mucilage to suspend it, and mix with the other ingredients.

COMMUNICATIONS, LETTERS, ETC., have been received from Messrs. T. and H. Smith, Bowie, Combs, Wilkinson, Newsholme, Nicholson.

"THE MONTH."

It is extraordinary that, notwithstanding, the electric light has now found wide application for a considerable time, so litle unimpeachable information is available as regards its cost as compared with that of gas. One of the most useful contributions upon the subject was a letter sent to the *Times* at the beginning of last year by Mr. O. E. Coope (*Pharm. Journ.*, [3], xiii., 602), in which he gave his experience in lighting Berechurch Hall by electricity with Swan incandescent lamps during the few preceding months. This he has now supplemented by a second letter (*Times*, Jan. 29) giving his experience for another twelve months. He reports that during the whole of this time there has been no mishap of any kind, with the exception of the belt slipping three times, which caused five minutes' delay at the outside. The lights have been found steadier than gas, and the lamps instead of being 18-candle power, as when started, are now working up to 20-candle power. There are two hundred of these lamps in use and the renewals numbered three hundred during the twelve months, in which the actual working hours of the lights amounted to 1823. The expenditure, including 10 per cent. of cost for depreciation of machinery and 5 per cent. for depreciation of conductors, amounted to £232 15*s.* 1*d.*, or nearly one farthing (0·9 of a farthing), per 18-candle lamp per hour. Mr. Coope says that another year's experience enables him to reassert most emphatically what he said last year as to the advantages of the incandescent lamp. He recommends that the plan of massing the lamps in electroliers should not be adopted in lighting dwelling houses, but that the lamps should be rather kept as far as possible apart. A Mr. Bower, writing to the *Times* subsequently, gives data to show that the same amount of effective light could have been obtained by burning coal gas, estimated to have been produced for 3*s.* 5*d.* per 1000 cubic feet, at a cost of one-sixth of a penny per light per hour.

Under the rather questionable caption of "Sound Mills," which recalls to the memory some of the fabulous rumours that got abroad when Mr. Crookes first described the radiometer, Professor Silvanus Thompson has given an interesting account (*Nature*, Feb. 13) of some apparatus designed by Dr. Dvorák to demonstrate the influence of sound waves in a manner analogous to that in which the radiometer marks the effect of light waves. One of these "sound mills" consists of four light hollow spherical glass resonators, suspended from the extremities of the arms of a light wooden cross, balanced on a needle point; the balls, which are 4·4 cms. in diameter, have each a slightly protuberant opening of 0·4 cm., all the openings being turned to follow in the same direction. The resonators respond to the note *g*′, and when that note is forcibly sounded by an appropriate tuning fork the air in the resonators vibrates in response, and the apparatus begins to rotate. Briefly the explanation of this action is that at all nodal points in the vibrations of the air in tubes or resonant boxes the pressure of the air is greater than elsewhere, and therefore any resonator closed at one side and open at the other is urged along bodily by the slight excess of pressure on the closed end. There are four kinds of "sound mills" described and figured in the paper.

Sir James Paget, whose interesting papers on abnormal growth of plants attracted so much notice some time since, has drawn attention in the *Medical Times* (Feb. 16, p. 206) to some remarkable investigations made by Dr. Beijerinck in connection with the formation of gum in trees, lately published by the Royal Academy of Sciences at Amsterdam. Dr. Beijerinck found that in the peach, apricot, plum, cherry, or other trees bearing stone fruits, the formation of gum may be caused by inserting a portion of the gum under the edge of a wound through the bark. The observation that heated or long-boiled pieces of gum would not produce this effect, and that wounds made in the bark of the tree did not produce gum unless a portion was first introduced into it, led him to suspect that the formation of gum was due to the presence of bacteria or other living organisms. On microscopical investigation he found that only those pieces of gum containing spores of a highly organized fungus, belonging to the *Ascomycetes*, had the power of conveying the gum disease or gummosis, and that these spores, inserted by themselves under the bark, produced the same pathological changes as did the pieces of gum. The fungus has been examined by Professor Oudemans, who has ascertained it to be a new species, and has named it *Coryneum Beijerinckii.* Its chief characters consist in the fact that it has a cushion-like stroma, composed of a bright brown parenchyma, on which stand numerous conidia having colourless, unicellular and very slender stems, about as long as themselves. The conidia are small, cask shaped, about one-thirtieth of a millimetre in length, and usually divided by slightly constricting septa into four cells, of which the two terminal are longer than the two middle ones. From these cells germinal filaments may proceed, from which are developed yeast-(like?) cells, or brown thick-walled and many-celled mycelia. The first symptom of the gum disease is the development of a beautiful red colour around the wound due to the formation of a red pigment in one or more of the layers of the cells of the bark. Dr. Beijerinck believes that the fungus produces a fluid of the nature of a ferment, which penetrates the adjacent structures, since the disease extends beyond the parts in which any trace of the fungus can be detected. This ferment he believes to act on the cell walls, starch granules and other constituents of the cells, transforming them into gum and even changing into gum the *Coryneum* itself. The influence of this fluid is also exerted in the cambium, causing the formation of morbid parenchyma, the cells being cubical or polyhedral, thin-walled and rich in protoplasm that is in its turn transformed into gum. It is further stated that "a similar disease produces gum arabic, gum tragacanth, and probably many resins and gum resins." Gum tragacanth is known to be produced by the pith as well as the bark of the stem, and to ooze out from the pith when the stem is cut, and if it be indeed due to a disease it would seem as if the disease infects the whole plant. Gum, moreover, may be found in the uninjured husk of the almond, and it seems at first sight more probable that the irritation caused by a fungoid parasite should cause a greater flow of the natural product, just as the irritation caused by an insect causes the development of galls. Whether this be so or not, the discovery that it is possible to produce artificially a free flow of gum is a valuable discovery, since it may now be found advantageous to cultivate certain trees for the purpose. This is a point which might well attract the attention of the Forestry Department, since the importations of gum arabic at the present time consist largely of a variety that gives a ropy, slightly adhesive and very unsatisfactory mucilage.

In *Nature* (January 31, p. 313) Dr. G. Schweinfurth gives an account of some new botanical discoveries made by him in connection with the mummies of the twenty-first Egyptian dynasty, found at Deri-el-Bahan. In the floral wreath on the mummy of the Princess Ugi-Khouni were found folded leaves of a willow, *Salix Safsaf*, perfect flowers of the corn poppy (*Papaver Rhœas*, var. *genuina*), flowerheads of *Centaurea depressa*, and of *Picris coronopifolia*. The flowers of *P. Rhœas* appear to have been gathered in an unopened condition to prevent the petals from falling, and are in such good condition that Dr. Schweinfurth remarks that such perfect and well-preserved specimens of this fragile flower are rarely to be met with in herbaria. It is worthy of note, too, that the character of this variety of the poppy, var. *genuina*, although gathered more than three thousand years ago, are identical with those of the same variety known at the present day. With respect to *Picris coronopifolia* the author remarks that not a single peculiarity is apparent by which it might be distinguished from the recent small form with low spreading branches now so common on the outskirts of the desert. From the occurrence of this flower in the wreaths it is possible to conjecture that the burial of the princess took place in March or April, since there would have been considerable difficulty in obtaining the flowers after the latter month. It has also been determined by capsules of the linseed plant found in a Theban tomb of the twelfth dynasty, 2200–2400 B.C., that the flax used by the ancient Egyptians was derived from *Linum humile*, Mill., and that the mustard oil used by them was derived from one of the two varieties of *Sinapis arvensis*, viz., *S. Allionii*, Jacq., or *S. turgida*, Del., both of which are still common in Egypt.

In the *Journal of Botany* for February, Mr. W. Carruthers, F.R.S., points out that the grass, *Anthoxanthum Puellii*, Lee and Lam., which has within the last few years been met with in Britain and was supposed to have been an indigenous plant hitherto overlooked, occurs only in localities which are not free from the suspicion that the plant has been introduced with agricultural seeds. This opinion receives some weight from the fact that the seed of this grass is being increasingly used by seedsmen to adulterate that of *A. odoratum*. The seed of *A. Puellii* differ from that of *A. odoratum* in being enclosed in straight paleæ, entirely covering the seed, and having hairs arranged in lines along the midrib and veins along the edges, and two or three irregular teeth at the apex. The seeds also are of a paler colour than in *A. odoratum*. In the latter the two paleæ are arched, so as to allow a portion of the seed to be seen between the open edges, are everywhere clothed with hairs, and are rounded at the apex, not toothed.

The means by which the function of aeration, usually performed by lenticels, is carried on in those climbing shrubs in which they are absent, has been recently investigated by Herr Klebahn, who finds that, in all cases which he has examined, there are a number of parallel cellular interspaces extending through the cortex, cambium, wood and medullary rays, and are thus in connection with the interspaces of the wood, forming a very eficient system of aeration for the stem.

In the leaves of *Abies pectinata* Herr Wilhelm has found a peculiar structure of the stomata, apparently intended to hinder transpiration. These openings contain a number of nearly black patches, composed of a great quantity of minute granules of the nature of wax, apparently identical with that which covers the surface of the leaves. They are present in the stomata at all times of the year.

The root hairs of plants have formed the subject of an exhaustive study by F. Schwarz, with regard to the morphological and physiological relations. He finds that the increase of absorptive surface presented by the presence of these hairs as compared with that of naked roots is from 5·5 to 18·7. Their development is interfered with either by too much or by too little moisture; too little causing a local increase, and too much causing a general decrease in the amount of root hairs formed. In some experiments made by J. Vesque on the oleander and garden bean, it was found that the absorption of water by the roots of these plants increased in the case of the former in proportion to the atmospheric pressure, osmose not always appearing to be very active, since when the atmospheric pressure was reduced to about 60 c.m. of water, absorption was arrested.

Observations made by V. Marcona on the movements of the sap in plants in the tropics indicated that in the plants examined, viz., *Carica Papaya* and a liana, there are two periods of maximum rapidity in the twenty-four hours, one between 8 and 10.15 a.m., and the other between 1 and 3 p.m., the rapidity in the latter being less than in the former and sinking gradually to zero, the activity commencing again after sunrise.

W. Detmer regards the organic acids as being the chief promoters of osmose, and consequently of the turgidity of the cell; the conversion of starch into sugar being also largely dependent on the presence or absence of free acids, small quantities of hydrochloric, nitric, phosphoric, acetic and oxalic acid promoting this conversion in a remarkable manner. He has also found that no transforming ferment can be formed in the cells of higher plants in the absence of oxygen. This fact may throw some light on the formation of gum more readily where trees are wounded.

The commercial samples of liquid starch sugar, or "glucose," examined by the Committee appointed in the United States to investigate the subject of starch sugar, to which reference was made recently, were found to contain from 34·3 to 42·8 per cent. of dextrose, 0 to 19·3 per cent. of maltose, 29·8 to 45·3 per cent. of dextrin, and 14·2 to 22·6 per cent. of water. The samples in the solid form—"grape sugar"—ranged in composition from 72 to 73·4 per cent. of dextrose, 0 to 36 per cent. of maltose, 4·2 to 9·1 per cent. of dextrin, and 14 to 17·6 per cent. of water. Three specially prepared samples of "grape sugar" contained respectively 87·1, 93·2 and 99·4 per cent. of dextrose, the last being "crystalline anhydrous dextrose." The ash in the "glucoses" varied between 0·325 and 1 per cent., and in the "grape sugars" between 0·335 to 0·75 per cent. The reporters add that in the United States starch sugar is chiefly used in making table syrup and artificial honey, in brewing and vinegar making, as well as in the adulteration of cane sugar and as a substitute for it in confectionery and canning fruits. It is estimated by the Committee that the industry in the United States gives employment to twenty-nine factories, which together represent a capital of one million sterling, consume about forty thousand bushels of maize daily, and produce "glucose" and "grape sugar" to the value annually of two million pounds.

At the Pharmaceutical Meeting in Philadelphia on January 15, Professor Maisch exhibited a root called cinnamon root, which was said to be used in Europe for the purpose of adulterating powdered cinnamon. The root had a flavour of cinnamon and cloves. Dr. A. W. Miller stated that in the neighbouring city of Camden there was a factory for roasting and grinding cocoa nut shells, the powder of which was used for adulterating spices; it sells at $2\frac{1}{2}$ cents per lb., and enables the fraudulent operator to dilute the spice and obtain large profits (*Amer. Journ. Pharm.*, Feb., p. 124).

Hyoscine, the second henbane alkaloid, which about three years since (*Pharm. Journ.*, [3], xi., 351) was isolated by Herr Ladenburg from residues from the preparation of hyoscyamine, has been further investigated by the same chemist (*Berichte*, xvii., 151). He has confirmed his previous experiment that when hyoscine is treated with alkalies it splits up, like atropine, into an acid and a base, the acid being identical with tropic acid, but the base being only isomeric with tropine (pseudotropine). The identity of the acid was proved by combining it with tropine, under the influence of hydrochloric acid, to form atropine. All attempts however to regenerate hyoscine by recombining the tropic acid and pseudotropine were without result. Pseudotropine is described as crystallizing in rhombohedra, and being less hygroscopic than tropine, but soluble, like it, readily in water and chloroform and less freely in ether. It melts at 106° C., and boils between 241° and 243°. By treatment with hydrochloric or sulphuric acid a new base can be obtained from pseudotropine, which is isomeric with tropidine.

"Belladonnine" is another little-known solanaceous alkaloidal substance that has been investigated by Herr Ladenburg. The name was originally given by Herr Hubschmann to a basic substance noticed in belladonna root, and the subject was afterwards investigated by Herr Kraut, who left the decision as to its composition unsettled. The question has therefore been taken up by Herr Ladenburg (*Berichte*, xvii., 152), working upon material supplied by Messrs. Gehe. This consisted of a brown, viscous, semi-solid mass, obtained from the mother liquor of atropine sulphate, and agreed in its characters with the substance examined by Herr Kraut. It was only slightly attacked when heated with baryta, but went completly into solution when boiled with alkalies. The alkaline solution gave up to chloroform or ether a basic mixture, one part of which consisted of tropine, and the other of a strong base which was at first thought to resemble pseudotropine, but which on analysis was found to be oxytropine. The acid products of the decomposition proved to be tropic acid and its derivatives, atropic and isatropic acids. It is therefore thought probable that the substance used in the investigation was a mixture of atropine with oxyatropine. Herr Ladenburg proposes to revert to the subject of belladonnine in a future paper.

Another interesting step towards effecting the complete synthesis of alkaloids has been taken by Herr Ladenburg in the conversion of pyridine into piperidine (*Berichte*, xvii., 156). The reverse operation, the conversion of piperidine into pyridine, had already been effected by Professor A. W. Hofmann and others, whilst Herr Ladenburg had obtained a similar result with tropidine (*Pharm. Journ.* [3], xii., 1049). Herr Ladenburg had therefore proposed to work upwards from pyridine, through piperidine, to hyoscyamine, but hitherto all attempts to hydrogenate pyridine by the usual agents had failed. This has now, however, been accomplished and piperidine has been obtained by the action of sodium upon an alcoholic solution of pyridine. It is also hoped that homologues of piperidine may be obtained by similar treatment of the other tar bases.

Reference has already been made in these columns to the divergent opinions expressed by different investigators with respect to the nature of picrotoxin (*Pharm. Journ.*, [3], xi., 352, 897). It will be remembered that, according to Messrs. Barth and Kretschy, ordinary picrotoxin would consist of a mixture of three distinct bodies, separable by fractional crystallization from benzol and water, which they proposed to call "picrotoxin," "picrotin," and "anamirtin," and that Messrs. Schmidt and Löwenhardt considered two of these bodies at least to be products of decomposition resulting from the action of the hot solvent. Herr Schmidt has now published (*Annalen*, ccxxii., 313) the results of a further investigation which are quite confirmatory as to the homogeneity of picrotoxin. Samples prepared by himself, and others obtained commercially and purified by repeated recrystallization from strong alcohol and water, were found to consist of colourless stellate crystals, having uniformly a composition represented by the formula $C_{30}H_{34}O_{13}$ and a constant melting point of 199–200° C. This product was, however, easily decomposed by hot benzol, or even by chloroform at the ordinary temperature, into two other bodies which he calls "picrotoxinin" and "picrotin." The melting point of a mixture of these bodies is, however, not uniform, since although it commences to fuse at 200° C., it does not completely melt before 210° to 230° C. The decomposition is represented by the equation:—

$$\underset{\text{Picrotoxin.}}{C_{30}H_{34}O_{13}} = \underset{\text{Picrotoxinin.}}{C_{15}H_{16}O_6} + \underset{\text{Picrotin.}}{C_{15}H_{18}O_7}$$

Picrotoxinin melts at 201° C., is bitter and poisonous; whilst picrotin melts at 255°–256° C., and is bitter and non-poisonous.

The well-known red coloration of carbolic acid has been the subject of a number of theories and assertions, but none put forward yet has enabled the manufacturers to overcome the difficulty, which frequently involves them in considerable loss. The *Pharmaceutische Post* (Feb. 2 and 6, pp. 101 and 131), contains an account of the results of a large number of experiments, which, as they promise to be of some practical use, may be briefly summarized. It was found that English crystallized crude carbolic acid contained certain volatile and colourless substances, which under the influence of light, and to a less degree of warmth and air, were converted into red and yellow-brown non-volatile compounds, and that of these compounds that which afterwards became red passed over in distillation with the first portion of the carbolic acid, and that which became yellow-brown with the last. In a fractional crystallization these colour-yielding compounds did not form part of the carbolic acid crystals, except to the extent that they were enclosed mechanically, but were concentrated in the mother liquor. They were only slightly soluble in cold water, and insoluble in benzin, but could be readily extracted from a solution by means of water acidulated with sulphuric or phosphoric acid. Contact with oxidizing agents during the distillation appeared to affect the compounds only partially. But in aqueous solution in the presence of free sulphuric acid oxidizing agents attacked both the colour-yielding compounds; the resulting oxidation products appeared to be more easily soluble in water than the original substances, whilst they had lost their volatility or passed over in small quantity only with the last portions of the acid. Referring to the theory that the colour is attributable to lead derived from the glass vessels used in the distillation of the acid, it is stated that no metal could be detected even in strongly coloured glass-distilled samples of carbolic acid.

The unpleasant consequences that sometimes follow the inhalation of an atmosphere charged with emanations from freshly painted surfaces are well recognized. The *Lancet* (Feb. 16, p. 313) appears to be disposed to attribute these to the action of some volatile compound of lead, notwithstanding that lead compounds are supposed to be non-volatile, and that the inconveniences are by no means confined to lead paints. The observation, however, upon which the *Lancet* bases this conclusion is sufficiently curious to be worth further investigation, it being to the effect that luminous paint, the basis of which is calcium sulphide, when unprotected is found to be perceptibly blackened by the fumes from fresh lead paint in its vicinity.

An interesting note upon the preparation of ferric ethylate and the separation from it of a colloidal ferric hydrate has been forwarded to the French Academy by M. Grimaux (*Comptes Rendus*, xcviii., 105). He states that when a molecule of ferric chloride dissolved in absolute alcohol is allowed to react upon six molecules of sodium ethylate, there is an immediate precipitation of sodium chloride, leaving a clear very dark brown solution that no longer contains chlorine, but in which the iron is present in the state of ferric ethylate. A solution made with 3·25 grams of ferric chloride dissolved in 25 c.c. of absolute alcohol and 1·40 grams of sodium dissolved in the same weight of alcohol can be distilled in a water-bath without alteration, and leaves as a residue a black pasty mass, soluble in absolute alcohol, benzine, chloroform, ether, petroleum and methylic alcohol. But if this residue be heated in a vacuum so as to remove all traces of the solvent there is a separation of a brown powder consisting of ferric hydrate; the small quantity of water that may be present in the alcohol or that may have been acquired during the manipulation reacting upon the ferric ethylate and decomposing it almost entirely. When the alcoholic solution is exposed to the air it absorbs moisture rapidly and the ferric hydrate separates as a thick coagulum. When the solution is thrown into excess of water a clear liquid is obtained, presenting the characters of solutions of colloidal hydrate of iron described by Graham, but which coagulates spontaneously after a longer or shorter time. The coagulation takes place more rapidly the smaller the quantity of water, and is also promoted by heat. The coagulum of ferric hydrate forms a thick jelly, at first transparent and retaining by capillary affinity so much water that even in dilute solutions it occupies the entire bulk. But gradually in the cold, and more rapidly when heated, the jelly contracts, the water separating and forming a kind of supernatant serum, the phenomena resembling in many respects those observed in the coagulation of blood.

The alteration in the blood caused by the administration of nitrite of sodium has recently been the object of spectroscopic investigation by M. Hénocque, who has made known his results to the Société de Biologie (*Medical Times*, Feb. 9, p. 197). He finds that under the influence of this drug hæmoglobin temporarily loses its power of absorbing oxygen and becoming converted into oxyhæmoglobin. He considers the action to resemble the asphyxia caused by carbonic acid rather than that resulting from carbonic oxide, since the effect gradually passes off and the corpuscles ultimately regain their normal functions.

Dr. T. M. Dolan, in the *British Medical Journal* (Feb. 9, p. 261), recommends sulphide of calcium in solution as a satisfactory lotion in scabies, and much superior to sulphur ointment, it being more easy of application, cleanly and speedy in its action. The mode of application is to give a warm bath, paint the patient's body with the lotion, and when the itching has ceased give another warm bath. The lotion is made by boiling together flowers of sulphur, 100 parts; quicklime, 200 parts; water, 1000 parts. The clear solution is preserved in hermetically-sealed bottles.

Paraldehyde does not appear to be received with much favour at the present time. Dr. J. C. Wilson, in the *Maryland Medical Journal*, states that he has employed it in nine cases; but that several patients complained of the disagreeable after-taste. On account of its unpleasant taste and odour it requires to be given with a considerable quantity of water. In his opinion it may form a useful addition to the ordinary hypnotics, but is not likely to supersede them. The dose he has given is one fluid drachm, but this quantity soon ceases to produce its effect and the dose soon requires to be increased (*Medical Times*, Feb. 9, p. 198).

Dr. R. Shingleton Smith, in a paper in the *British Medical Journal* (Feb. 16, p. 314), confirms the statements made by Dr. Filehne that kairine is a powerful antipyretic, and that it will reduce the temperature in from two to six hours to the normal state with perfect safety to the patient. He considers that the quickness of its action gives it a great advantage over quinine, the only disadvantage attending its use being that its effects are more evanescent than those of quinine. Dr. Smith considers that kairine is a valuable drug, which will perform quite safely, quickly, and pleasantly the office which has hitherto been effected by nothing else than the disagreeable and troublesome cold bath. Further observations recorded in the *Medical Press* (Feb. 13, p. 143) indicate, however, that kairine is not without certain disadvantages. Dr. Guttman states that patients complain very much of the taste of the drug, so much so, that it had to be given in wafer paper, whilst the course of the disease is not in the least altered by the medicine. Messrs. Colin and Zadek state that in intermittent fever especially, or the malarial form even, large doses did not cut short the attack. According to Dr. Menche, also, collapse sometimes follows its administration in typhus and pneumonia.

Dr. J. B. Mitchell in the *Lancet* (February 9, p. 283) recommends castor oil as a most satisfactory lubricant for use in the insertion of catheters, its viscidity and tenacity causing it to adhere to the instrument where other lubricants would become removed before the bladder is reached. It does not, as might have been supposed, produce any irritation.

An illustration of the saying that "doctors differ" may be found in the pages of the *Medical Press* (Feb. 6, p. 127) under the head of "Is Lobelia a Poison?" Lobelia is generally considered by the medical profeision to be as much a poison as tobacco, when taken internally; yet in the recent trial of a medical botanist, one witness, a M.R.C.S., stated that for thirty years he had been in the daily habit of using and prescribing it, and had himself taken it in doses of 1 drachm. There can be no doubt that the drug is largely used in full doses by the followers of Skelton and Coffin, and yet comparatively few cases of poisoning occur. This is probably due to the fact that it is usually given in conjunction with large doses of cayenne pepper, and the rapid emetic effect which follows administration of the drug in this combination prevents it from being absorbed into the system. That it is a powerful drug and should only be used by those who are well acquainted with the conditions under which it may prove dangerous or fatal, is evident from the narrow escape the late Professor Palmer had from death by a large dose of the drug, although in his case it ultimately cured instead of killing him.

Professor Lustgarten is reported (*Pharm. Post*, Jan. 26, p. 86) to have made some experiments with mercurous tannate, which have shown it to surpass all other mercurial preparations for therapeutic purposes. The dose is one decigram two or three times a day.

Bromine is strongly recommended by Dr. Schiltz (*Pharm. Central.*, Feb. 14, p. 71) in the treatment of diphtheritis. One form in which he uses it is as a solution prepared from aqua chlorata, 30 parts; aqua dest., 150 parts and potass. brom., 3 parts. The bromine separated by the chlorine from the bromide of potassium remains dissolved in an excess of the latter, like iodine in potassium iodide. The standard for aqua chlorata, P.G., is lower than that for chlori liq., B.P., since it is only required to contain "at least" 0·4 per cent. of chlorine as compared with 0·6 per cent.

The physiological effects of jequirity still continue to be a subject of investigation by Messrs. Cornil and Berlioz. In a paper recently read before the Académie de Médecine they state that an injection of 10 to 20 drops of the infusion into the breast of a fowl caused rapid poisoning terminating in death, copious diarrhœa being the most marked symptom. If a small quantity only be injected local œdema and damage to the neighbouring muscle is produced, but immunity is acquired (*Lancet*, February 9, p. 267).

A new micro-organism, *Bacillus beribericus*, has been discovered in the blood of patients suffering from the disease known in the tropics as beri-beri. The organism consists of cylindrical branched filaments, with genuine joints and sometimes refracting brilliant points which are believed to be spores. The filaments cultivated after Pasteur's method and injected into rabbits have caused all the symptoms of beri-beri. M. de Lacerda believes that the parasite is originally derived from rice which has undergone a peculiar alteration (*Lancet*, Feb. 9, p. 268).

Some further particulars as to the results obtained by the Cholera Commission sent out to India by the German Government have been received from Dr. Koch, writing from Calcutta on the 17th ult. The first experience in India was that in dissecting the dead bodies of nine cholera patients, in every case the same bacilli were discovered with the aid of the microscope that were observed by the Commission whilst in Egypt (see before, p. 321). But this left it still undecided whether these bacilli did not belong to the regular parasites of the gut, having made their way into the mucous membrane of the intestine under the influence of the cholera disease. Some of the bacilli were, therefore, isolated from the intestinal contents of the purest cholera cases and cultivated in gelatine, so that their form and growth might be sufficiently studied to allow of their being distinguished from other bacilli. In this way it was demonstrated that this kind of bacillus was present in all the choleraic evacuations examined, as well as in all the intestinal contents from persons who had died of cholera. On the other hand, the bodies of eight persons who had died of pneumonia, dysentery, phthisis and kidney disease have been examined, as well as bodies of several animals and other substances abounding in bacteria, but in none of these cases has anything been found like the cholera bacillus. It is also reported that the same organism has been discovered in water from a tank, which had been suspected of having been a source of the disease.

In connection with this subject reference may be made to the recent important decision of Mr. Justice Pearson, in the case of *Ballard* v. *Tomlinson*, that the owner of a well may use it as a receptacle for sewage, even though in doing so he may contaminate other wells in the same water-bearing stratum. In this particular case the plaintiff was a brewer depending for a supply of water upon a well sunk into the chalk, which had been in use for the same purpose for thirty years. Within one hundred yards is another well, sunk into the same water-bearing stratum, which has of late been used by the defendant as a cess-pit. That both wells have a common source was not denied; indeed this was proved by putting chloride of lithium into the defendant's well and finding it forty-eight hours afterwards in water taken from the plaintiff's well. It was admitted also that in like manner the defendant's sewage made its way into the plaintiff's well, poisoning the water and rendering it entirely unfit for brewing or any other dietetic use. But it was claimed that this was within the defendant's right, both to abstract water from the well and to return it to the well polluted to any extent he pleased, and this claim has been upheld by the Court. The possible effect of this decision upon the public health will be evident, and Dr. Frankland has pointed out in a letter to the *Times* (Feb. 15), that there would appear to be nothing to prevent the establishment of an aniline colour factory in the neighbourhood of the deep wells in the chalk used by the Kent Water Company for the water-supply of a part of the metropolis, and the discharge of its waste arsenical liquors into the subterranean reservoir from which the water is drawn. The inconsistency exists, therefore, that whilst a manufacturer is not allowed to discharge any noxious material into surface water, he may do as he pleases with subterranean water.

REPORT ON ANALYSES OF SPECIMENS OF CINCHONA BARK.

Forwarded from Madras, through Her Majesty's Secretary of State for India, to the Pharmaceutical Society.

BY BENJAMIN H. PAUL, PH.D.

No.	Mark.	Description of Bark.	Quinine.	Quinidine.	Cinchonidine	Cinchonine.	Amorphous.	Total.
1	3/12	*C. officinalis*, renewed . .	4·86	0·09	0·07	0·40	0·48	5·90
2	5/22	„ coppice shoots	2·81	—	1·12	0·32	0·20	4·45
3	6/27	„ renewed . .	5·79	0·21	0·15	0·19	0·30	6·64
4	7/28	? corky, natural	4·08	0·45	trace	0·23	0·40	5·16
5	8/29	*C. officinalis*, renewed . .	5·75	0·20	0·12	0·16	0·44	6·67
6	10/9	„ „ . .	3·72	0·36	1·00	0·96	0·40	6·44
7	12/13	„ „ . .	6·09	0·21	0·62	0·66	0·53	8·11
8	A/0	„ (*Uritusinga*)	3·94	0·19	1·06	0·38	0·34	5·91
9	B/44	„ natural . .	4·71	—	0·12	0·20	0·40	5·43
10	C/25	„ „ (*ang.*)	3·19	—	0·95	0·17	0·30	4·61
11	D/0	„ (*Uritusinga*)	2·45	0·04	0·43	0·22	0·30	3·44
12	G/0	„ renewed . .	4·19	0·20	0·26	0·44	0·30	5·39
13	13/0	*C. Pitayensis*, natural . .	3·93	0·25	0·07	2·40	1·00	7·65
14	15/1	*C. Pahudiana* „ . .	1·24	—	0·60	trace	0·20	2·04
15	16/23	„ renewed. .	0·69	—	1·94	0·20	0·30	3·13
16	17/50	„ natural . .	0·37	—	0·67	trace	0·20	1·24
17	18/5	? corky, renewed	1·52	—	0·39	0·58	0·50	2·99
18	19/14	? „ natural .	2·27	—	0·67	0·45	0·50	3·89
19	20/32	*C. micrantha* „ . . .						3·23
20	21/48	*C. Calisaya* „ . . .						3·31
21	22/49	„ natural . . .	3·86	0·23	0·30	0·43	0·40	5·22
22	23/47	„ „ (*Joseph.*)						3·90
23	24/38	*C. anglica* „ . . .	3·53	0·18	0·64	1·90	0·80	7·05
24	25/35	„ renewed . . .	3·30	0·27	0·86	0·80	0·70	5·93
25	H/46	„ mossed . . .	4·37	—	1·80	0·36	0·70	7·23
26	26/30	*C. pubescens*, natural (?) .	3·43	0·28	0·11	3·02	0·60	7·44
27	28/37	„ „ . . .	3·91	—	2·88	0·60	0·40	7·79
28	29/29	„ renewed . .	3·51	—	1·62	0·48	0·40	6·01
29	31/11	? „ . .	2·63	—	1·04	0·45	0·50	4·62
30	32/20	? mossed . .	3·01	trace.	1·21	0·22	0·40	4·84
31	33/34	? natural . .	6·16	trace.	1·57	0·34	0·48	8·55
32	35/31	*C. succirubra*, mossed . .	1·35	—	2·15	2·66	1·00	7·16
33	„	„ renewed. .	2·86	—	1·72	2·50	0·70	7·78
34	36/33	„ natural . .	1·56	trace.	2·04	2·00	0·88	6·48
35	K/O	„ „ . .	1·33	—	2·86	2·34	0·80	7·33
36	L/O	„ mossed . .	1·00	—	2·14	3·40	1·00	7·54
37	M/O	„ „ . .	1·18	trace.	1·61	3·08	0·60	6·47
38	N/O	„ renewed. .	2·86	—	1·32	2·60	0·60	7·38
		NATURAL BARKS FROM DARJEELING.						
39	Indian.	*C. officinalis*	1·93	—	0·43	0·30	0·36	3·02
40	Indian.	„ root. . . .	3·22	0·91	0·31	1·74	0·86	7·04
41	Indian.	*C. succirubra*	1·54	—	0·89	1·96	0·80	5·19
42	Indian.	? Ledger bark .	4·60	—	0·42	0·24	0·52	5·78
43	Indian.	? „ „ root	4·27	0·13	0·04	1·10	0·40	5·94

(1) This and two following samples are from *C. Condaminea*, How. variety.

(2) These botanical specimens and also the bark were taken from coppice shoots.

(3) The bark belonging to this specimen is renewed, after the tree had been subjected to the Java shaving process. In this the outer cellular portion is shaved or pared off, the inner vascular layer being left intact.

(4) Bark covered externally with a thick corky layer, very peculiar, of officinalis type but undetermined species.

(6) Large leafed or *C. Uritusinga*, Pavon type.

(7) This is the No. 2 variety, in the estate nomenclature, of the variety *C. angustifolia*, How.

(14) This species was discovered by Hasskarl, cultivated on a large scale in Java and found to be worthless. From Java it was introduced into India, where its culture never went beyond the stage of an experiment.

(17) This plant was said by Cross, on his recent visit to the Nilghiris, to be the *C. crispa* of which he sent seeds from the Loxa Mountains. That it came from Loxa there is no doubt, as the few specimens of it on the estate of Dodabetta are growing amongst the "crown" barks introduced from that region. It differs, however, very much from the *C. crispa* of Tafalla, which belongs to the *C. officinalis* group of Weddell. In general appearance it is more nearly allied to Weddell's section *Pahudianæ*. Its bark is also very peculiar, in fact unique.

(20) This form of the *C. Calisaya* grows to a considerable size and has bright green shining leaves, some of which measure from 6 to 7 inches in length by 3½ to 4 inches in width. Flowers pink, very sweetly scented.

(21) This plant approaches the *Boliviana* form of Weddell, but the *Calisayas* are most variable.

(23) This plant, according to Howard, is a hybrid between *C. Calisaya* and *C. succirubra*. On the other hand it is said to come perfectly true from seed. Mr. Surgeon-Major Bidie thinks it to be only a variety of *C. Calisaya*.

(26) This is not the *C. pubescens* of Vahl, but a plant which was considered to be a hybrid by the superintendent of the cinchona estates, the late Mr. McIvor. Mr. Cross regards it as the pubescent form of "Cuchicara," referred to by Dr. Spruce in the Parliamentary Blue Book of 1863, p. 116. Mr. McIvor stated that it is a hybrid between *Cinchona succirubra* and *Cinchona officinalis*.

(29) Pata de gallinazo of Cross.

When the valuable series of specimens of Madras cinchona bark was presented to the Museum of the Pharmaceutical Society by the Indian Government, through Dr. Bidie, it appeared to be important that analyses should be made, in order that the specimens might be rendered thereby more useful for reference, and that the analyses might be available for comparison with others which might be made subsequently on the plantations. Therefore having learnt from Mr. Holmes, the Curator of the Society's Museum, that portions could be spared from the Museum specimens without destroying their value for reference I undertook to carry out the examination. Unfortunately, the smallness of some of the samples precluded the possibility of dividing them. Only eleven specimens, however, out of the forty-nine received were too small to be divided. The preceding table gives the results obtained. The footnotes are taken from remarks written on the Herbarium specimens by Dr. Bidie. The specimens No. 39 to 43, marked "India," are barks which were forwarded last year from Darjeeling by Dr. King.

These specimens of bark illustrate very well the influence of hybridization in masking the characteristic features of the bark of particular species of *Cinchona*, and the difficulty of forming an opinion as to the source of samples as well as their value in regard to amount of alkaloid.

I learn from Mr. Holmes that a comparison of the samples of *C. officinalis* bark indicates that the only one which could be easily recognized is No. 4. In this sample the bark presents an extraordinary development of the suberous or corky layer, which is divided into angular pieces about half an inch square, each piece exhibiting a stratified appearance. It is totally different from Nos. 17 and 18, in which the suberous layer, although very much developed, presents a rough granular appearance more like toasted bread-crumbs and is very friable. The corky *C. officinalis* also possesses more quinidine (0·45) than the other varieties, and a good percentage (4·08) of quinine. No. 4 is evidently the bark referred to by Dr. Trimen in his report "On the Nilgiri Plantations," as being the "crispa" of McIvor and Beddome, of which a vigorous propagation was going on by seed. If it can be shown, therefore, by further analyses on the plantations that these percentages are tolerably constant, this variety would appear in every way to be specially suited for pharmacy.

On examination of the several specimens of renewed bark of *C. officinalis*, Mr. Holmes is of opinion that it would not be possible to recognize by physical characters bark rich in alkaloids from a poor one, and that however valuable such bark may be to the quinine manufacturer it would not be expedient for pharmaceutical use, unless a guarantee as to alkaloidal strength were supplied to the retail pharmacist. It is also of interest to note that in Nos. 2, 6 and 8 the smaller amount of quinine found by analysis is associated with an increased amount of cinchonidine. The fact that No. 2 was obtained from coppice shoots adds weight to the supposition that the age of the tree may have something to do with the yield of cinchonidine; while the fact that the renewed (No. 6) and the natural (No. 8) *Uritusinga* varieties yield less quinine than the *angustifolia* and *Condaminea* points to the latter as being the better varieties, *i.e.*, so far at least as can be gathered from a limited number of analyses.

The bark of *C. Pahudiana* might easily be mistaken by an unpractised eye for that of *C. officinalis*, and it seems desirable that such an inferior bark should be eliminated from the plantations as speedily as possible, lest by cross-fertilization it should deteriorate the seed of more valuable species. The same remark applies to the corky barks, Nos. 17 and 18, which, although very different in appearance from *C. Pahudiana*, are produced by a tree which has on its young shoots and capsules the peculiar coarse hairiness of that species, although in a less degree, forming a feature by which it is easily distinguished.

The specimens of the bark of *C. anglica*, from the Nilghiris, are not easily recognizable by physical characters, and Mr. Holmes considers that they bear evidence of the hybridization of the plants with *C. succirubra*, particularly No. 23, which gives 1·90 of cinchonine. This, he thinks, is further confirmed by the large leaves, resembling in size, shape and venation those of *C. succirubra*. The capsules also more nearly approach in size those of that species, being much larger than those of *C. Calisaya*.

With respect to the barks from Darjeeling, No. 39 to 43, Mr. Holmes is of opinion that the samples, judging from their physical appearance, were evidently collected from several different varieties of each species, and therefore the analyses cannot reveal anything special concerning them.

Judging from its physical characters the Ledger bark, No. 42, is good typical *Calisaya* bark, and does not at all resemble the thick bark with scattered warts which was recognized by Mr. Howard as Ledger bark, and of which samples presented by him exist in the Museum of the Society. Taken in conjunction with the analysis, the characters of the No. 42 bark indicate that it approaches most nearly to the *Boliviana* variety of *Calisaya*.

The Nilghiri *Calisaya*, No. 21, appears to be identical with that of Darjeeling. The herbarium specimen of the latter is marked 2000 feet, an elevation that is hardly high enough to develop the alkaloidal richness of the *Calisaya* to its utmost degree.

In Dr. Trimen's recent report on the cinchonas of the Nilghiris he lays great stress on the importance of analysis as a guide in the selection of plants for cultivation, and he expresses his conviction that in the present state of our knowledge, selection based on analysis is the most promising direction for the improvement of the trees as alkaloid yielders. From this point of view he recommends the isolation of trees with high analysis, together with other precautions to prevent cross fertilization, care in collecting seed, analysis of a selection of the resulting plants and destruction of all that do not reach the standard of their parent. It is by the continuation of this mode of procedure in the cinchona districts of the Madras Presidency that Dr. Trimen considers the interests of the great industry of cinchona growing in India can alone be efficiently promoted.

The attempt to draw deductions from the figures of the analyses now published of a limited number of specimens must, of course, be regarded as subject to correction by results of further examinations of a larger series of similar botanical specimens and barks that may come under future notice; but it may be hoped that the facts brought out by analyses of these specimens may prove of some value to the pharmaceutical public and to the energetic Directors of the plantations in India and elsewhere.

THE USES OF POTASSIUM PERMANGANATE IN ANALYSIS.*

BY ARTHUR G. HADDOCK, A.I.C.

My paper does not contain any novelties but is written with a view of showing what an exceedingly useful reagent the chemist possesses in potassium permanganate. I mean as a standard solution for use volumetrically.

I think every chemist who has technical analyses to make will admit that the system of volumetric determination is of the utmost use and convenience. It may be better to use gravimetric methods in cases were the substance can be precipitated in a definite form, in the pure state, and in a form absolutely insoluble in the menstruum used. But these three conditions, which are essential to the success of the operation, cannot always be obtained, and very often, even when it is possible, the number of operations which have to be gone through is so great, and the time required so long, that it would be a source of great inconvenience to the technical chemist to adopt this system. Both volumetric and gravimetric methods have their place in analysis, and it is sometimes convenient and desirable to adopt one system and sometimes the other.

For instance, if a determination of iron was required in a substance containing that metal or any of its compounds, together with manganese, no one would think of going to the trouble of separating the two, and precipitating and weighing the iron as oxide, but a volumetric agent such as bichromate or permanganate of potassium would be used, which would give the required result in a tithe of the time occupied by the other method, and, probably, with greater accuracy.

Permanganate of potassium is one of the most useful solutions which can be placed in a laboratory. The diversity of substances which can be tested with it, the simplicity of its application, and the accuracy of the results which are obtained, entitle it to a very prominent position in the analyst's cupboard.

The crystals may be obtained in commerce in an exceedingly pure form. We have some in the laboratory now, which were bought in the ordinary way, which are practically free from impurity. To try to make the salt on a small scale in the laboratory is both expensive and unsatisfactory, as it is very difficult to get it to crystallize nicely. However obtained, its purity should not be taken for granted, but after making the solution, its strength should be tested. For general purposes, perhaps, decinormal is the most convenient strength to make the solution. This would be obtained by dissolving 31·6 grains of the pure crystals in 10,000 grains of distilled water. It is better to dissolve a little more than the theoretical quantity, as it is very easy to dilute it to the proper strength after standardizing. The solution thus obtained may be standardized in several ways.

One is, by seeing how much FeO it will convert into Fe_2O_3. The purest soft iron wire is used for this purpose. About 2 grains is accurately weighed out and dissolved in dilute sulphuric acid in a flask fitted with a reducing cork to exclude the air, diluted with about 3000 grains cold water, and the permanganate solution run in without loss of time from a graduated burette. The operation is finished when the colour is no longer discharged, but a slight pink shade remains in the liquid. If the solution is decinormal it should require 357 grain measures for 2 grains of iron.

It is difficult to get pure iron wire. Soft binding wire or thin pianoforte, which are about the best, contain from $\frac{1}{4}$ to $\frac{1}{2}$ per cent. impurity, so that it is necessary to test the wire gravimetrically, once for all.

The double ferrous and ammonium sulphate is often recommended for standardizing with. It is stated to be exceedingly stable, and may be kept for months without oxidation. If pure materials are used in making it, and great care is taken in its preparation, this probably is so, but, otherwise, it is not to be depended on. When pure, 7 grains of this salt contain 1 grain of iron. It is dissolved in water, acidulated with dilute sulphuric acid, and the titration effected as with the solution of the iron wire.

I prefer to use oxalic acid to standardize with. It can be obtained very pure and is easily crystallized, so that by recrystallizing the commercial article it can be obtained in a state of absolute purity. 63 grains of the crystals ($H_2C_2O_4 2H_2O$) are equivalent to 31·6 grains permanganate. 3·15 grains may be weighed off and dissolved in about 3000 grains of water, and a little dilute sulphuric acid added. The action in this case only takes place in a hot solution; it must, therefore, be heated to about 70° C. and the permanganate run in as before. The colour is not discharged so quickly as with the iron salt. The solution first goes brown, then yellow, and, finally, colourless. The end-reaction is, however, very distinct, as it is impossible to mistake a brown or yellow shade for the final pink. 3·15 grains would require 500 grain-measures of $\frac{1}{10}$ normal permanganate.

The solution when standardized should be placed in a well-stoppered bottle and kept as much as possible in the dark. It sometimes deposits a little soon after it is made, and is apt to become slightly weaker on that account. After a few months all alteration ceases, and if dust and organic matter is kept out of it, the strength will remain constant for a very long time. I had a solution which, after the first six months, did not vary at all for over two years, and, indeed, very little alteration (2 per cent.) had taken place at the end of five years, and this was a solution I was constantly using. If a deposit forms it should always be restandardized.

With this solution many different determinations may be made. The following are some of the substances which may be estimated by it:—Iron, manganese, lead, calcium, oxalates, ferro- and ferri-cyanides, prussian blue, tannin, methyl alcohol, organic matter in water, etc.

Its equivalents are—

1000 =	3·16	$KMnO_4$
	5·6	Fe.
	6·3	$H_2C_2O_4.2H_2O$.
	2·8	CaO.
	42·2	$K_4FeCy_6.3H_2O$.
	32·9	K_3FeCy_6.
	4·156	Galls tannic acid.
	6·234	Oak bark tannin.
	28·67	Fe_7Cy_{18} (Prussian blue).
	0·80	Oxygen.
	4·53	$MnSO_4$.

Iron.—To estimate the amount of iron in a sample, it is treated in any convenient way to get it into solution in acid, then reduced by means of pure Z_n (preferably amalgamated) to the ferrous state and titrated as before described in the standardizing.

$$10FeSO_4 + K_2Mn_2O_8 + 8H_2SO_4 = K_2SO_4 + 2MnSO_4 + 5Fe_2 3SO_4 + 8H_2O.$$

It is, of course, necessary that all organic matter shall be got rid of. In the case of samples containing only a small quantity of iron, it is desirable to concentrate it by precipitating it as hydrate or phosphate, and dissolving this in a litile acid. It is generally stated that unless a sulphuric acid solution is used the results are incorrect. No doubt, if a great deal of hydrochloric acid is present the results are vitiated to a certain extent, but it has been my experience that if the hydrochloric acid solution is reduced with zinc, and the action allowed to go on till the solution is neutral, and it is after this acidified with sulphuric acid, the results are very concordant and accurate. In iron ores and samples where the iron is in very considerable quantity, I prefer to use bichromate as the oxidizing agent, but in cases where the amount of iron is comparatively small, I think permanganate is preferable.

To estimate the iron in animal charcoal, which contains

* Read at a meeting of the Liverpool Chemists' Association, January 17, 1884.

from ·10 to ·60 per cent., I ignite 50 grains, dissolve in nitric acid, dilute to about 3000 grains, add ammonia in excess, then acetic acid in excess. The acetic acid dissolves the precipitated calcium phosphate, and leaves the phosphate of iron and alumina. These I filter off, wash slightly, ignite, dissolve in hydrochloric acid, reduce the iron with zinc until neutral, acidulate with sulphuric acid, dilute, and titrate with permanganate. The results obtained in this way agree very closely with each other. It is better for this purpose to have a weaker solution of permanganate, say $\frac{1}{20}$ normal.

Manganese.—The estimation of manganese gravimetrically is not at all an easy or satisfactory operation. The different precipitates have an extraordinary tendency to retain alkaline salts, and also on ignition it is extremely difficult to obtain the protosesquioxide in a fully oxidized state. It must also be separated from nearly every other base or they precipitate along with it.

But volumetrically, fortunately it is extremely easy to estimate it with the greatest accuracy. If solution of permanganate is added to a neutral or nearly neutral hot solution of a manganese salt, there is a precipitation of the manganese contained in both of them as dioxide.

$$2\,H_2O + K_2Mn_2O_8 + 3\,MnSO_4 = 5\,MnO_2 + K_2SO_4 + 2\,H_2SO_4.$$

The sample to be analysed is dissolved in aqua regia, diluted largely, neutralized as nearly as possible with Na_2CO_3, which is added until the precipitate which forms redissolves with difficulty, the solution heated nearly to boiling and permanganate solution added from the burette. A brown-black precipitate falls, which rapidly subsides, leaving a clear supernatant liquid, which remains colourless till the whole of the manganese is precipitated, when it retains a rosy-red colour. With care, it is easy to titrate it to a drop, and the results are very satisfactory. Any bases, other than manganese, which may be in the sample, are in a fully oxidized state, and do not at all interfere with the process. It is a point that the neutralized solution should be nearly boiling, as at lower temperature different reactions occur.

The manganese in an ore may also be determined by dissolving it with dilute sulphuric acid and a weighed quantity of pure oxalic acid in excess, when carbonic dioxide is liberated and 126 parts of crystallized oxalic acid are decomposed by every 87 parts of manganese dioxide present. The solution is diluted, boiled, and the excess of oxalic acid titrated with permanganate in the usual way. This process gives accurate results unless the sample is not completely decomposed by treatment in this way. Some samples of pyrolusite for instance are very difficult of solution. Unless any residue which remains undissolved is of a light colour it is not safe to trust to it. In any case the sample should be powdered exceedingly fine; five minutes with an agate pestle and mortar will often save an hour's subsequent bother.

Calcium is generally estimated gravimetrically by precipitation as oxalate, and conversion of the precipitate into carbonate by ignition. If the heat is very carefully regulated this gives good results, but it is difficult to know when just sufficient heat has been applied to decompose the oxalate, and not so much as to drive off the carbon dioxide from the resulting carbonate. However carefully the heating has been performed, the carbonate is always of a grey colour, and on dissolving it in acid organic matter is left behind. In limestone and similar substances I always use a volumetric process, as I have found it next to impossible to obtain satisfactory results in the other way.

The calcium may be precipitated in the usual way as oxalate, washed, transferred to a flask, acidulated with dilute sulphuric acid, and the oxalic acid titrated with permanganate, which indirectly gives the calcium.

$$5\,CaC_2O_4 + K_2Mn_2O_8 + 8\,H_2SO_4 = K_2SO_4 + 2\,MnSO_4 + 5\,CaSO_4 + 10\,CO_2 + 8\,H_2O.$$

Or a weighed quantity of pure oxalic acid in excess may be added, the solution made up to a bulk and an aliquot portion of the clear filtered liquid titrated with permanganate, which will give the excess of oxalic acid which has been added.

Lime, when in large quantity, as in limestones, I prefer to estimate as follows:—Ignite the precipitated oxalate strongly or at any temperature higher than sufficient to decompose it. Dissolve the resulting carbonate and oxide in standard hydrochloric acid, and neutralize the excess of acid with standard solution of caustic soda. Making experiments with pure Iceland spar I have several times got within ·05 per cent. of the theoretical quantity.

Ferrocyanides.—If permanganate is added to an acid solution of a ferrocyanide it converts it into ferricyanide.

$$10\,K_4FeCy_6 3\,H_2O + K_2Mn_2O_8 + 8\,H_2SO_4 = 10\,K_3FeCy_6 + 6\,K_2SO_4 + 2\,MnSO_4 + 38\,H_2O.$$

About 3 grains of the sample are taken, diluted largely with water, acidulated with sulphuric acid, and standard permanganate solution added until the yellow colour disappears and a faint pink tinge takes its place. The end reaction is not very clearly defined, but a little practice accustoms one to the reaction and a number of analyses of the same sample may be made differing very slightly from each other. Some chemists prefer to add a few drops of dilute ferric chloride solution; this gives a greenish coloration as long as any ferrocyanide is left, and which disappears when the operation is finished. Whether this is advantageous or not seems to depend a great deal on which colour the experimenter is sensitive to.

Ferricyanides may be estimated by first converting them into ferrocyanides. This is effected by boiling with caustic potash, and adding ferrous sulphate solution from time to time until the precipitate which falls is black, and then filtering from the precipitated oxide of iron. The solution is then made very dilute, acidified with sulphuric acid, and the ferrocyanide titrated as before.

Prussian blue may be estimated by boiling with caustic potash, filtering, acidifying, and titrating the ferrocyanide produced with permanganate solution.

$$Fe_7Cy_{18} + 12KHO = 3\,K_4FeCy_6 + 2\,Fe_2 6\,HO.$$

Tannin.—A number of methods have been devised for the estimation of tannin in barks, wood extracts, etc., all claiming superiority, but I am afraid none of them come up to an ideal standard of perfection. The results obtained for the same sample when tested by different methods exhibit a charming variety, and indeed it is a pleasure to get anything like the same result twice together by the same method. The methods generally adopted are all volumetric and I think the best of them is the one devised by Lowenthal, and improved by Neubauer, which consists essentially in oxidizing the tannin by means of permanganate. Whether this process gives the true amount of tannin or not, I cannot say; but, at all events, the same results (or thereabouts) can be obtained from the same sample time after time, so that a comparison can be made of the relative values of different specimens of the same kind of material. This process is described in Sutton's 'Volumetric Analysis,' and in Allen's 'Commercial Organic Analysis.' The fullest description, with the latest improvements, will be found in the latter work. There are one or two curious bits of arithmetic in the calculations, but they will be self-evident to any one who works the process. It is there recommended to separate the tannin with Cologne glue, which I suppose is a kind containing very little oxidizable matter; but it seems difficult to obtain, and I therefore have used isinglass, which answers quite well.

Methyl alcohol.—Permanganate solution has been proposed by Cazeneuve and Cotton (*J. Pharm.*, ii., 361, 367), as a means of estimating the amount of methyl alcohol in ethyl alcohol. There is an abstract of the paper in the *Journal of the Chemical Society*, 1881, p. 198. By using this process, I have succeeded in detecting 10 per cent. methylated spirit (90 ethyl, 10 methyl) in ethyl alcohol, or that is to say 1 per cent. of pure methyl alcohol when mixed with ethyl. In using this process the alcohol should be previously distilled to eliminate colour and organic matter.

Organic Matter in Water.—Permanganate of potassium was years ago in great repute as an indicator of the amount of organic impurity in potable waters, but for a time got into bad odour with chemists, and the results obtained by it regarded with distrust. However, by devising several improvements in the manner of applying it, Dr. Tidy has succeeded in re-establishing its reputation, and it is now once more regarded as a valuable agent in determining the organic pollution of potable water.

I have noticed that whenever we get a bad water to analyse it invariably consumes a large quantity of permanganate solution, and I have come to look on this test as *primâ facie* evidence of organic contamination. A water which rapidly decolorizes permanganate, which when evaporated to dryness gives a coloured residue, and whose residue when exhausted with alcohol and the alcoholic solution on evaporation to dryness leaves a coloured and deliquescent residue, is one which I look on with great suspicion.

A simple way of applying the permanganate test to a potable water is to measure 8 ounces of the water into a *clean* flask, acidulate it with 10 to 20 drops sulphuric acid, and add a solution of permanganate (4 grs. in 10,000) from a burette, until the coloration which is produced by 3 drops does not fade in thirty minutes or so. When the colour remains permanent after that lapse of time, the operation may be considered finished. If, working in this way, the water consumes less than 40 grains of the permangauate solution it may be regarded as sufficiently free from sewage contamination to produce any injurious effects, but if it takes more, further examination is required before it is safe to pass it as a good water. If the permanganate is rapidly decolorized, it points to sewage infiltration; if slowly, to peaty and vegetable matter. If the water is turbid from suspended matter it should be filtered previous to making the test, and the floating matter examined microscopically. This process which is so easy of performance, is of course, not so scientifically perfect as Dr. Tidy's, but as a preliminary test it seems to afford valuable information as to the organic purity, or otherwise, of a potable water.

The uses which I have mentioned are sufficient to show that in permanganate of potassium the chemist has a valuable agent, and one which no doubt can often be beneficially employed.

NOTE ON HYDRARGYRUM FORMAMIDATUM.*

BY JAMES C. WILSON, M.D.

Some accounts of this preparation have appeared in recent journals. Towards the close of last year, Professor Liebreich proposed, in a meeting of the Berlin Medical Society, a new drug for the treatment of syphilis by the hypodermic method. Chemically, this drug belongs to the amide group. Liebreich was led to use it, from the fact that the ordinary amides of the body, of which urea is the principal one, are eliminated in an undecomposed state. When, however, the amide is in combination with a metal, decomposition occurs, and the metal is reduced and deposited. Liebreich found, by actual experiment, that this statement is true of mercury. It is supposed that the formamidated mercury, after hypodermic injection, undergoes decomposition, and that the metal mercury is set free in the tissues. The preparation is soluble in water, of neutral reaction, does not coagulate albumen, is not precipitated by caustic soda, and the presence of mercury can be demonstrated by potassium sulphide. It produces its effects very surely and rapidly. Liebreich regards it as the best remedy known for the hypodermic treatment of syphillis by mercury, as it is but little liable to excite local troubles or salivation. Later (*Med. Times and Gazette*, July 7, 1883), we find that Professor Zeissel, in Vienna, after trial of this remedy in fifteen cases of syphilis, was well satisfied with the results. In three of these cases salivation was produced. Some pain followed its injection, which was not, however, so severe as that following the hypodermic use of mercuric chloride. Twenty injections was the maximum number required to disperse the manifestations, even in severe cases.

Dr. Schacht, of Berlin (*New Remedies*, September, 1883), writes as follows:—

"Formamide is a colourless liquid, boiling at about 195° C., which can be distilled without decomposition only *in vacuo*. It is prepared by acting upon formate of ethyl by ammonia. When pure it is neutral, but easily becomes acid.

"If a *concentrated* solution of formamide be *boiled* with precipitated mercuric oxide, decomposition ensues, and metallic mercury is separated.

"On the other hand, if a dilute solution of formamide be *warmed* on the water-bath with precipitated mercuric oxide, a clear, colourless solution results, in which soda (hydrate of sodium) produces *no* precipitate. Sulphide of ammonium, however, precipitates the mercury as sulphide, both from the formamide of mercury and from mercuric chloride. Solution of albumen is precipitated by the latter salt, but not by the formamide.

"Formamide of mercury is prepared in the following manner:—10 to 13 grams of freshly precipitated, completely washed and still moist mercuric oxide are generally warmed with a little water in a porcelain capsule, with gradual addition of 10 grams of formamide. As soon as solution has taken place, the resulting colourless liquid is filtered into a litre-flask, and the latter filled to the litre-mark with distilled water. Each cubic centimetre contains 0·01 gram of mercury, which is the quantity representing one hypodermic dose. Formamide of mercury keeps well in brown-coloured bottles, and should also be dispensed in these."

In a note from Vienna (*Med. News*, October, 13, 1883), it is stated that Professor Neumann is now trying hydrargyrum formamidatum on a large scale as an antisyphilitic. It is used hypodermically in doses of 1 c.c. It acts with far greater efficacy upon the recent efflorescences than upon the later manifestations. Pain of great severity and active local inflammatory troubles have resulted in Neumann's cases.

The preparation I exhibit, made by Merck, of Darmstadt, is a 1 per cent. aqueous solution, and the dose of it is from half to one ordinary hypodermic syringeful.

It has not been possible to obtain this drug in Philadelphia until the present time.

* Read before the Philadelphia County Medical Society, October 17, 1883. Reprinted from the *Pharmaceutical Record*, January 15, 1884.

THE USE OF LITMUS, METHYL ORANGE, PHENACETOLIN AND PHENOLPHTHALEIN AS INDICATORS.*

BY ROBERT T. THOMSON.

The number of indicators which have been proposed to supersede litmus is now very great, but none, as far as I am aware, have been thoroughly tested as regards their efficiency in presence of the impurities which constantly occur in the alkaline hydrates and carbonates of commerce. There is no lack of information to be obtained concerning the high tinctorial power of these indicators compared with that of litmus, and their delicacy when

* Read before the Chemical Section of the Philosophical Society of Glasgow, January 22, 1883, and reprinted from the 'Proceedings.'

employed in the determination of alkalies in solutions of the pure hydrates and carbonates; but on the question of their value in presence of sulphites, thiosulphates, sulphides, phosphates, silicates, aluminates, etc., little or no attention has been bestowed.

In the following paper are detailed the results of a series of experiments I carried out with the view of testing, in as complete a manner as possible, the merits of litmus, methyl orange, phenacetolin, and phenolphthaleïn as indicators in the estimation of alkalies and certain free acids. Instead of taking these indicators in succession, and recording all the tests made with them, I have considered it preferable to take the substances which were tested by the standard acid or alkali, and state the result obtained with each indicator. By this means a close comparison of the behaviour of the different indicators with the same substance will be secured.

The tests were made in such a way that the solution employed would measure about 100 c.c. when the end-reaction was observed. The strengths of the indicator solutions (·5 c.c. of which was used for every experiment) were so arranged that equal volumes of each gave, as nearly as could be judged from their different tints, the same intensity of colour at the point at which the change caused by the addition of excess of acid or alkali was just complete.

I.—Delicacy of the Indicators in Absence of Interfering Agents.

This was tested by adding the ·5 c.c. of the indicator solution to 100 c.c. of distilled water, and finding how much decinormal acid or alkali (1 c.c. = ·0031 gram Na_2O or ·004 gram SO_3) was required to change the colour.

Litmus.—This indicator, as is well known, is naturally blue, and remains so in presence of alkalies and alkaline carbonates, but changes to red when a slight excess of acid is added. The litmus solution employed contained 20 grams of the dry extract per litre. Half a c.c. of this was mixed with 100 c.c. of distilled water, and decinormal sulphuric acid added from a burette, drop by drop, till no further alteration in colour was observed. To accomplish this ·5 c.c. of the acid was consumed. This is equal to ·05 c.c. (about 1 drop) of normal acid, which is the strength usually employed in alkalimetric tests.

Methyl orange.—It is soluble in water with formation of an orange yellow liquid, which is unchanged in colour by alkalies or alkaline carbonates and bicarbonates, but is transformed to a deep pink by a mineral acid. The solution employed contained ·15 gram of the methyl orange per litre, and ·5 c.c. of decinormal acid was required to effect a complete change in the colour, when tested in exactly the same way as the litmus solution. It is thus on an equality with litmus as regards delicacy in absence of all salts.

Phenacetolin.—This substance is soluble in alcohol with formation of a dark brown liquid, which gives with the hydrates of potassium and sodium, even in presence of carbonate, a scarcely perceptible yellow, with ammonia and the normal alkaline carbonates a dark pink, with the bicarbonates a much more intense pink than with the normal carbonates, and with mineral acids a golden yellow colour. The solution employed contained 2 grams of phenacetolin per litre, and was tested by decinormal carbonate of sodium, of which ·1 c.c. was required to produce a decided change from a faint brown tinge to a dark pink.

Phenolphthaleïn.—This indicator gives rise to a fine red colour in presence of alkaline hydrates and carbonates, but with bicarbonates (in absence of normal carbonates) and free acids no colour is produced. Phenolphthaleïn is almost insoluble in water, but is readily soluble in 50 per cent. alcohol. The solution used contained ·50 gram per litre, and was of a pale yellow colour, which was probably due to a slight impurity. When tested under the conditions observed in the case of the other indicators, ·1 c.c. of decinormal hydrate of sodium caused a sudden transformation, the colourless solution becoming red.

In the following Table (I.) will be found a summary of the results given above.

Table I.

Showing the delicacy of the indicators in the absence of interfering agents.
Amount of distilled water used for each test . . 100 c.c.
Amount of indicator solution used for each test . 0·5 c.c.

Name of Indicator.	Grams of Solid Matter per litre of Indicator solution.	Amount of decinormal acid or alkali required to change colour of indicator.
Litmus	20·0	·5 c.c. H_2SO_4
Methyl orange .	·15	·5 c.c. "
Phenacetolin . .	2·0	·1 c.c. Na_2CO_3
Phenolphthaleïn .	·5	·1 c.c. NaHO

II.—Application of the Indicators to the Determination of Soda existing as Hydrate with a small Proportion of Carbonate.

The solution of caustic soda employed was of normal strength, and each test was made with 50 c.c., which thus contained 1·55 gram of available soda. The soda existing as carbonate in this quantity was ·024 gram and was estimated by precipitation with chloride of barium.

Litmus.—When this indicator was used exactly 50 c.c. of normal sulphuric acid were consumed. The solution was, of course, boiled thoroughly after each addition of acid, especially when near the neutral point, and only a single drop was required to effect the end-reaction.

Methyl orange.—The great advantage claimed for methyl orange over litmus is that with the former no boiling is required, as carbonic acid has no effect on the colour. On making several determinations of soda with this indicator, I found that its delicacy was by some means considerably impaired, as the pale yellow colour became just perceptibly tinged with pink when 49·95 c.c. of the normal acid were added. The change in colour was very decided when 50, but was not fully developed till 50·15 c.c. were consumed. In these cases ·2 c.c. of the acid was necessary to bring out the full intensity of colour, while ·05 c.c. produced the same result in absence of interfering agents. It would be naturally expected that if half the quantity of methyl orange were used, a proportionately more delicate end-reaction would be secured, but at least ·15 c.c. of the normal acid was required to occasion the alteration in tint. Again, the same expectation might reasonably be entertained with regard to varying the proportions of soda, but I found that when ·775 gram of soda was tested ·15 c.c., while with 3·1 grams of soda, ·25 c.c. of the test acid was indispensable in effecting the complete transformation. It is evident that this extension of the end-reaction over from ·15 to ·25 c.c. of normal acid must be due, either to the liberated carbonic acid, or to the salt of sodium produced by the action of the acid on the hydrate and carbonate of sodium. That it is solely owing to the latter cause I shall show when the action of the neutral sulphates, chlorides and nitrates of the alkalies is under consideration. On looking over these results the question arises, At what point is the estimation of alkali, when methyl orange is used as indicator, to be reckoned as finished? The point I have adopted is that at which the first *decided* change in colour is apparent, and this end-reaction coincides exactly with that of litmus. The intensification of the colour by the further addition of acid serves as a confirmation of the first reading. Greville Williams, in a paper which appeared in the *Chemical News*, xxxix., 98, recommends for each determination the use of from ·1 to ·2 c.c. of a solution containing ·1 gram of methyl orange per litre. The larger of these quantities is about one-fourth of that which I have employed, and when excess of acid is added gives a very faint pink colour, which is sensibly less intense in presence of much sulphate of sodium. It is obvious, however, that the amount of the indicator solution used must be varied according to the volume and colour (if any) of the solution in which the alkali is to be determined.

Phenacetolin. — This indicator was introduced by Degener for use in the determination of the respective proportions of hydrate and carbonate of sodium in the same solution, and was tested by Professor Lunge, whose results will be found in the *Jour. Soc. Chem. Industry*, i., 55.

To determine the hydrate of sodium the normal acid was added till the scarcely perceptible yellow colour gave place to a rose-pink, which remained permanent for a few minutes at least. Two tests gave respectively 49·1 and 49·2 c.c. of acid consumed, which are equal to 1·523 and 1·526 gram of soda existing as hydrate, as against 1·526 obtained by deducting the soda existing as carbonate (which was determined by chloride of barium) from the total soda. It must be carefully borne in mind that the rose colour should be permanent, for it may be developed by adding a drop of the acid, even when there is still a little hydrate present, and then fade slowly away. The first reading can be confirmed by adding a drop or two more acid, which should render the colour more intense.

To find the proportion of soda existing as carbonate the addition of acid was now continued. The colour at first was intensified, then became mixed with yellow, and finally all the pink tinge was eliminated, and a golden yellow was produced. For each test 50 c.c. of the normal acid were consumed, thus giving in the one case ·9 c.c. for the soda as carbonate, and in the other ·8 c.c., showing respectively ·027 and ·024 gram of soda existing as carbonate, as against ·024 estimated by chloride of barium. A much sharper end-reaction is obtained by boiling off the carbonic acid after each addition of acid when determining the portion of soda existing as carbonate.

Phenacetolin is not adapted to the estimation of small quantities of hydrate in presence of a large proportion of carbonate of sodium or potassium, as is evident from the following test. To a solution containing 2·65 gram of carbonate of sodium and 0·4 gram of hydrate of sodium in 100 c.c., phenacetolin was added, but even after an hour had elapsed the dark pink colour did not disappear, as it should do if the process were of any value.

Phenolpthaleïn.—This indicator, which seems first to have been employed by Luck in that capacity, can also be used for the determination of the proportion of hydrate and carbonate of sodium in the same sample. The method of procedure is to add the normal acid to the cold alkaline solution till the red colour is discharged, taking care, by using a dilute solution and keeping the point of the burette in the liquid, that no carbonic acid escapes. The point at which the colour is dispelled is when all the hydrate is neutralized, and the carbonate has been converted into bicarbonate according to the following equation:—

$$2Na_2CO_3 + H_2SO_4 = 2NaHCO_3 + Na_2SO_4.$$

By this means the whole of the soda existing as hydrate and half the soda as carbonate is determined. The number of c.c. consumed is now noted, and the estimation continued, boiling thoroughly after each addition of acid to decompose the bicarbonate of sodium, and thus bring back the red colour. It is preferable, as pointed out by Warder in his paper in the *Chem. News*, xliii., 228, to add excess of normal acid, boil off the carbonic acid, and titrate back with normal caustic soda. The results of several experiments gave 49·6 c.c. of normal acid consumed for the hydrate and half the carbonate of sodium, and 50 c.c. for the total available soda, or, in other words ·8 c.c. for the carbonate and 49·2 for the hydrate. These results agree almost exactly with those obtained by the estimation of the carbonate of sodium by barium chloride, and with the use of phenacetolin as indicator. It must be noted that the more carbonate of sodium there is present the less delicate will the end-reaction be, as the red colour gradually fades away during the first portion of the titration. It is also evident, from the nature of the process, that this method is quite unreliable for the determination of a small quantity of hydrate of sodium in presence of a large proportion of carbonate of sodium.

Table II.

Showing results obtained by each indicator when used in the determination of soda in caustic soda containing a little carbonate of sodium.

Soda, existing as hydrate, employed . 1·526 gram.
Soda, existing as carbonate, employed. ·024 gram.
Total soda employed . . . . 1·550 gram.

Name of Indicator.	Grams of total Na_2O found.		Grams of Na_2O as hydrate found.		Grams of Na_2O as carbonate found	
Litmus	1·55	1·55	...		...	
Methyl orange .	1·55	1·55	...		...	
Phenacetolin . .	1·55	1·55	1·523	1·526	·027	·024
Phenolphthaleïn .	1·55	1·55	1·526	1·526	·024	·024

III.—Estimation of Available Potash in Caustic Potash.

It is quite unnecessary for me to give any details of the results of the experiments made under this head. Litmus and methyl orange can be used for the determination of the total available potash, and phenacetolin and phenolphthaleïn for the estimation of the respective proportions of hydrate and carbonate of potassium with as great accuracy as in the case of the caustic soda.

IV.—Estimation of Ammonia existing as Hydrate.

The liquor ammonia used for the following tests did not contain an appreciable quantity of carbonate, and was free from other impurities. It was diluted with an indefinite quantity of water, and 50 c.c. of the dilute sample were employed for each determination. This quantity, according to a result obtained by converting the ammonia into chloride of ammonium and drying at 100° C., contained ·547 grams of ammonia (NH_3).

When litmus, methyl orange, or phenacetolin was used, exactly 32·4 c.c. of normal sulphuric acid were consumed, which are equal to ·550 gram of ammonia. The end-reactions in each case were quite as delicate as with caustic soda. As phenacetolin produces with ammonia the dark pink colour characteristic of its reaction with the carbonates of sodium and potassium, and not the faint yellow formed with the hydrates of these metals, the respective proportions of hydrate and carbonate of ammonium cannot be determined by titration in presence of this indicator.

In the two determinations made with phenolphthaleïn as indicator 31·5 c.c. and 31·4 c.c. of the normal acid were consumed. After 25 c.c. had been added the colour began to fade away slowly, and was fully discharged at the point mentioned. These results show respectively ·535 and ·533 gram of ammonia, and are so far below the truth as to be equal to about 3 per cent of the whole ammonia present. It is, therefore, perfectly plain that phenolphthaleïn is utterly useless for indicating the end-reaction in the estimation of ammonia. The anomalous behaviour of phenolphthaleïn is due to the action of the salt of ammonium which is formed, and which destroys the red colour produced by the ammonia when the proportion of the latter becomes small. That this is the true explanation will be shown when the effect of the neutral salts of ammonium on the indicators comes to be examined.

(To be continued.)

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 23, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

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

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

THE BENEVOLENT FUND.

In the present number of the *Pharmaceutical Journal* unusual prominence is given to the subject of an institution which indisputably has a claim upon the attention of every registered chemist and druggist in the United Kingdom. It is to the honour of our country that there exist in it many organizations for the relief of the indigent and sick, some of which are general in the scope of their operations, whilst others are confined within more or less restricted limits. But there is no arrogance in the assertion that not one of them is more worthy of support from the class to whom it specially appeals than the Benevolent Fund which was founded more than forty years ago by the earliest leaders of the Pharmaceutical Society, and which is still administered by the Council of that body. Instituted originally with the object of providing for the relief of any who were in distress among the Members and Associates of the Society or their widows and orphans, the true nucleus of the Fund was constituted by a donation in the year 1842 of £500 from the general assets of the young Society, and this was increased by similar sums set aside from the Society's funds in 1843 and in 1844. These sums, together with all the donations, were invested, and to this funded capital were added at intervals any unexpended balances of subscriptions and interest left from the gradually increasing annual income, until in the Annual Report for 1865, when the investments amounted to nearly £6500, the Council felt warranted in recommending the Society to incur the responsibility of granting annuities. In that year accordingly two persons were chosen to receive the sum of £30 each annually from the Fund, and since then no year has passed without the election of fresh annuitants. Up to that time previous connection with the Pharmaceutical Society had been a qualification essential to a successful application for assistance; but a desire to extend the sphere of the application of the Fund induced the Council, which was just then seeking the legislation that came eventually in the shape of the Pharmacy Act, 1868, to avail itself of the opportunity to obtain powers that would authorize the extension of the benefits of the Fund to the needy of the whole body of qualified chemists and druggists as constituted by that Act. In order to appreciate properly the liberality of this course, it must be remembered that the Pharmaceutical Society was not then nearly so representative of the trade as it is now, and the immediate effect was to extend the potential scope of the Fund from about 2500 persons to more than 12,500. Nevertheless, two years afterwards, in 1870, another donation of £500 was voted from the funds of the Society to be invested in what had now become a General Benevolent Fund for chemists and druggists. In addition to this it may be stated that from its initiation the Fund has been administered by the Council of the Pharmaceutical Society and has never been subjected to any of those expenses for management which constitute so serious—and yet unavoidable—a charge upon the income of nearly all benevolent institutions.

It is not surprising therefore that, fostered thus carefully, the Fund has prospered. The investments now amount to £19,400, whilst the income from annual subscriptions and donations last year reached the respectable sum of £1922. On the other hand, the annuitants have now increased to forty—a number which bears no unworthy proportionate relation to the total number of registered chemists and druggists, and which represents an annual sum of £1350, whilst the money expended last year in casual relief amounted to £675. The Fund has therefore now attained proportions, both in respect to its receipts and its expenditure, upon which all chemists and druggists may well be congratulated, especially since it can now be officially declared that "no genuine case of necessity presented to the Council is left unaided by temporary assistance." In order, however, to maintain this degree of efficiency, not only has the Council to exercise the greatest vigilance through its Committee in the careful examination of all applications for help, but it has also continually and persistently to urge the claims of the Fund to the generous consideration of all chemists and druggists who are in a position to contribute towards the alleviation of the distress of their less prosperous brethren.

There is one direction, however, in which the repeated appeals of the Council have not been responded to in the degree that might have been expected. We refer to the large number of chemists and druggists that still abstain from connecting themselves with the Pharmaceutical Society as Members or Associates, and who, apparently as a corollary, do not subscribe to the Benevolent Fund that it dispenses. For it is a fact, that whilst nearly 50 per cent. of the Members and Associates of the Society subscribe to the Fund, only about 11 per cent. of the registered chemists and druggists outside the Society contribute to it. Or, to put the case in another form, the nine thousand chemists and druggists unconnected with the Society between them only subscribed last year £385 12*s.* 8*d.*, while the class of Pharmaceutical Chemist Members of the

Society alone subscribed £516 19*s.* 6*d.* Nevertheless there is no ground for supposing that chemists and druggists outside the Society are less willing to relieve the distress of the afflicted to the best of their ability than those who are connected with it. It is thought probable rather that, notwithstanding the numerous occasions on which the Fund has been brought under their notice, they still remain imperfectly acquainted with the catholic character of the Fund and the advantageous conditions under which it is administered. It is in the hope of promoting the removal of any such remaining misapprehension or prejudice on the subject that the occasion of sending a copy of this Journal, containing a classified list of Subscribers and Donors to the Fund, to every chemist and druggist on the Register, is utilized once more to explain the character and urge the claims of this valuable institution. In the first place it may be stated that the relief afforded from the Fund is given in two forms. Urgent cases are helped temporarily by grants of money based upon the recommendation of a Committee charged with the investigation of the *bona fides* of each application. Other cases, which are thought worthy of more permanent help, are also placed on the list of approved candidates, from which a certain number, dependent upon financial considerations, are elected every year by the subscribers and donors themselves to receive annuities for the remainder of their lives. During the year 1883 the money expended in temporary aid amounted to £660 10*s.*, of which sum £260 went to registered persons, £330 to widows, and £70 10*s.* to orphans. The annuities paid during the same year to forty-two men and women above sixty years of age amounted to £1283 15*s.* With respect to the recipients, it cannot be too distinctly stated that no other qualification for relief from the Fund is ever required than that the application is made on behalf of a person whose name is on the Register of Chemists and Druggists, or the widow or children of such a person, and that it can bear the test of an inquiry. Indeed, it may be mentioned here that the grants and annuities received last year by persons who had never been connected in any way with the Pharmaceutical Society exceeded by far the amount subscribed by persons outside it. The Fund is maintained by annual subscriptions and donations, which may be paid to any Local Secretary of the Society, or forwarded direct to the Secretary, Mr. ELIAS BREMRIDGE, 17, Bloomsbury Square, W.C. Every person subscribing half-a-crown annually is entitled to one vote at each election of annuitants, whilst each half-a-guinea represents five votes. By giving five guineas in one sum a person may become a life subscriber with five votes at each election, and each additional guinea will entitle him to another vote. Similar donations from firms or corporations entitle them to the same number of votes during ten years. In conclusion we express the hope that this simple statement may prepare the way in many instances for a favourable reception of the local secretary or whoever else may be seeking contributions to the Fund.

SCHOOL OF PHARMACY.

As will be seen by the advertisement in the present number, the courses of lectures on "Chemistry and Pharmacy" and "Materia Medica and Botany," in connection with the Pharmaceutical Society's School of Pharmacy, 17, Bloomsbury Square, will recommence on Saturday, March 1, at 9 a.m., when Professor BENTLEY will give his first lecture on Botany. Professor REDWOOD will commence his course on "Chemistry and Pharmacy" on Monday morning, March 3, at 9 o'clock.

Students will find the ensuing five months a favourable period for studying at the School, for between March 1 and the end of July they will have an opportunity of attending not only Practical Chemistry in the laboratories and the usual courses of lectures on Chemistry and Pharmacy and Materia Medica and Botany, but also the summer course on Practical Botany and the Classification of Plants, at the Royal Botanic Society's Gardens, in the Regent's Park, where every opportunity will be afforded to them of obtaining a practical acquaintance with medicinal plants and the natural orders.

In addition to the above courses of lectures and Practical Chemistry, there is also Mr. INCE's class for "Practical Instruction in Dispensing," which will recommence on Tuesday, March 4, and be continued until the end of July.

THE CHEMISTS' ASSISTANTS' ASSOCIATION.

IT is pleasant to be able to congratulate the Chemists' Assistants' Association once more on the success of its Annual Dinner, which was held on Wednesday evening last, at the Holborn Restaurant, under the presidency of Mr. S. R. ATKINS, the Vice-President of the Pharmaceutical Society, one hundred and fifty members and their friends being present. The Chairman, in proposing the "Medical Profession," referred to the great amount of unpaid labour and the other important services which the members of it are continually rendering to the public. On the one hand, he said, the eminent London specialist is consulted by the friends of the peer, and on his decision, as the ultimate court of appeal, life or death may be said to hinge; and on the other, the hard-worked, ill-paid provincial practitioner is summoned long distances, regardless of wind and weather, to attend the wife or child of the peasant. He took the opportunity, also, to remark that pharmacists wished to be true to the traditions of the Pharmaceutical Society and to keep to their own line of action, whilst they hoped that the medical profession would keep to theirs. Dr. H. MACNAUGHTON JONES, in replying, reviewed the progress of knowledge of disease during the past forty or fifty years and said that much of this had depended on the valuable assistance of pharmacists. Speaking as an examiner he regretted that medical students were not compelled to learn more pharmacy than was now required of them. In his opinion the prescribing of proprietary preparations by medical practitioners went dangerously near to empiricism. The toast of the "Pharmaceutical Society" was proposed by Mr. Millhouse, who said that the claims of the Society for further State recognition were based upon the technical education which had been provided and fostered by it. Mr. Greenish replied, and referred to the absence of community between members of the trade before the institution of the Society, and he drew a contrast between the educational facilities of to-day and those which existed forty years ago. The Chairman then proposed the toast of the evening, "The Chemists' Assistants' Association," and referred to the great advantages which the Association afforded from a social point of view, and also to its claims to recognition on account of the good scientific and practical work which it was doing. Mr. Parkinson, in replying, spoke of the formation and subsequent work of the Association, and said he hoped it would soon become self-supporting and would not have to depend upon the subscriptions of gentlemen who were not members of it. He thought there ought to be a sufficient number of members to make the Association a success financially. The toast of "The Visitors" was proposed by Mr. Winfrey and replied to by Professor Attfield, and, lastly, that of "The Chairman" was proposed by Mr. Braithwaite and suitably acknowledged by Mr. Atkins.

In the evidence given by Dr. Campbell Brown at the recent trial of two women at the Liverpool Assizes for the murder by poisoning of the husband of one of them, he stated that the liquor contained in a flask produced was a neutral solution of arsenic, resembling the liquor which he had obtained by extracting eight out of nine samples of fly paper with water. Although Dr. Brown does not seem to have committed himself absolutely to the theory that fly papers had been the source of the arsenic used in the poisoning, it is understood that one of the prisoners, since her conviction, has admitted that this was the case. We venture, therefore, to remind our readers that about five years since (*Pharm. Journ.*, [3], viii., 1039), Mr. Plowman called attention in our correspondence columns to the prevalence of arsenical fly papers, and the evil results that might be consequent on their unrestricted sale.

* * *

The proceedings under the Massachusetts Adulteration Act for the sale of faulty drugs, to which reference was made a few weeks since, appears to have created much uneasiness among the druggists of the State. As one consequence a letter has been addressed by the President of the Boston Druggists' Association, Professor Markoe, to the Board of Health, asking that any druggist who may be found to have supplied an article in violation of the law may receive official notification of the fact and that prosecutions may not be instituted except when a person continues to sell the challenged article after receiving such a notice. The Board has, however, declined to take the course suggested, on the ground that it would be neither reasonable nor just and would make the "Board directly responsible for the condition of the whole drug market." The *Sanitary Engineer* goes further and describes the request as "a piece of effrontery that we have seldom seen equalled

* * *

We understand that Herr Knapp, the Curator of the Herbarium of the Vienna General Pharmaceutical Association, is to accompany a scientific expedition that will start next month for Northern Persia to explore the fauna and flora. It is to be hoped that the journey may incidentally contribute to our knowledge of materia medica.

* * *

Notwithstanding the existence in New Zealand of a "Sale of Poisons Act" which, although it allows scheduled poisons to be sold by others than qualified pharmacists, contains provisions as to the registry of sales, labelling, etc., similar to those in the British Pharmacy Act, the Colonial Government has recently by an Order in Council added other restrictions upon the sale of arsenic and strychnia. Henceforth it will be illegal for any person in New Zealand to sell either of these poisons unless before making the requisite entry of the sale he obtains from the intending purchaser a statutory declaration setting forth his or her name, occupation and address, the exact quantity of the poison required, the express purpose for which it is intended to be used, and the place or places where it is to be used or deposited. Immediately after the completion of the sale the seller is to forward the statutory declaration to the registrar of the district. A meeting of pharmacists was to be held in Dunedin to consider the effect of this Order.

* * *

Professor Bentley, Professor Attfield and Mr. E. M. Holmes have been elected Honorary Members of the Philadelphia College of Pharmacy, "as a mark of respect for their scientific researches and acquirements." Professor Attfield was elected a Corresponding Member in 1869.

* * *

On Friday, the 15th inst., the Institute of Chemistry Bill was presented in the House of Lords, read a first time, and referred to the Examiners.

* * *

The next meeting of the Chemists' Assistants' Association will be held on Wednesday, the 27th inst., when a paper on "Coal Tar Derivatives used in Pharmacy" will be read by Mr. Joseph F. Burnett.

* * *

A meeting of the School of Pharmacy Students' Association will be held on Thursday, February 28, at 8 p.m., when a paper on "Some Silicon Compounds" will be read by Mr. F. MacDiarmid, and a Report on Botany will be made by Mr. E. Baily.

* * *

The next meeting of the Manchester Pharmaceutical Association will be held at The Owens College (Coupland Street entrance), on Tuesday evening next February 26, at 7.30 p.m. when the following papers will be read:—"Disinfectants," by Mr. W. Kirkby, and "A Note on Exotic Henbane," by Mr. W. Elborne.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The annual general meeting was held in the Society's Room, on Wednesday evening, February 6. Mr. J. Preston, the retiring President, in the chair.

The minutes of the last general meeting were confirmed.

The Secretary announced that the following donations had been received during the year:—The *Pharmaceutical Journal*; Calendar of the Pharmaceutical Society; Register of Chemists and Druggists, from the Pharmaceutical Society of Great Britain; the 'Year-Book of Pharmacy,' from the British Pharmaceutical Conference.

It was unanimously resolved, on the motion of the President, that the best thanks of the Society be given to the respective donors.

On the motion of Mr. Smith, seconded by Mr. Marshall, Messrs. Brookes, Chatterton, Cobban, Grierson, Holleley, Humphrey, Jacques, Johnson and Kite were elected Associates of the Society.

The Annual Report was then read by the Secretary, as follows:—

"Annual Report, 1883.

"Your Council in again presenting its report for the year would call attention to the following items of business:—There have been five general meetings and six Council meetings, all of which show a full attendance and testify to the vitality of the association.

"The financial condition of the Society is a matter of congratulation, inasmuch as the balance in hand has not been greatly touched upon, especially when we consider the extraordinary calls which have been made upon it. The receipts for the current year amount to £10 5*s.* 1*d.*, which is mainly made up of the small subscriptions. This with balance in hand, £16 16*s.* 2*d.*, brings the total to £27 1*s.* 3*d.* The expenditure for the year is made up as follows:—Rent, £5; gas, 10*s.*; coals, 2*s.* 3*d.*; insurance, 3*s.*; printing, stationery and other secretarial expenses, £8 2*s.* 3*d.*, make a total on the other side of £13 17*s.* 3*d.*, which, with bank interest 7*s.*, leaves a clear balance in hand of £13 11*s.* 0*d.*

"It will be noticed that the balance now in hand is a decrease on that of last year, but this is owing to the extraordinary demand which has been made upon the funds, and which is not likely to occur again. The Council would suggest that the original sum of 10*s.* for membership should be again adopted.

"A pleasing feature of the year's work is that gentlemen not directly connected with the trade have freely given their edifying services, whose efforts were fairly appreciated by the full attendances at the respective meetings. Your thanks are specially due to Messrs. Hibbert and Wood. The services of members of the association have greatly contributed to maintain the life and activity which has marked its career during the year.

"A special meeting of the members of the Society and the trade was called during the year to consider the proposed Pharmacy Acts Amendment Bill, the discussion on which was fully reported in the pages of the *Pharmaceutical Journal*, and at no little expense to the Society, but your Council has the satisfaction of knowing that the views then enunciated were respectfully considered, and appreciated in high quarters and elsewhere.

"During the year a communication with respect to the Pharmacopœia revision was discussed at one of the Council meetings, and the action then taken we have reason to believe was much appreciated by the Pharmaceutical Society of Great Britain.

"At the meeting of the British Pharmaceutical Conference at Southport, in September last, your Society was represented by Messrs. Furness, Learoyd, Newsholme and Ward as delegates.

"Your Council has perseveringly kept the subject of education before it, and a scheme was propounded and inaugurated, the lecturers of Firth College considerately adapting their course of lectures and laboratory practice to the requirements of the curriculum of the Pharmaceutical Society. These efforts have met with some success, and your Council believes that the small beginnings augur hopefully for Sheffield as a pharmaceutical centre. The efforts in this direction will not be relaxed until circumstances prove that they are no longer needed.

"Your Council has been greatly encouraged by the increased attendance at the monthly meetings, especially of the younger members of the trade, and it recognizes with gratitude the growing desire amongst many to fit themselves for the high position which they will probably, at no distant time, have to occupy.

"Your Council also desires to record the fact that a junior association has lately sprung up, holding its meetings in the Society's rooms twice a week, having for itself a President in the person of Mr. N. S. Smith, 4, High Street, and a Secretary, Mr. J. Marshall, 74, Market Place, the objects of the Association being purely intellectual, viz., for the study of the subjects required for the Minor examination and on the principle of mutual improvement; judging from its beginnings it will doubtless prove helpful to all concerned.

"In conclusion, your Council feels that it cannot close this report without again referring to the good work the Society is doing, not only in promoting good feeling amongst the chemists generally, but in providing opportunity for mutual benefit and improvement."

The adoption of the report was moved by Mr. Preston, and seconded by Mr. Maxey, and carried unanimously.

The election of President now took place.

Mr. W. Ward, in proposing that Mr. Preston be again elected to the Presidential chair, referred to the good work done by him during his two years of office, and said that the Society had never been in so prosperous a condition as at the present time, and that Mr. Preston had contributed largely to this by his energy and attention to the interests of the Society.

Mr. Furness seconded the resolution, which, being put to the meeting by Mr. Ward, was carried unanimously.

Mr. Preston, on rising, said that whilst he accepted the office of President for the third time he did so reluctantly. He considered that they had greatly honoured him in proposing him again, and he should not have been induced to accept the responsible position had it not been for the pressing representations made to him. However, in accepting, he did so partly because he had been encouraged by the success which had marked the efforts of the Council in the past; a success which was evidenced by the increased attendance at the monthly meetings and the lively discussions which had ensued, also by the increased numbers which had recently joined their ranks, especially from amongst the younger members of the trade. He believed that it was better that new blood should be alike introduced into the Presidential office as well as into the body corporate of the association, and this conviction was dead against the position he now took up. He would have refused to undertake the duties they now desired him to take, if by doing so he would not have laid himself open to a charge of sheer stupidity, and inasmuch as he did not lay claim to belong to the particular animal which bore this character he bowed to the wish of his *confrères*. In looking forward to the future, his hopes were that, the Society would prove still more useful to its members, by that mutual interchange of opinions, on trade topics, so necessary, in the present condition of trade, with its varying usages and in the hard competition going on all around. He believed that it could be made still more useful in a higher sense also, by the reading of papers and discussions thereon of subjects having a pharmaceutical interest; and, it might be, by advancing the chemical knowledge, which the public—an increasingly discerning public—demanded from them. And lastly, not least, certainly, by proving an aid to their younger friends who were now showing a vitality in self-education which was hopeful for the future status of the pharmaceutical chemist. He believed that knowledge in this direction was not only power, but a lever which would, if rightly used, advance their positions in innumerable ways. The absence of this in the chemist of the future would be folly, and must consign the owner of it to a position of ridicule among his fellow men. He recently heard of a case where such a young man, in the last part of his apprenticeship, was asked by a customer what the difference was between "proto sulphate of iron and sulphate," and to his shame he replied, Well, he knew there was a difference, but he was not able to say what it was. To these ends he trusted the Council and members of the Society would press, and with self-denying help from the masters and a wise use of the opportunities which such an association as this, with the help which our local schools afforded, the younger members themselves, he hoped, would be able to acknowledge the benefits which accrued from their membership, remembering that the battle was not always to the strong or to the swift, but to the persevering and the plodding.

The following were the other officers elected for the year:—Vice-Presidents, Mr. J. M. Furness and Mr. Joseph Watts; Hon. Secretary, Mr. G. T. W. Newsholme; Treasurer, Mr. W. Jervis; Auditor, Mr. G. A. Cubley; Council, Messrs. Dobson, Ellinor, Fox, Learoyd, Maxey, Smith and Ward.

LIVERPOOL CHEMISTS' ASSOCIATION.

The eighth general meeting of the thirty-fifth session was held at the Royal Institution, January 31. Mr. Edward Davies, President, in the chair.

The minutes of the previous meeting were read and confirmed and the following donations to the Library and Museum were announced:—'The Annual Report of the Liverpool Amateur Photographic Association, 1883,' from the Association; 'The Year-Book of Pharmacy, and Transactions of the British Pharmaceutical Conference, 1883,' from the Conference; 'The Calendar of the Pharmaceutical Society of Great Britain' and the *Pharmaceutical Journal*, from the Society; and *The Science Monthly Illustrated*, from the Editor.

Mr. L. S. Ward was elected a member.

Mr. A. C. Abraham exhibited a specimen of kola nuts and also a portion of his apparatus for milk analysis.

Mr. A. H. Mason drew attention to a letter from Mr. Blunt, in the *Pharmaceutical Journal*, January 26, in reference to Mr. A. C. Abraham's statement, in the previous week's Journal, that he (Mr. Abraham) believed that the difference in strength in lime water, when made from unwashed lime, was due to the presence of sulphates and chlorides of potash and soda in the chalk, which would be converted into the hydrates during the process of burning. Mr. Mason remarked, that same years ago, *viz.*, in 1874, he had drawn attention to a similar fact, which was recorded in the transactions of that date.

Mr. A. C. Abraham said that as this matter had been referred to, he might point out that while Mr. Blunt had confirmed his statement with regard to the presence of hydrates of potash and soda, he had also strangely stated that the amount which he found was not sufficient to account for the excessive strength noted in the lime water, whereas as a matter of fact, the quantity found by Mr. Blunt would account for this difference many times over.

Mr. Davies thought that Mr. Blunt had probably overlooked the fact that all the hydrates of potash and soda would be taken into solution in the first washing, whereas but a small portion of the lime was dissolved.

The President then called on Mr. J. C. Bredin to read his paper on "Alchemy." The paper gave a very interesting *résumé* of the alchemists of the Middle Ages, and showed how their groping after the secrets of the production of the different forms of matter led to the foundation of the modern science of chemistry. The paper was interspersed with anecdotes, and evinced throughout much care in its compilation.

Mr. Conroy proposed, and Mr. A. C. Abraham seconded, a vote of thanks to Mr. Bredin for the pleasure the meeting had derived from his maiden effort before the Association. The vote was carried unanimously.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

On Wednesday evening, February 6, the half-yearly meeting of the above Association was held at the rooms, No. 4, Halford Street, when the members sat down to a substantial tea. After which votes of thanks were passed to the retiring Committee, and to Mr. Edwards.

The Honorary Secretary then read the report of the session, in which the fact of one of the present members having passed the Major examination of the Pharmaceutical Society was prominently noticed. It also contained expressions of thanks to the honorary members for their continued support and to the Society and Conference for their supply of Journals and gift of the 'Year-Book of Pharmacy.'

The financial statement shows a balance of about 21*s.* due to the Treasurer; a state of affairs which is considered more satisfactory than in the corresponding half-year of 1883.

A new Committee was elected, from whom Mr. J. J. Edwards was chosen President, Mr. E. Brice Vice-President, Mr. J. Garrett Honorary Secretary, and Mr. W. B. Clark Treasurer.

On the following Wednesday, February 13, the President, Mr. J. J. Edwards, inaugurated the new session with an able description of the microscope together with its uses. Towards the close he exhibited several specimens of starches and physiological substances, to the great delight of his audience.

A vote of thanks to the lecturer, proposed by the Chairman, Mr. E. Brice, concluded the meeting.

EDINBURGH CHEMISTS' ASSISTANTS' AND APPRENTICES' ASSOCIATION.

The eighth meeting of the sixth session of this Association was held in the Pharmacentical Society's rooms, 118A, George Street, Edinburgh, on Thursday evening, February 14, at 9.15; Mr. Claude F. Henry, President, in the chair.

The minutes of the previous meeting having been read and confirmed, the Chairman called upon Mr. William Pirie to read a paper on "Mineral Waters.'

After sketching briefly the origin of springs with the probable manner in which the more common ingredients of mineral water were taken into solution, Mr. Pirie gave some quaint information regarding the composition of mineral waters as related by writers of last century. He then proceeded to discuss the more important waters under four groupings, namely, sulphurous, chalybeate, acidulous and saline. The composition of several of the more common waters was then treated of and the essay was concluded with some thoughtful remarks on the different therapeutical properties of natural as contrasted with artificial saline solutions.

The Chairman, in proposing a vote of thanks to Mr. Pirie, said that he was confident that all had received instruction from the thorough, yet lucid and happy manner in which the essayist had brought the subject before them.

Mr. Turnbull seconded the motion, which was heartily awarded.

There followed a discussion which was taken part in by Messrs. Coull, Crowden, Hill, MacEwan, Stephenson and others.

Queries were then submitted and replied to by many members. The Chairman intimated that at the next meeting Mr. Peter Boa will read a paper entitled "The Cultivation of Taste in the Practice of Pharmacy."

Proceedings of Scientific Societies.

ROYAL INSTITUTION.

The Chemical Work of Wöhler.

On Friday the 15th inst., Professor Thorpe delivered a lecture at the Royal Institution upon "The Chemical Work of Wöhler." Remarking upon the training that Wöhler had received, Professor Thorpe said he entered the University of Marburg in 1820, and though it was the wish of his family that he should study medicine, he never attended any regular course of lectures upon chemistry. The following year, however, he published his first paper on selenium, and soon afterwards placed himself under Gmelin at Heidelberg, with whom he remained until the earlier part of 1825, employing the greater part of his time in the study of prussic acid and other cyanogen compounds. Wöhler then went to Stockholm to study under Berzelius, with whom he stayed a few months, learning his modes of manipulation in mineral analysis, and of whose laboratory he gives a graphic description. Whilst in Stockholm he worked especially upon monoxychloride of tungsten, and succeeded in convincing Berzelius that chlorine was a better name than oxidized muriatic acid. He formed a great friendship with Berzelius, and afterwards translated his 'Jahresbericht.' Returning to Germany the same year, he was appointed to the Technical School at Berlin. In 1827 Wöhler succeeded in isolating aluminium, and in the following year he accomplished the synthesis of urea, which revolutionized previous ideas as to organic compounds. In 1829, he investigated the nature of mellitic acid, and his results were published simultaneously with those of Liebig, who had unknowingly worked upon the same subject and arrived at the same conclusions as Wöhler. Soon afterwards Wöhler returned to the study of cyanic acid, whilst about the same time Liebig and Gay-Lussac experimented upon fulminic acid. The results of these investigations showed that these two acids, though widely differing in their properties, had the same composition; this difference was afterwards explained by Wöhler in his treatise on Isomerism. Becoming acquainted with Liebig, he suggested that they should make a joint investigation upon the benzoyl compounds, which work was very completely carried out in 1832. After a lapse of five years Wöhler made another series of experiments, conjointly with Liebig, upon amygdylin and bitter almond oil; and in the following year, 1838, he made his last important investigation with Liebig, upon the nature of uric acid. Wöhler then gradually turned his attention more towards the analysis of mineral bodies, though occasionally he worked with Liebig, as in the investigation of opianic acid, and on the derivatives of cyanic acid and urea, as well as thialdin and selenaldin. In 1850 he experimented upon the cyano-nitrides of titanium, and in 1852 and the three following years he devoted his time to the study of the tellurium compounds with organic radicals. In 1857, he made, with Ste.-Claire Deville, a joint investigation of boron and the nitrides of silicon and titanium, and in the same year discovered hydride of silicon. In 1860, Wöhler accomplished the last of his principal investigations, that of theobromine, the organic base in cocoa. Though little known in England, Wöhler, who was the first chemist that succeeded in effecting the synthesis of organic bodies, had many distinctions conferred upon him by various societies, amongst which was that of the Copley Medal in 1872. Ten years after receiving this medal he died, at Gottenburg, at the age of eighty-two years.

Parliamentary and Law Proceedings.

Supposed Poisoning by a Narcotic.

Mr. Wightman held an inquest on Tuesday last at Park, Sheffield, on the body of Frederick Castle, aged six weeks.

Sarah Ann Castle identified the body as that of her son. He had been a healthy child, with the exception of crying a great deal. A week ago, as the druggist's shop was closed, she went to a grocer named Mr. Wilcock, in South Street, and asked him if he had anything that would "do for the baby," as it was always crying. He said he had some "stuff," and another person had used a great deal of it. Witness then went and procured a bottle and bought a pennyworth. She did not know what it contained, or what it was called, for there was no label on the bottle, but Mr. Wilcock told her to give the child ten drops. She gave the child the "stuff" at 10.30 on Friday night. About 11.30 p.m. she gave deceased some bread, water and sugar, and then went to bed at twelve o'clock, the child appearing to be as usual. When she awoke at 6.30 the next morning, the child was lying with his hands clasped together and his eyes open, and making a noise. She got up at nine o'clock and left the child in bed, and that was the last time she saw it alive. On going upstairs at 11.35 death had taken place.

The coroner's officer produced a bottle containing a few drops of liquid of a brownish colour. Witness said the bottle was that she had fetched the "stuff" in. There was no label upon the bottle.

The Coroner, after smelling at the contents, said that he thought it contained laudanum and paregoric. He should order a *post-mortem* examination to be made. The inquest was then adjourned.

At the adjourned inquest on Wednesday, Mr. Arthur Hallam, surgeon, said he had made a *post-mortem* examination. The deceased appeared to be about six weeks old, and seemed to be fairly well nourished. He found congestion of the lungs and brain. The appearances were consistent with opium poisoning. That was the cause of death, in his opinion. Death had been slow. If the child had had convulsions it would have died rapidly Mr. Hallam went on to say that the child looked as though it had not had any food for ten or twelve hours before its death. He had seen the bottle which containe the mixture purchased by the deceased's mother, and there was a strong smell of laudanum in it. He could not tell what the mixture was, but he perceived a distinct odour of laudanum. The mixture had not been prepared by a qualified medical man.

The Coroner: What would be the effect of ten drops on a child six weeks old?

Mr. Hallam: Well, I know that a fifth of a grain of opium would kill a child three months old, and that is only equal to two drops of laudanum.

The Coroner here read the evidence of the deceased's mother given the previous day and said: Are these symptoms at all consistent with poisoning by opium?

Mr. Hallam: Certainly.

Mr. Thomas Wilcock said he was a grocer at No. 81, South Street, Park. He had known Mrs. Castle and her husband for three years. He remembered her coming to his shop a week ago last Saturday. She brought a child between two and three years of age with her. She said she wanted some infant's mixture for the child which she had with her, and she purchased a quarter of an ounce of the mixture.

The Coroner: Did you tell her how much to give the child?—Yes; I read it from the label on my bottle.

You did not put a label on her bottle?—No.

How much did you tell her to give the child?—I told her about ten drops would be a proper dose.

Witness, continuing, said he got the mixture from Messrs. Davy Brothers, wholesale grocers, and they got it made up by Mr. Lindley, chemist, Sheffield Moor. He did not know that it contained laudanum, and did not ask what it contained. He sold it by what the label on the bottle said.

The Coroner: Does the label on your bottle say poison?

Witness: No, sir. He advised Mrs. Castle to have some of the mixture because he thought it would do the child good.

The Coroner: How could you recommend that mixture when you did not know what it contained?

Witness: I sold it to another woman, and she used a lot of it.

The Coroner: Would you have objected to give the woman any if she told you it was for the baby?

Witness: I do not think I should have objected, but I should have recommended a smaller dose.

The Coroner: I may as well tell you that if you sell that stuff it is your duty to know what it is; and if it contains poison you are bound to put on a label, which label must contain the name of the article, the word "poison," and the name and address of the seller. It does not matter whether you sell it yourself, or whether your apprentice or assistant sells it. If you do not put a label on it, and it is found that there ought to have been one, you are liable to a penalty of £5 for the first conviction and £10 for the second. Ignorance is no excuse. Whatever may be the result of this inquiry, I think you may go from this room with the conviction that you will be prosecuted, and it ought to be a warning to all in a similar position.

Mr. Wilcock's bottle, from which the mixture was taken, was here produced. It bore the following label:—

"Carminative Mixture for Infants.

Children one to three months old					5 to 10 drops
,,	4 ,, 6	,,	,,		10 ,, 20 ,,
,,	8 ,, 12	,,	,,		half a teaspoonful.
,,	13 months to 3 years	,,			one teaspoonful.

H. Lindley, Dispensing Chemist,
57, South Street, Sheffield Moor."

The Coroner: If this bottle contains opium Mr. Lindley is in the same comfortable position as you are. He is liable as well. (To Mrs. Castle): Will you swear that the bottle which you took had no laudanum in it?—Yes, I will. It had only a little brandy in it.

The Coroner: It is just possible that the mixture does not contain laudanum. According to the smell there does not appear to be much doubt that there is some proportion of laudanum in it.

Mr. Hallam recalled, in answer to the Coroner, said that he was of opinion that the few drops of the mixture left in the small bottle were of a similar nature to that in the large bottle.

The Coroner: Can you undertake to swear that the child died from any narcotic at all?

Mr. Hallam: No, I cannot swear; but I can find nothing else to account for death.

The Coroner said he did not feel justified in closing the inquiry without knowing whether there were narcotics in the mixture or not. The contents of the bottle might be harmless, but it was just as much the duty of the jury to find out that as whether they were hurtful.

The inquest was accordingly adjourned until the 3rd of March, to allow of the contents of the bottle being analysed.

Reviews.

Lectures on Practical Pharmacy. By Barnard S. Proctor. Second edition.*

The name of this well-known writer is quite sufficient recommendation for anything he may have to say on practical pharmacy. He has himself worked out the subjects on which he treats, and the reader has before him in these pages the printed results deduced from long experience.

The present volume constitutes a second and enlarged edition, with much careful revision of the original lectures. The text has undergone general correction, and sundry details have been omitted to make way for necessary additions without a too great increase of space.

The value of the book has been enhanced for reference purposes by a copious index, the absence of which was a defect in the manual as first published. We have still the lecture form retained, and the instruction conveyed is more a record of personal observation than an exposition of teaching derived from accredited sources.

Mr. Proctor is especially good when attempting to describe a pharmacopœial process, an illustration of which may be found in the pages devoted to Percolation. "Filtration," says the author, "is the passing of a liquid through a solid, with the view of the solid separating something from the liquid; percolation is the same operation, with the view of the solid imparting something to the liquid." After this definition he proceeds to sketch the manner in which percolation may be applied; the precautions indispensable to success when operating on various substances; approved forms of apparatus and the importance of intelligent packing.

Probably the degree of attention to this last point accounts for the discrepancy of opinion entertained by experimenters as to the value of the process.

Turning to quite a different subject, the unguentum hydrargyri nitratis, one is relieved to find that that interminable question is not made an excuse for an essay, and we thoroughly agree with the writer when he states:—"There has been much stated about the difficulty of making a good nitrate of mercury ointment, and a great number of formulæ have been suggested. There need not, however, be any deviation either from the ingredients or the mode of operating directed in the British Pharmacopœia." When once official authority had sanctioned the proportions of mercury and nitric acid which had long been used in private laboratories, no further change was requisite.

Following Mr. Proctor behind the dispensing counter, those who themselves are practically versed in compounding medicines will recognize in the lecturer a safe guide for others who are anxious to learn the art and mystery of dispensing.

We miss indeed certains excellent excipients for pill masses of difficult combination, and each pharmacist of any standing would be able to suggest minor improvements; but a general exposition of the subject is given, sufficient to direct the student in all material points; and we have no intention of blaming the writer of a book for being unable to supply that peculiar knowledge which personal and actual manipulation can alone supply.

The same remark applies to the series of autograph prescriptions, which gave so distinct a character to these lectures on their first appearance.

The selection (thirty-two in number) is soon exhausted, and may be taken rather as a sign-post to indicate the path to the traveller than as a guide-book to direct his steps. The facsimiles are now relegated to the end of the volume at the conclusion of the text in order that the student may not be tempted to read the commentary

* London: J, and A. Churchill. Demy 8vo. Pp. i.–xvi., 1–493. With 32 plates. 12s.

before having made a fair effort to decipher the handwriting of the formulæ.

In example No. 28 a doubt rests on the reading of an ingredient which looks much like infus. diosmæ. It was so read by Mr. Proctor:—"I felt no hesitation in reading the infusion as diosma, though the patient said it was not the same as he had previously. Infus. quassiæ seems next in order of probability." Since the appearance of this facsimile several pharmacists in Buxton assured the author that they were familiar with the handwriting and the custom of the writer, and that the infusion was undoubtedly quassia. We felt, in 1873, no more hesitation than Mr. Proctor; and we would venture to express regret that a member of the profession should have the custom to write one thing and to mean another.

With this brief notice we must leave the lectures on practical pharmacy, stating only that the pharmacy of special drugs has been considerably enlarged, and that there is a new chapter entitled "Supplementary Notes on Pharmaceutical Testing.

We cordially commend the volume, and consider it indispensable to the rising pharmacist. It is now ten years since Mr. Proctor came before the public as the author of a treatise which was then most favourably received, and the present issue bears marks throughout of the maturer judgment and larger experience of the author.

CHEMISTRY: GENERAL, MEDICAL, AND PHARMACEUTICAL, INCLUDING THE CHEMISTRY OF THE U.S. PHARMACOPŒIA. By JOHN ATTFIELD, F.R.S., etc.* Tenth Edition. Specially Revised by the Author for America.

This Manual of the general principles of chemical science and their applications in medicine and pharmacy is too well known in this country to need any description or criticism. The work is almost as popular in the United States, where indeed it probably is more widely used by pharmaceutical students than any other text-book on chemistry. The present is, we believe, the fourth edition that has been prepared with special reference to the United States Pharmacopœia, and has been thoroughly revised so as to cover the widely extended area and the altered conditions of the last edition of that work. Although the typographical arrangemeet is not, in our opinion, so hel; ful to the eye as that in the English edition, in respect to the paper, printing and binding, the American book is far superior, and reflects especial credit upon the publishers.

Correspondence.

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

THE PHARMACEUTICAL SOCIETY.

Sir,—I have read, with feelings of amazement almost, the letter in last week's Journal on the above subject, signed "W. Wilkinson," and I should like to say a few words in reply. I cannot believe that Mr. Wilkinson will be very much gratified at seeing his strong effusion in print, notwithstanding that he expresses a wish that it should be printed. Surely he might be a little more charitable in his mode of expressing his "disgust," for, as you say, such strong language as he uses only tends to minimize the efficiency of the Pharmaceutical Society as a representative body. I am quite of the opinion that the registered chemist, in however small a way of business, should be on an equality with men in a larger way, and that no co-operative store should be allowed to deal in poisons.

But I think if instead of writing so strongly Mr. Wilkinson would show a little more loyalty to the Pharmaceutical Society, to which I presume he belongs, and, if he chooses, only vote for those members of the Council who pledge themselves to use their influence to restrain co-operative stores from dealing in poisons at all, he would be much more likely to gain the sympathy of his brother chemists. I trust some one more able than myself will reply to Mr. Wilkinson, but I hope he will forgive me if I advise him to be more considerate in his denunciations and just in his criticisms, and also lend a helping hand at any time he can do so to the Society; he will thus be far more likely to further the objects of the Pharmaceutical Society and the interests of pharmacy, which I trust he has at heart.

Stoke Ferry. W. H. NEWSAM.

Sir,—Mr. W. Wilkinson is scarcely fair to the Pharmaceutical Society. Surely it is not their fault if the House of Lords pronounced an insane decision *re* "limited companies," a decision that may be law, but assuredly is not common sense, and, if legal, the state of the law cries loudly for alteration.

Certainly the remarks about juries, however, seem remarkably tame! Why go cap in hand, when the law for once is distinctly on the pharmaceutical chemists' side.

Again, *re* sale of poisons. Why should not every chemist adhere strictly to the letter of the law, and then sell in accordance with it, and resent the expression of every insulting coroner, who demands, as is not unusual, more caution than the law compels? This might help in passing more wholesome and stringent protective laws.

It is useless for Mr. W. Wilkinson to clamour for protection for chemists direct. It can only be obtained indirectly by pleading and proving the necessity for the safety of the public.

Does Mr. W. Wilkinson, moreover, wish the "poor beggar" to compete with him without qualification?

A CHEMIST.

Sir,—I do not quite perceive which you consider the "weakest link of the chain" in my letter, nor what you mean by its serving "to illustrate one of the influences which tend to minimize the efficiency of the Pharmaceutical Society as a representative body," unless you agree with what I have written.

I can only say that it was the expression of a feeling that prevails very widely both amongst the members and the trade outside, and could you read the expressions of sympathy and approval I have received since its publication you might perhaps come round to the opinion that the efficiency of the Pharmaceutical Society would be very much increased by a more vigorous policy.

Cheetham Hill, Manchester. W. WILKINSON.

"*Detective*."—In order to make your caution of any service our statements would have to be more precise than we could venture to make them with our present knowledge of the facts. In this and all similar cases application of the adage "*caveat emptor*" is the only real safeguard.

T. and T.—The gelatine capping is made by adding to seven pounds of light coloured glue ten ounces of glycerine and three pints of water. When the glycerine and water have been absorbed by the glue the whole is placed in a water-bath and the pigment added. See papers in *Pharm. Journ.*, [2], vii., 448 and 511.

W. D.—We cannot advise you; consult your solicitors.

W. T. Frost.—Apply to the Secretary for a copy of the pamphlet 'Hints to Apprentices and Students.'

Fritz.—(1) Any person may extract teeth, but only a registered person can legally represent himself to be a dentist. (2) The labels approach the limits very closely, if they do not transgress. It would be better to submit them to the Inland Revenue authorities.

Mr. Ward is thanked for his communication.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Fletcher, Cruickshank, Corry, Pring, A. K. F., W. R. F., F. J. F., Dispenser.

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* Philadelphia: Henry Lea's Son and Co. 1883. 12mo. Pp. i.-xvi., 1-727.

LOCAL LIST OF SUBSCRIPTIONS

TO THE

BENEVOLENT FUND

RECEIVED DURING 1883.

	£	s.	d.
Aberaman.			
Sims, William	0	5	0
Aberayron.			
Jones, John Price	0	2	6
Aberdare.			
Jones, D. W.	0	5	0
Smith, Morgan	0	2	6
Aberdeen.			
Broomhead, George E.	0	10	6
Coutts, Charles	0	5	0
Cruickshank, Geo. P.	0	5	0
Davidson, Charles	1	1	0
Giles, William	0	5	0
Glover, W. K.	0	2	6
Gordon, William	0	5	0
Johnston, John	0	5	0
Kay, James P.	0	5	0
Kemp, James	0	10	6
Paterson and Sons	0	10	6
Presslie, R. D.	0	5	0
Reid, David	0	5	0
Shepherd, James	0	10	0
Sinclair, William	0	10	0
Strachan, Alexander	0	5	0
Aberfeldy.			
Macnaughton, H. B.	1	1	0
Abergavenny.			
Shackleton, G. W.	0	2	6
Abergele.			
Hannah, John	0	5	0
Lloyd, Edward	0	5	0
Aberystwith.			
Davies, David J.	0	5	0
Ellis, Robert	0	2	6
Thomas, John	0	5	0
Wynne, Edward P.	0	10	6
Abingdon.			
Preston, Alfred P.	0	5	0
Smith, William	0	5	0
Smith, William F.	0	5	0
Aboyne.			
Petrie, James J.	0	5	0
Abridge.			
Windus, Arthur E.	0	5	0
Accra (West Coast of Africa).			
Jones, Thomas	2	5	4
Accrington.			
Stanley, Thomas	0	2	6
Addiscombe.			
Townsend, Charles	0	10	6
Alcester.			
Adcock, Isaac Dickson	0	10	6
Overbury, Henry	0	5	0
Ratherham, William	0	5	0
Aldershot.			
Williams, James	0	10	6
Alexandria, N.B.			
McFarlane, Peter	0	5	0
Alfreton.			
Robinson, Joseph S.	0	10	6
Alnwick.			
Newbigin, James L.	0	10	6
Newbigin, Lesslie	0	5	0

	£	s.	d.
Alresford.			
Connor, Thomas H.	0	5	0
Richardson, J. H.	0	2	6
Ambleside.			
Bell, Thomas	0	10	6
Herd, Henry W.	0	2	6
Ampthill.			
Allen, George	1	1	0
Brown, James	0	10	6
Andover.			
Gould, Robert G.	0	10	6
Angmering.			
Freeland, Alonzo J.	0	2	6
Freeland, H. W.	0	2	6
Annan.			
Rae, Robert S.	0	10	6
Appleby.			
McCounal, A.	0	5	0
Arbroath.			
Burn, David H.	0	5	0
Ashbourne.			
Bradley, Edwin Sylvester	0	10	6
Greaves, Frederick W.	0	5	0
Osborne, James	0	5	0
Reckless, A. H.	0	10	6
Ashby-de-la-Zouch.			
Bullen, George W.	1	1	0
Ashford (Kent).			
Ingall, Joseph	1	1	0
Stedman, William	0	5	0
White, Charles Thomas	0	5	0
Ashton-under-Lyne.			
Arnfield, John C.	0	5	0
Bellfield, William	0	5	0
Bostock, William	0	10	6
Heap, Henry	0	5	0
Knott, E.	0	2	6
Neal, S.	0	2	6
Phillips, John J.	0	5	0
Thatcher, Thomas	0	2	6
Waterhouse, Jabez	0	10	6
Wilson, Samuel	0	2	6
Ashwell.			
Skelton, J. H.	0	5	0
Atherstone.			
Orme, William	0	10	6
Atherton.			
Fletcher, Ellis	0	5	0
Heywood, John H.	0	5	0
Auchterarder.			
Cairnie, Robert	0	2	6
Aylesbury.			
Dickins, Rowland	0	5	0
Palmer, Edwin T.	0	5	0
Turner, John	0	5	0
Badsworth (near Pontefract).			
Heald, Samuel H.	0	10	6
Bakewell.			
Carrington, Edward G.	0	5	0
Thompson, John	0	5	0
Baldock.			
Bally, Edward F.	0	5	0

	£	s.	d.
Banbury.			
Ball, George V.	1	1	0
Bartlett, H.	0	5	0
Gilkes, W. P.	0	10	6
Watts, W.	0	5	0
Banchory.			
Lunan, Alexander	0	5	0
Bangor.			
Baker, Henry V.	0	10	6
Jones, H. L.	0	5	0
Jones, Owen	0	5	0
Roberts, Meshach	1	1	0
Webster, Thomas	0	5	0
Barnard Castle.			
Martin, C. B.	0	5	0
Barnstaple.			
Goss, Samuel	0	5	0
Partridge, James	0	5	0
Pratt, Edward	0	5	0
Symons, William	0	5	0
Barrow-in-Furness.			
Sansom, E.	0	5	0
Barton-on-Humber.			
Ingoldby, William	0	2	6
Smith, Richard F.	0	5	0
Basingstoke.			
Sapp, Aikas	0	10	6
Woodman, George	0	5	0
Bath.			
Bird, F. C. J.	0	2	6
Bright, William	0	5	0
Capper, Edmund	0	5	0
Clarke, B. G.	0	2	6
Commans, Robert D.	0	10	6
Dunn, Richard	0	10	0
Ekin and Appleby	0	10	6
Goodman, D. H.	0	5	0
Griffin, Alfred W.	0	10	6
Hillier, Henry	0	10	6
Marsh, John H.	0	10	6
Masters, Henry James	0	5	0
Merrikin, John B.	0	10	6
Pinch, James E.	0	5	0
Rickwood, Henry	1	1	0
Thomas, Henry J.	0	10	6
Thring, Edmund J. H.	0	10	6
Tilsley, George	0	10	6
Toone, Joseph V.	0	10	6
Vigis, Joseph L.	0	10	6
Williams, Sophia	0	10	6
Wilson, Joseph	0	5	0
Batley.			
Fryer, John (Batley Carr)	0	10	6
Parrington, William	0	5	0
Battle.			
Lemmon, Eric (Hooe)	0	5	0
Beaumaris.			
Slater, John	0	10	6
Bedale.			
Swinbank, J.	0	5	0
Bedford.			
Anthony and Biss	0	10	0
Cameron, William Alexander	0	5	0
Clifford, R. N.	0	5	0
Corrie, A. A.	0	1	0
Corrie, Isabella A.	0	5	0

Bedford—continued.	£	s.	d.
Cuthbert, J. M.	0	5	0
Ekins, John	0	10	6
Hester, Charles	0	5	0
Jones, George	0	5	0
Norman, Joseph S.	0	5	0
Taylor, J. B.	0	5	0
Thompson, H.	0	5	0
Bedford, Leigh.			
Haddock, James	0	5	0
Bedlington.			
Foggan, George	0	5	0
Belfast.			
Green, Thomas	0	5	0
Yoxall, Henry	0	5	0
Belper.			
Bowler, William Samuel	0	2	6
Burkinshaw, W. T.	0	5	0
Calvert, James	0	5	0
Hicking, Joseph	0	2	6
Belvedere.			
Miles, George	0	5	0
Berkeley.			
Bell, Edward Collinson	0	10	6
Berkhamsted.			
Bosher, Alexander	0	2	6
Rippon, R. O.	1	1	0
Berwick.			
Carr, Walter P.	0	5	0
Lyle, William	0	2	6
Beverley.			
James, Kirby	0	10	0
Sheffield, Arthur J.	0	5	0
Bexley Heath.			
Mason, Alfred J.	0	5	0
Bicester.			
Sandiland, R. B.	0	10	6
Bideford.			
Hogg, Thomas	0	5	0
Biggar.			
Eunson, John	0	2	6
Biggleswade.			
Spong, D. M.	0	5	0
Bilston.			
Kearnes, Robert H.	0	5	0
Bingham.			
Doubleday, Frederick	0	5	0
Bingley.			
Skirrow, William E.	0	10	6
Slicer, Walter	0	7	6
Birkenhead.			
Ambler, Thomas	0	5	0
Barber, George	0	10	6
Burroughs, George H.	0	10	6
Dutton, H. O.	0	10	0
Field, H. E.	0	5	0
Fore, Thomas	0	5	0
Foulkes, William James	1	1	0
James, Thomas C.	0	5	0
Mullock, Richard	0	10	6
Nicholson, Henry	0	10	6
Stewart, Alexander	0	10	6
Stewart, John	0	10	6
Wilkinson, Samuel	0	5	0
Birmingham.			
Adams, William	0	2	6
Bagshaw, Henry B.	0	10	6
Barker, Thomas	0	10	6
Bird, Alfred	1	1	0
Bradley, T.	0	5	0
Cattell, John T.	0	2	6
Cattell, Thomas B.	0	2	6
Chase, Thomas, jun.	1	1	0
Churchill, Walter J.	1	1	0
Clayton, Francis Corder	1	1	0
Cornforth, Edwin	0	2	6
Drew, John	0	5	0
Foster, Alfred H.	0	5	0
Foster, James Alfred	0	5	0
Frobisher, Frederick	0	5	0
Greatrex, Henry	0	10	6
Holdsworth, Thomas W.	0	10	6
Jacombs, W. H.	0	5	0

Birmingham—continued.	£	s.	d.
Jones, G. M.	0	5	0
Lucas, Joseph	0	10	6
Mantell, Charles	0	10	6
Mantell, Charles, jun.	0	10	6
Midland Counties Chemists' Association	5	5	0
Mott, John C.	0	5	0
Naish, C. E.	0	10	6
Pegg, Herbert	1	1	0
Perry, George E.	0	5	0
Perry, William Henry	0	5	0
Snape and Son	0	10	6
Southall Bros. and Barclay	2	2	0
Thomason, Thomas W.	0	2	6
Thompson, William	0	5	0
Turner, Benjamin	0	2	6
Wakefield, John	1	1	0
Weaver, T.	0	5	0
Wilcox, George	0	10	6
Bishop Auckland.			
Dobinson, Thomas	0	5	0
Harburn, Alfred	0	5	0
Townsend, Thomas F.	0	5	0
Bishop Stortford.			
Hardy, John	0	5	0
Speechly, George	0	10	6
Bishop's Castle.			
Bills, Martha Cam	0	10	6
Blackburn.			
Booth, James	0	10	0
Butterfield, William	0	5	6
Clayton, John W.	0	10	6
Critchley T.	0	10	0
Farnworth, William	1	1	0
Garland, A. P.	0	5	0
Hindle, James	0	2	6
Paffard, Frank	0	10	6
Blandford.			
Groves, Mrs. W. E.	1	1	0
Groves, Richard H.	1	1	0
Bodmin.			
Williams, Joel D.	1	1	0
Bognor.			
Long, Alfred T.	0	10	6
Bolsover.			
Thornley, Thomas	0	5	0
Bolton.			
Blain, Alfred Lucas	0	5	0
Blain, William	0	10	6
Forbes, James W.	0	10	6
Hart, James	0	10	6
Mather, James	0	10	6
Bo'ness (N.B.).			
Tweedie, Alexander	0	10	6
Bonnyrigg.			
Hutcheon, W.	0	5	0
Boston (Lincs).			
Allen, Thompson	0	5	0
Cammack, John	0	5	0
Elkington, W. A.	0	2	6
Grimble, Albert	0	5	0
Haller, F. W.	0	5	0
Lawrence, George R.	0	5	0
Lewin, Edward C.	0	5	0
Pilley, Henry T.	0	10	6
Pilley, Samuel	0	10	6
Boulogne (France).			
Parsons, J. Vincett	0	5	0
Bourne (Lincs).			
Mills, Robert M.	0	10	6
Bournemouth.			
Allen, Frederick C.	0	2	6
Atkins, John	0	5	0
Beale, J. H. T.	0	5	0
Callaway, L.	0	10	6
Dobell, Dr. Horace	1	1	0
Duncan, Alexander	1	1	0
Endle, Frederick	0	5	0
Gilbert, William	0	5	0
Hardwick, Stewart	0	10	6
Hazard, James D.	0	5	0
Newbury, Samuel	0	5	0
Shipman, John J.	0	2	6
Spinney, Frank	0	10	6
Taylor, George	0	2	6
Worth, Edwin	1	1	0

Bourton-on-the-Water.	£	s.	d.
Griffin, Henry S.	0	10	6
Bovey Tracey.			
Selleck, W. R.	0	5	0
Bowness-on-Windermere.			
Birkett, Charles	0	5	0
Bradford (Yorks).			
Beanland, Samuel	0	5	0
Blackburn, Bailey	2	2	0
Butterworth, Albert	0	10	6
Cocker, Justus J.	0	5	0
Harrison, Parkinson and Co.	2	2	0
Lister, Simeon (Great Horton)	0	10	6
Pumphrey, Arthur	0	2	6
Rimmington and Sons	1	1	0
Rogerson and Son	2	2	0
Stephenson, Robert	0	5	0
Tempest, Joseph	0	5	0
Watts, John	0	10	6
Bradford-on-Avon.			
Cooper, Albert H.	0	10	6
Braintree.			
Row, George C.	0	2	6
Tarzewell, R.	0	5	0
Brampton.			
Younger and Ridley	0	5	0
Braughing.			
Franklyn, Thomas	0	5	0
Brecon.			
Meredith, John	0	10	0
Bridgend.			
Jenkins, D.	0	5	0
Lloyd, John	0	5	0
Williams, M. (Pencoed)	0	5	0
Bridgnorth.			
Hughes, Hubert	0	5	0
Steward, William	0	10	6
Bridgwater.			
Basker, J. A.	0	5	0
Woodward, John L. L.	0	5	0
Bridlington.			
Jackson, Henry J.	0	5	0
Woodliffe, Alfred	0	2	6
Wrack, F. G.	0	2	6
Bridlington Quay.			
Dickins, Mary	0	5	0
Bridport.			
Beach and Barnicott	1	1	0
Beach, James	0	10	6
Jones, Frederick	0	2	6
Brightlingsea.			
Cooper, George B.	0	5	0
Brighton.			
Adams, Frank	0	10	6
Arnold, J.	0	2	6
Barton, Charles	0	10	6
Barton, Henry	0	10	6
Bullen, Thomas	0	10	6
Chambers, Herbert	0	2	6
Chaplin, T. W.	0	5	0
Chapman, F.	0	2	6
Cornish, William	0	5	0
Cox, Arthur H.	1	1	0
Edwards, J.	0	5	0
Else, William	0	10	6
Gibson, W. H.	0	5	0
Glaisyer, Thomas	0	10	6
Grinstead, J.	0	5	0
Guy, Frederick	0	10	6
Gwatkin, James Ross	0	10	6
Hardcastle, S. B.	0	10	6
Harris, E. R.	0	5	0
Hickley, G.	0	10	6
Hornsby, George G.	0	10	6
Jeeves, Thomas	0	10	6
Leigh, Marshall	0	10	6
Long, Henry	0	10	6
Manley, W. F.	0	10	6
Metherell, K.	1	1	0
Padwick, John	0	10	6
Pears, Kilby	0	10	6
Perress, J. C.	0	5	0
Roberts, A. T.	0	5	0
Robson, Thomas	0	10	6
Salmon, E. F.	0	5	0
Salmon, F. W.	0	10	6

Brighton—continued.

	£	s.	d.
Savage and Son	1	1	0
Smith, B.	0	5	0
Smith, Walter Henry	1	1	0
Smithson, J.	0	10	6
Vizer, Edwin B.	1	1	0
Walmsley, Robert	0	5	0
Watts, Charles C.	0	10	6

Brill (Bucks).

Tottenham and Holmes	0	10	6

Bristol.

Ackerman, Henry	0	10	6
Ackerman, Theophilus	1	1	0
Allen, Benjamin	0	5	0
Bamfield, John	0	5	0
Barton, J. B. (Kingswood)	0	5	0
Bennett, Joseph	0	5	0
Berry, William	0	10	6
Boucher, John	0	10	6
Bramald, F. D.	0	5	0
Butler, Samuel	1	1	0
Cuff, Robert C.	0	5	0
Dibble, J. W.	0	10	6
Freestone, R. H.	0	5	0
Freestone, Thomas M.	0	10	6
Hatch, Richard M.	1	1	0
Hodder, Henry	0	10	6
Howell, Henry	0	5	0
Jennings, Thomas H.	0	5	0
Jones, William W.	1	1	0
Latrobe, Henry	0	5	0
Llewellyn, David	0	2	6
Long, John T.	0	10	6
Moore, J. E.	0	10	6
Newcombe, Robert	0	2	6
Newcombe, William L.	0	2	6
Newman, Robert	0	10	6
Palmer, Frank T.	0	2	6
Pitman, John	1	1	0
Plumley, James G.	0	5	0
Schacht, G. F.	1	1	0
Spill, Thomas	0	10	6
Stroud, John	1	1	0
Towerzey, Alexander	0	10	6
Townsend, Charles	1	1	0
Troake, R. J.	0	10	6
Wade, Thomas T.	0	2	6
Watson, E. M.	1	1	0
Weeks, Albert J. J.	1	1	0
White, James W.	0	10	6
Wretts, John R.	0	10	6

Briton Ferry.

Jones, Morgan H.	0	5	0
Olive, W. T.	0	5	0

Bromley (Kent).

Goulden, Herbert	0	5	0
Shillcock, George	0	5	0
Shillcock, Joseph B.	0	10	6
Skinner, Richard	0	5	0

Broseley.

Norton, Thomas	0	5	0

Brynmawr.

Evans, Alfred E.	0	5	0
Jones, Alfred M.	0	10	6

Buckingham.

Kingerlee, George	0	10	6

Burgess Hill.

Kemp, John	0	10	6

Burnham (Bucks).

Heald, Alfred	0	10	6

Burnham (Essex).

Ellis, William	0	5	0

Burnham Market.

Spencer, William Henry	0	5	0

Burnley.

Barlow, Joseph A.	0	2	6
Cowgill, Brian H.	0	10	6
Evans, Thomas	0	5	0
Foster, George	0	5	0
Francis, Charles E.	0	5	0
Heaton, Martha	0	2	6
Hitchin, Robert	0	5	0
Holden, John	0	2	6
Munn, Robert	0	5	0
Parkinson, J.	0	5	0

Burnley—continued

	£	s.	d.
Parkinson, William	0	5	0
Smith, James Jeremiah	0	2	6
Walker, Sandford	0	5	0
Wilks, Maurice	0	2	6
Wright, John W.	0	5	0

Burntisland.

Gilmour, Andrew	0	5	0

Burslem.

Blackshaw Thomas	0	10	6
Guest, George C.	0	2	6
Leicester, Thomas	0	10	6
Oldham, William	0	10	6
Wardle, Thomas	0	2	6

Burton-on-Trent.

Oftey, Thomas	0	5	0
Wright, George	0	10	6

Bury.

Bowker, Ellis	0	10	6
Clifton, George F.	0	2	6
Crompton, Alfred	0	5	0
Meadowcroft, James	0	2	6
Wood, Warwick	0	2	6

Bury St. Edmunds.

Allan, Henry	0	5	0
Brain, F. G.	0	2	6
Count, Sidney	0	2	6
Crassweller, W. E.	0	5	0
Floyd, James	0	5	0
Gross, William	0	2	6
Hardwick, J. E.	0	5	0
Kirkham, Thomas	0	2	6
Last, A. J.	0	2	6
Portway, John	0	2	6
Summers, Frank	0	5	0
Summers, Thos. D.	0	5	0
Youngman, Edward	0	2	6

Buxton (Derbyshire).

Thresh, Arthur	0	5	0
Thresh, John C.	1	1	0

Caistor.

Levick, George A.	0	4	0

Cambridge.

Beall, George	0	5	0
Beall, Samuel S.	0	5	0
Bull, E. J.	0	5	0
Deck, Arthur	0	10	0
Field, Ebenezer	0	5	0
Gillett, C.	0	5	0
Greenwood, Dennis	0	5	0
Hoare, W. P	0	5	0
Lawrence, A. F.	0	2	6
Pain, Walter E.	0	5	0
Throssel, John	0	5	0
Yeomans, John	0	5	0

Canterbury.

Amos, Daniel	0	10	6
Biggleston, E. R.	0	5	0
Bing, Edwin	0	10	6
Harris, F. R.	0	10	6
Thomas, James (Bridge)	0	5	0

Canton (China).

Brunt, G. H.	0	10	6

Cardiff.

Anthony, David	0	5	0
Coleman, Alfred	0	5	0
Coleman, E. J.	0	10	6
Collier, J. A.	0	5	0
Davies, Ifor	0	5	0
Drane, Robert	0	10	6
Furnival, William	0	5	0
Greaves, John	0	5	0
Hagon, Albert	0	5	0
Hicks, W. T.	0	5	0
Howell, Thomas	0	5	0
Jones, D. A.	0	2	6
Jones, J. A.	0	5	0
Jones, John T.	0	5	0
Joy, F. J. J.	0	5	0
Lloyd, David	0	5	0
Mumford, Richard	0	5	0
Munday, John	0	5	0
Phillips, John	0	2	6
Prust, Richard	0	5	0
Robb, John	0	5	0
Roberts, William (Pontlottyn)	0	2	6
Williams, Thomas	0	10	6
Williamson, J. E.	0	5	0
Yorarth, T. B.	0	5	0

Carlisle.

	£	s.	d.
Bell, John	0	5	0
Fisher, Catherine Hodgson	0	5	0
Foster, James	0	5	0
Hallaway, John	0	5	0
Parker, Edward J.	0	5	0
Parker, William	0	5	0
Richardson, Thomas J.	0	2	6
Robson, John	0	5	0
Thompson, Andrew	0	10	6
Todd, Joe	0	5	0

Carluke.

Hinksman, John	0	5	0

Carmarthen.

Davies, Richard Morgan	0	5	0
Smith, John H.	0	5	0

Carnarvon.

Jones, John	0	5	0
Lloyd, William	0	5	0

Carshalton.

Carter, Francis	0	10	6

Castle Douglas.

Veitch, A.	0	5	0

Castle Hedingham.

Foulsham, H. B.	0	5	0

Chapel Allerton.

Saville, William	0	5	0

Chard.

Churchouse, W. B.	0	5	0
Woodland, W. F.	0	5	0

Charlestown-of-Aberlour.

Smith, John	0	2	6

Chatham.

Crofts, Holmes C.	0	10	6
French, Miss	0	10	6
Lamb, Thomas C.	0	5	0
Thompson, George Alfred	0	5	0
Tribe, John	0	10	6

Chatteris.

Langman, Peter	0	2	6

Chelmsford.

Baker, Gerrad	0	10	6
Metcalfe, Wilson	0	10	6
Tomlinson, James	0	10	6

Cheltenham.

Balcomb, John	0	10	6
Barron, William	0	10	6
Beetham, M.	0	10	6
Board, Thomas F.	0	5	0
Butcher, Thomas	1	1	0
Dolman, William	0	5	0
Dunn, Geo. S.	0	2	6
Fletcher and Palmer	1	1	0
Flooks, George	0	5	0
Godsell, Philip G.	0	5	0
Hands, William	0	5	0
James, Joseph	0	5	0
Jeffrey, Thomas A.	0	10	6
Klte, W. T.	0	5	0
Macdonald, E.	0	2	6
Mansbridge, M. C.	0	10	0
Milne, Alexander	0	2	6
Moore, Edward	0	2	6
Pattison, Thomas	0	10	6
Power, J. H.	0	5	0
Prockter and Forth	1	1	0
Purnell, Henry A.	0	5	0
Seys, Frederick A.	0	2	6
Shaw, Alexander H.	1	1	0
Smith, Nathaniel and Co.	1	1	0
Smith, William H.	0	5	0
Thompson, Thomas L.	0	2	6
Tudor, William	0	5	0
Walters, John	0	10	0
Wilkins, Henry	0	5	0
Wilson, John S.	0	5	0
Wood, Frederick	0	5	0
Woodward, Solomon	0	10	6

Chepstow.

Tame, Thomas	0	5	0

Chertsey.

Boyce, George	0	5	0

Chesham.

Mackaness, Charles	0	10	6

	£	s.	d.
Chester.			
Baxter, George	0	10	6
Grindley and Son	0	10	6
Guy, John (Boughton)	0	5	0
Hodges, William	0	10	6
Hope, John	0	5	0
Huke, James W.	0	5	0
Mills, John	0	5	0
Shrubsole, G. W.	0	5	0
Chesterfield.			
Barfoot, J. R. D.	0	2	6
Booth, George	0	10	6
Elliott, Thomas	0	5	0
Furness, Thomas	0	2	6
Greaves, A. W.	0	5	0
Greaves, Wm. S.	0	10	6
Lancaster, Wm. G.	0	5	0
Lowe, A.	0	5	0
Sampson, George	0	2	6
Windle, John T	0	5	0
Chester-le-Street.			
Longbotham, Joseph	0	5	0
Greenwell, Richard Henry	0	10	6
Chew-Magna.			
Milton, Thomas	0	5	0
Chichester.			
Baker and Son	0	10	6
Batchelor, C. J. H.	0	5	0
Ellidge, John W.	0	10	6
Chippenham.			
Coles, John C.	0	10	6
Turpin, A. B.	0	5	0
Chipping Ongar.			
Chapman, Richard J.	0	10	6
Ward, David	0	10	6
Chipping Sodbury.			
Jones, Richard	0	10	6
Chislehurst.			
Scrase, Richard	0	5	0
Wing, Lewis	0	10	6
Chorley.			
Hill, William	0	5	0
Christchurch.			
Green, John	0	5	0
Chulmleigh.			
Joint, Robert James	0	6	0
Cirencester.			
Griffiths, Waldron	0	10	6
Kinch, Edward	0	10	6
Smith, Charles S.	1	1	0
Claycross.			
Lloyd, Robert	0	10	6
Smith, John	0	5	0
Clevedon.			
Evans, Evan J.	0	5	0
Stewart, James	0	10	6
Clun.			
Darroll, William	0	10	6
Cockermouth.			
Bowerbank, Joseph	1	1	0
Brown, R. F.	0	2	6
Cooper Brothers	0	2	6
Robinson, William	0	5	0
Straughton, Joseph	0	2	6
Codnor (near Derby).			
Farnsworth, Thomas	0	5	0
Colchester.			
Bates, Thomas W.	0	5	0
Cole, Fred A.	0	5	0
Cordley, W. B.	0	5	0
Hammerton, Edward	0	5	0
Prosser, Mrs.	0	5	0
Shenstone, J. C.	0	5	0
Simpson, Hales	0	5	0
Weddell, Arthur	0	5	0
Colombo (Ceylon).			
Davidson, P.	0	5	0
Congleton.			
Cole, Frederick	0	5	0
Goode, Charles	0	5	0
Connah's Quay.			
Jones, Kendrick L.	0	2	6
Corris.			
Thomas, Maurice	0	5	0
Corwen.			
Jones, William	0	10	6
Coventry.			
Bird, Frederick	0	5	0
Brown, John	0	2	6
Clarke, William	0	2	6
Foote, A. H.	0	2	6
Glover, Henry	0	2	6
Hinds, James	0	10	6
Loveitt, Thomas	0	2	6
Marston, James	0	2	6
Mason, D.	0	2	6
Newton, Alfred H.	0	2	6
Sellors, Thomas	0	2	6
Summer, James	0	10	6
Wyleys and Co.	1	1	0
Cowbridge.			
Thomas, John	0	5	0
Cowes (Isle of Wight).			
Beavan, George A.	0	10	6
Fennings, Alfred	1	0	0
Cradley Heath.			
Bishop and Wooldridge	0	10	6
Cranbrook.			
Turner, John	0	5	0
Crawley.			
Leach, John	0	5	0
Webb, W. J.	0	5	0
Weedon, Joseph	0	5	0
Crediton.			
Jackson, William	1	1	0
Crewe.			
Bayley, William	0	10	0
Harrop, William H.	0	5	0
Crewkerne.			
Catford, O. W.	0	5	0
Criccieth.			
Bowen, Joseph W.	0	2	6
Cromer.			
Priest, Edward R.	0	10	6
Croydon.			
Andrews, J. W.	0	5	0
Barritt, George	0	10	6
Clarke, Josiah	0	10	6
Harwood, Charles	0	5	0
Hayward, George	0	10	0
Long, Henry	0	10	6
Padwick, W. G.	0	5	0
Roberts, D. P.	0	10	6
Stannard, Frederick John	0	10	6
Cullen, N.B.			
Seivwright, George	0	5	0
Dalton-in-Furness.			
Preston, William L.	0	5	0
Darlington.			
Best, George	0	5	0
Best, J. W.	0	5	0
Coatsworth, Thomas	0	5	0
Cranston, John	0	5	0
Nicholson, Richard	0	5	0
Raw, James H.	0	5	0
Robinson, James	0	5	0
Swenden, James	1	1	0
Walton, Frederick G.	0	2	6
Dartford.			
Cottingham, Joseph J.	0	5	0
Wilson, R. E.	0	5	0
Dartmouth.			
Humphrey, Horatio	0	10	6
Rees, William H.	0	5	0
Deal.			
Green, John	0	10	6
Denbigh.			
Edwards, William	0	5	0
Denton (Lancs).			
Arrandale, William	0	10	6
Derby.			
Bishop, E. J.	0	2	6
Blunt, W. B.	0	5	0
Clifton, Frederick	0	10	6
Cope, J. A.	0	5	0
Dickinson, David	0	2	6
Frost, George	0	10	6
Goodall, Henry	0	5	0
Monkhouse, Henry	0	5	0
Nicklinson, Thomas	0	5	0
Scholes, James S.	0	5	0
Stevenson, Richard W.	0	5	0
Devizes.			
Clark, Robert	0	10	6
Edwards, T. R.	0	2	6
Devonport.			
Codd, Francis	0	5	0
Kent, B. J.	0	5	0
Lamble, John A.	0	2	6
Dewsbury.			
Walker, George	0	5	0
Didcot (Berks).			
Sadgrove, Arthur A.	0	5	0
Didsbury.			
Bates, John F.	0	5	0
Richardson, Allen	0	5	0
Diss.			
Cadge, John	0	5	0
Cupiss, Francis	0	10	6
Gostling, T. P.	0	10	6
Gostling, W. A.	0	10	6
Humphries, C. J.	0	5	0
Muskett, Charles	0	5	0
Thrower, Edward A.	0	10	6
Whitrod, H. F.	0	5	0
Doncaster.			
Atkinson, Stephen (Arksey)	0	10	6
Cooper, C. C. Cocking	0	5	0
Dunhill and Stiles	1	1	0
Hasselby, Thomas J.	0	5	0
Hopper, Charles	0	5	0
Hough, William	0	5	0
Howorth, James	0	10	6
Parkin, Charles	0	5	0
Pickering, John (Crowle)	0	5	0
Shaw, H. W.	0	5	0
Walker, E. H.	0	10	0
Dorchester.			
Durden, H.	0	5	0
Emson, W. N.	0	5	0
Evans, Alfred J.	0	5	0
How, William	0	5	0
Pearce, William L.	0	5	0
Watts, E. P.	0	5	0
Dorking.			
Clark, W. W.	0	10	6
Mount, James	0	2	6
Douglas (Isle of Man).			
Brearey, A. W.	0	10	6
Brearey, Wm. A.	1	1	0
Gore, J. R. A.	0	5	0
Dover.			
Adams, R. W.	0	5	0
Barnes, William James	0	5	0
Bolton, J.	0	5	0
Bottle, Alexander	1	1	0
Brown, Joseph Fred.	1	1	0
Cotterell, W. B.	0	2	6
Dickeson, Richard	1	1	0
Ewell, Richard M.	0	5	0
Forster, Robert Henry	0	10	6
Hambrook, John Barber	0	5	0
Killick, C. R.	0	5	0
Leigh, H. M.	0	2	6
Peake, Henry	0	10	6
Thompson, Edward	0	10	6
Wyles, William	1	1	0
Dresden.			
Walker, Thomas D.	1	1	0
Driffield.			
Bordass, James	0	5	0
Droitwich.			
Sandiland, R. B., jun.	0	5	0
Dublin.			
Bowles, Charles A.	0	10	6
Scott, Walter	0	5	0
Dudley.			
Green, William	0	2	6
Thompson, John W. (Sedgley)	0	10	6

	£	s.	d.
Dufftown (N.B.).			
Sangster, William	0	5	0
Dumbarton.			
Babtie, John	0	5	0
ampbell, Colin	0	5	0
Dumfries.			
llan, William	0	10	6
Dundee.			
cMillan, James	0	10	6
Dunfermline.			
ilmour, David	0	2	6
eath, Alexander	0	10	6
Dunse.			
eitch, James	0	10	6
Durham.			
owman, S.	0	2	6
urdon, John	0	10	6
urn, B. P.	0	2	6
astle, John W.	0	2	6
eighton, Mrs	0	10	6
almer, John G.	0	2	6
ollin, John G.	0	10	6
arsfield, John	0	2	6
arsfield, William	0	10	6
cawin and Burn	0	10	6
tangroom, A. (Whissonsett)	0	2	6
Ealing.			
arry, Thomas S.	0	10	6
ayles Brothers	1	1	0
Earlstown.			
ogg, Andrew	0	2	6
eake, Arthur	0	5	0
Eastbourne.			
ndrews, J. F.	0	5	0
rown, Henry R.	1	1	0
rook, Herbert	1	1	0
ullingford, L. J.	1	1	0
ibbs, Joseph	1	1	0
all, Samuel	1	1	0
armar, A. D.	0	5	0
East Dereham.			
mith, William	0	5	0
East Grinstead.			
ixon, W. H.	0	2	6
Eastwood.			
herrington, B.	0	10	6
Eccleshall.			
mith, Edgar R.	0	5	0
Edinburgh.			
damson, W. S.	0	2	6
inslie, Wm. W.	0	2	6
itken, James	0	5	0
itken, Robert	0	5	0
itken, William	0	5	0
llan, William	0	10	6
rthur, Charles	0	5	0
aildon, Henry B.	1	1	0
oa, Peter	0	5	0
rown, Robert	0	5	0
rown, Robert S.	0	5	0
ruce, Alexander G.	0	5	0
uchanan, James	1	1	0
hemists' Assistants' Association	1	1	0
lark, William Inglis	0	10	6
oates, Edwin	0	10	0
oates, J. T.	0	2	6
owie, George	0	3	0
row, William	0	5	0
ewar, F. L.	0	5	0
ick, Robert	1	1	0
ick, Robert Gibson	0	5	0
ott, David B.	0	5	0
unlop, J. B.	0	5	0
wing, James L.	0	10	0
idler, T. W.	0	5	0
orret, John A.	0	5	0
raser, J. I.	0	5	0
amley, David	0	5	0
ardner and Ainslie	1	1	0
ilmour, William	1	1	0
orrie, Daniel	0	5	0
ray, E. H.	0	2	6
annay, L. W. C.	0	10	6
eron, James	1	1	0
ennedy, Adam	0	10	0
ing, William	0	2	6
aird, George H.	0	5	0

	£	s.	d.
Edinburgh—continued.			
Leitch, William	0	10	6
Leith, James	0	2	6
Lockerbie, James	0	5	0
MacAlley, Robert	0	5	0
McCulloch, T. T.	1	1	0
Macdonald, Alexander	0	2	6
Macdonald, John	0	5	0
MacEwan, Peter	0	5	0
Macfarlan and Co.	2	2	0
Macfarlane, Andrew Y.	0	7	6
McGlashan, J.	0	5	0
Mackay, George D.	1	1	0
Mackenzie, James	0	10	6
Maclagan, James	0	5	0
MacLaren, David	0	5	0
McPherson, Colin A.	0	5	0
Marshall, James	0	2	6
Morison, John	0	10	6
Napier, Alexander	0	10	6
Noble, Alexander	1	1	0
Pinkerton, William	0	10	6
Pottage, J. C.	0	10	6
Prentice, John	0	5	0
Purves, Samuel	0	5	0
Radford, George	0	5	0
Raimes, Blanshard and Co.	2	2	0
Reid, James	0	5	0
Ritchie, J.	0	5	0
Robertson, J.	0	5	0
Robertson and Co.	1	1	0
Scobie, James	0	5	0
Scott, James	0	10	6
Smiles, James	0	5	0
Smith, Thomas	1	1	0
Smith, William	0	5	0
Spence, William	0	5	0
Stephenson, Frederick	0	5	0
Stephenson, J. B.	0	10	6
Steward, A. K.	0	2	6
Stoddart, T. G.	1	0	0
Suttar, John	0	2	6
Symington, Thomas	0	5	0
Thomson, Robert	0	10	0
Wylie, David N.	0	2	6
Edmonton.			
Ragg, William	1	1	0
Ragg, William W.	0	10	0
Egham.			
Bartholomew, William	0	10	6
Egremont (Cheshire).			
Hallawell, Joseph	1	1	0
Elgin.			
Robertson, William	0	5	0
Young, John	0	5	0
Ely.			
Heading, H. H.	0	10	6
Lincoln, William	0	10	6
Pate, Henry T.	0	10	6
Empingham.			
Johnson, F. E.	0	5	0
Emsworth.			
Waters, Henry Griffith	0	10	6
Waters, William A.	0	5	0
Epping.			
Rowland, Thos.	0	10	6
Rowland, T. W.	0	2	6
Epsom.			
Oxley, Frederic	0	5	0
Erith.			
Oldfield, Henry	0	10	6
Eton.			
Lewis, C.	0	5	0
Evesham.			
Dingley, R. L.	0	5	0
Pumphrey, John, and Son	0	5	0
Exeter.			
Bard, Jane	0	2	6
Brailey, Charles	0	5	0
Bromfield, Charles	0	5	0
Broom, W. W.	0	5	0
Bulley, William H.	0	2	6
Cooper, George	0	10	6
Fouraker, Thomas E.	0	5	0
Gadd, Henry	0	10	6

	£	s.	d.
Exeter—continued.			
Harris, Henry W.	0	10	6
Hunt, Arthur	0	10	6
Lake, John H.	0	10	6
Milton, Thomas C.	0	5	0
Napier, George L.	0	5	0
Pasmore, George	0	5	0
Sanders, W. F.	0	2	6
Stone, Frederick W.	0	10	6
Tighe, Henry W.	0	5	0
Topham, John Samuel	0	10	6
Eye.			
Bishop, Robert	0	10	6
Eynsham.			
Howe, Henry A.	0	5	0
Falkirk.			
Lyon, Thomas	0	10	6
Murdoch, David	0	10	6
Falmouth.			
Newman, Walter F.	0	5	0
Solomon, W. H.	0	10	6
Wilmer, F. J.	0	5	0
Fareham.			
Batchelor, Alfred E.	0	5	0
Batchelor, Charles	0	5	0
Franklin, Alfred	0	5	0
Faringdon.			
Ballard, Arthur	0	10	6
Farnham.			
Griffiths, J.	0	10	6
Faversham.			
Lenfestey, W. G.	0	5	0
Mundy, William F.	0	2	6
Fenton.			
Massey, Stephen	0	5	0
Weston, Joseph	0	2	6
Fife Keith.			
Dawson, J. H.	0	2	6
Filey.			
Robson, John Binnington	0	5	0
Fishguard.			
Vaughan, William	0	2	6
Flint.			
Jones, Michael	0	5	0
Jones, O. W.	0	5	0
Folkestone.			
Giles, John J.	0	10	6
Goodliffe, George	0	10	6
Lea, Frederick J.	0	5	0
Lea, John	0	10	6
Stainer, John	0	10	6
Foots Cray.			
Baker, William R.	0	5	0
Fordingbridge.			
Haydon, Frederick W.	0	5	0
Forfar.			
Ranken, James A.	0	5	0
Ranken, John	0	5	0
Fortune's Well.			
Grant, Donald	0	5	0
Fraserburgh.			
Burnett, Robert	0	5	0
McDonald, James	0	10	0
Freshwater (Isle of Wight).			
Wellington, Henry A.	0	5	0
Fyvie (N.B.)			
Bremner, James	0	5	0
Gainsborough.			
Forrest, Richard Wm.	0	10	6
Marshall, John Ferris	0	10	6
Galashiels.			
Noble, Alexander	0	5	0
Ross, William	0	5	0
Garstang.			
Thomas, J. J.	0	5	0
Garston.			
Lloyd, T. E.	0	5	0

	£	s.	d.
Gateshead-on-Tyne.			
Clarke, T. W.	0	10	0
Elliott, Robert	0	10	6
Greenwell, William C.	0	5	0
Prosser, Thos. W.	0	2	6
Smith, E. B.	0	2	6
Gedney.			
Harrison, William	0	5	0
Glasgow.			
Adams, John	0	10	6
Brodie, Robert	0	5	0
Clarke, Joseph A.	0	10	6
Crocher, Joseph	0	7	6
Currie, John	0	5	0
Currie, William L.	0	5	0
Dickie, James	0	10	6
Dunlop, Thomas	0	5	0
Fenwick, John	0	5	0
Flint, C. B.	0	10	6
Foster, John	0	5	0
Frazer, Daniel	1	1	0
Glasgow Apothecaries' Co.	1	1	0
Glen, Robert	0	5	0
Greig, William	0	10	6
Harrower, Peter	0	5	0
Henderson, John	0	5	0
Illingworth, George S.	0	5	0
Jaap, John	0	10	6
Kinninmont, Alexander	0	10	6
Kitchen, James	0	2	6
Lambie, Hugh	0	5	0
Lawrence, John	0	10	6
McMillan, John	0	10	6
McNichol, John	0	5	0
Murdoch Brothers	0	10	6
Paris, Walter	0	5	0
Peacock, John R.	0	2	6
Pettigrew, John W.	0	4	0
Pinkerton, John S.	0	10	0
Rose, Alexander	0	10	6
Simpson, William	0	5	0
Thompson, M. F.	0	5	0
Twaddle, Robert	0	5	0
Wallace, William	0	10	6
Ward, William A.	0	5	0
Whitelaw, James	1	1	0
Glass (N.B.).			
Aberdein, James	0	2	0
Glastonbury.			
Hulbert, S. J.	0	2	6
Gloucester.			
Berry, Edward	0	5	0
Franklin, James	0	5	0
Hughes, Evan G.	0	5	0
Jenkins, Henry	0	5	0
Meadows, Henry	0	10	6
Sadleir, John	0	10	6
Skinner, Thomas	0	10	6
Stafford, William	0	10	6
Trigg, James W.	0	5	0
Trotman, A. C.	1	1	0
Ward, Joseph	0	10	6
Godstone.			
Horner, James T.	1	1	0
Gorleston.			
Thurlby, George	0	2	6
Gorton.			
Plant, Frank G. L.	0	5	0
Gosforth.			
Gaitskell, James	0	5	0
Gosport.			
French, Benjamin	0	10	6
Hunter, John	0	10	6
Mason, Philip H.	1	1	0
Mumby, Charles	0	10	6
Mumby, Charles J. E.	0	10	6
Smith, W. B.	0	5	0
Govan.			
Skinner, John	0	5	0
Graaff Reinet (Cape Colony).			
Tebb, Henry	1	1	0
Grantham.			
Cooper, H. G.	0	5	0
Gibson, John B.	0	10	0
Hall, R. A.	0	10	6
Stewart, James	0	2	6
Whysall, William	0	10	6

	£	s.	d.
Grantown (N.B.).			
Duncan, William	0	2	6
Gravesend.			
Bulgin, William	0	5	0
Clarke, Richard F.	0	5	0
Lucas, Joseph M. M.	0	5	0
Mitchell, Mrs.	0	2	6
Spencer, Charles	1	1	0
Great Bedwyn.			
Gerard, George R.	0	10	6
Great Grimsby.			
Cook, Robert, jun.	0	5	0
Gossop, George K.	0	5	0
Mason, William D.	0	2	6
Robinson, Jonathan Scott	0	2	6
Great Malvern.			
Fox, T.	0	2	6
Hanson, Christopher	0	2	6
Johnson, Thomas S.	0	10	6
Metcalfe, Edmund Henry	0	10	6
Shephard, W. A.	0	5	0
Great Warley.			
Hayes, James	0	5	0
Greenhithe.			
Cox, Edwin J.	0	5	0
Guernsey.			
Arnold, Adolphus	0	10	6
Cumber, Henry	0	2	6
Guildford.			
Burton, William	0	5	0
Jefferies, Henry	1	1	0
Martin, Edward W.	0	10	6
Thompson, Thomas	0	5	0
Wheeler, Frederick	0	5	0
Guisborough.			
Fairburn, Robert W.	0	5	0
Haddington.			
Watt, James	0	5	0
Hailsham.			
Jenner, Charles U.	0	2	6
Halesworth.			
Gostling, John H.	0	5	0
Halifax.			
Brook, Robert	0	10	6
Dyer, William	0	5	0
Jessop, Jonathan	0	5	0
Swire, Jabez	0	5	0
Halstead.			
Hoddy, Benjamin	0	2	6
Hanley.			
Insull, E. S.	0	2	6
Moore, John William	0	5	0
Smith, Arthur H.	0	10	6
Tirrell, John	0	5	0
Harleston.			
Muskett, James	0	10	0
Woods, Charles	0	5	0
Harrogate.			
Coupland, Joseph	0	10	6
Davis, Richard H.	0	10	6
Greenwood, Charles	0	10	6
Greenwood, John	0	10	6
Mather, J. H.	0	5	0
Taylor, Joseph H.	0	10	6
Harrow.			
Chesterfield, T. M.	0	2	6
Harrow Weald.			
Blackwell, S. J.	2	2	0
Hartlepool.			
Emmerson, C.	0	10	6
Jackson, William George	1	1	0
Pattrick, George	0	10	6
Harwich.			
Bevan, Charles F.	0	10	6
Harding, Joseph	0	5	0
Worts, Augustine	0	5	0
Haslingden.			
Blayney, Joseph J.	0	5	0

	£	s.	d.
Hastings.			
Amoore, Charles	0	5	0
Beck, Albert N.	0	5	0
Bell, J. A.	0	10	6
Bolton, Thomas	0	5	0
Jameson, W. E.	1	1	0
Kernot, Dr. G. C.	0	10	6
Keyworth, G. A.	0	10	0
Mackenzie, Chas. A.	0	5	0
Rossiter, Frederick	0	5	6
Snowdon, Robert	0	5	0
Haverfordwest.			
Jenkins. Jabez (Lysyfran)	0	5	0
Saunders, Charles P.	0	5	0
Saunders, David P.	0	10	6
Hawick.			
Blaine T. J. S.	0	5	0
Craig, John	0	5	0
Maben, Thomas	0	5	0
Hawkhurst.			
Corke, Edward	0	5	0
Pridgeon, W. J.	0	5	0
Hay.			
Davies, John Lutwiche	0	5	0
Hebburn.			
Puttuck, Fredk. W.	0	4	0
Hebden Bridge.			
Hey, David	0	10	6
Hey, Thomas K.	0	10	6
Lawton, John D.	0	5	
Heckington.			
Sumners, Michael Cole	0	5	0
Heckmondwike.			
Booth, John	1	1	0
Stephenson, James N.	0	5	0
Helensburgh.			
Harvie, George	0	5	
Helmsdale.			
Fraser, John	0	2	6
Helston.			
Troake, M. H.	0	10	6
Wakeham, Charles	0	5	
Hemel Hempstead.			
Argue, James	0	5	
Henley-on-Thames.			
Hunn, Benjamin	0	5	
Hereford.			
Walker, John	0	10	6
Williams, W. and H. B.	0	10	6
Hertford.			
Aldridge, J. H.	0	5	
Lines, George	0	5	
Wilshaw, Samuel T.	0	10	
Hexham.			
Gibson, J. P.	1	1	
Richardson, George	0	5	
Riddle, W. R.	0	5	
Heywood.			
Beckett, William	0	10	
Mills, W. H.	0	5	
Hirwain.			
Sims, Joseph	0	10	
Hitchin.			
Pearson, W. J.	0	2	
Perks and Llewellyn	1	1	
Ransom, William	1	1	
Hoddesdon.			
Green, William G.	0	5	
Whitmore, W. F.	0	2	
Holywell.			
Carman, John	0	5	
Jones, Samuel	0	5	
Horley.			
Philp, Joseph	0	10	
Horncastle.			
Betts, William	0	5	
Carlton, E. P.	0	5	
Horndean.			
Bettsworth, Henry T.	0	5	

	£	s.	d.
Horsforth.			
Wynn, Frederick	0	10	6
Horsham.			
Williams, Philip	0	5	0
Wood, Edward	0	10	6
Huddersfield.			
Higgins, Tom Sellers	0	10	6
Kaye, Hamor	0	5	0
King, William	0	10	6
Macaulay, W. H.	0	10	6
Swift, C. H.	0	5	0
Sykes, Henry	0	5	0
Wheatley, Charles	0	10	6
Hull.			
Allison, E. and H.	1	1	0
Baynes, James	0	10	6
Bell, Charles B.	1	1	0
Bousfield, —	0	5	0
Burnett, W.	0	2	6
Campbell, Charles	0	5	0
Chapman, E.	0	5	0
Chapman, Joseph	0	2	6
Creasser, Matthew	0	5	0
Desforge, J. H.	0	5	0
Dobson, J. B.	0	5	0
Dyson, George	0	5	0
Earle, Francis	1	1	0
Fowler, Edwin	0	5	0
Gibson, C. P. (Trustees of)	0	5	0
Goldsmith, William	0	5	0
Gregory, Mrs.	0	2	6
Grindell, John	0	10	6
Hall, Henry R. F.	0	5	0
Hammond, William H.	0	5	0
Hart, George William	0	10	6
Hay, W.	0	2	6
Hebblethwaite, G. A.	0	2	6
Hollingsworth, James	0	5	0
Hoyles, George	0	2	6
Linford, John S.	1	1	0
Lofthouse and Saltmer	1	1	0
Loten, W. L.	0	5	0
Milner, John G.	0	5	0
Myers and Saunders	0	10	6
Oldham, James	0	5	0
Parsons H. J.	0	2	6
Price, W.	2	2	0
Shaw, Ward	0	5	0
Shepherdson, Welburn	0	10	6
Snape, E.	0	5	0
Souter, Jas. S.	0	10	6
Staning, Walter	0	5	0
Stoakes, Benjamin M.	0	5	0
Hunstanton.			
Twiss, Wm.	0	10	6
Huntingdon.			
Baxter, Robert	0	10	6
Huntly (N.B.).			
Chalmers, G.	0	2	6
Hurstpierpoint.			
Hudson, Alfred W.	0	2	6
Hyde.			
Oldfield, Henry	0	10	6
Hyères (France).			
Powell, Walter A.	0	5	0
Hythe.			
Lemmon, R. A.	0	7	6
Idle.			
Hopton, Edwin	0	5	0
Ilfracombe.			
Crang, Walter	0	10	6
Ilkeston.			
Potts, Charles	1	1	0
Ilkley.			
Worfolk, George William	0	5	0
Ilminster.			
Callander, W. W.	0	5	0
Ingatestone.			
Stuart, Henry James	0	2	6
Invergordon.			
Sinclair, Robert	0	5	0
Inverness.			
Galloway and Son	0	10	6
MacRitchie, David	0	5	0
Ogston, William	0	5	0

	£	s.	d.
Ipswich.			
Anness, Samuel R.	0	10	6
Chapman and Pain	0	10	6
Christopher, Fred.	0	5	0
Clifton, E. S.	0	5	0
Cornell, William	1	1	0
Cossey, James D.	0	5	0
Eyre, Henry R.	0	5	0
Grimwade, Ridley and Co.	0	10	6
Lyon, Robert	0	5	0
Matcham, Edward	0	5	0
Miller, T. T.	0	5	0
Pain, Arthur	0	5	0
Spurgeon, Fredk. J.	0	5	0
Younger, Robert E.	0	5	0
Irvine.			
Gillespie, James	0	5	0
Isleworth.			
Reece, James	0	5	0
Jamaica.			
Marshall, C. W.	0	5	0
Jarrow-on-Tyne.			
Huckebridge, J. M., jun.	0	5	0
Jedburgh.			
Peters, J. F.	0	5	0
Jersey.			
Baker, John T.	0	5	0
Cole, George	0	10	6
Ereaut, John, jun.	1	1	0
Millais, Mrs.	1	1	0
Miller, Henry	0	5	0
Keighley.			
Edwards, F. W.	0	5	0
Kemberton.			
Guy, William A.	1	1	0
Kendal.			
Bateson, Thomas	1	1	0
Burton, Matthew	1	1	0
Hind, Thomas W. L.	1	1	0
Severs, Joseph	1	1	0
Kenilworth.			
Barton, Henry Emlyn	0	10	6
Keswick.			
Swindle, Norman V.	0	5	0
Townley, Thomas	0	10	6
Kettering.			
Denston, John Thomas	0	5	0
Thursfield, John F.	0	5	0
Kidsgrove.			
Griffiths, Edwin H.	0	10	6
Kilmarnock.			
Borland, John	1	1	0
Borland, John, jun.	0	10	6
Kimberley (South Africa).			
Helmore, W. H.	0	5	0
King's Lynn.			
Atmore, George	0	5	0
Betts, George	1	1	0
Cocher, John A.	0	5	0
Kingston-on-Thames.			
Bond, C. R.	0	10	6
Brewster, William	0	10	6
Higgs, Alfred	0	5	0
Walmsley, Samuel	0	5	0
Whaley, Edward	1	1	0
Kingstone.			
Ackrill, George	0	10	6
Kington.			
Venables, Samuel H.	0	5	0
Kirkby Stephen.			
Armstrong, J.	0	5	0
Kirkcaldy.			
Storrar, David	1	1	0
Knaresborough.			
Potter, Charles	0	5	0
Thompson, John H.	0	5	0
Kurrachee (India).			
Brown, Leonard H.	0	8	6

	£	s.	d.
Lahore (India).			
Inglis, W. K.	0	5	0
Lancaster.			
Arkle, William	0	5	0
Bagnall, W. H.	0	5	0
Fell, John J.	0	5	0
Hall, W.	0	5	0
Holmes, Edward (Bentham)	0	5	0
Suart, George	0	5	0
Troughton, Henry	0	5	0
Vince, James	0	5	0
Landport.			
Alderslade, William	0	5	0
Hackman, Leonard L.	0	10	6
Perfect, George	0	5	0
Langholm.			
Beattie, Thomas	0	5	0
Langport.			
Chant, Herbert A.	0	10	6
Largs (N.B.).			
Fraser, Alexander	0	5	0
Launceston.			
Downing, Frederick	0	5	0
White, Thomas	0	10	6
Leamington.			
Barnitt, John	0	10	6
Barrett, Josephus T.	1	1	0
Bloomfield, E. J.	0	2	6
Clague, T. Maltby	0	2	6
Clower, John	0	5	0
Davidge, H. E. F.	0	2	6
Davis, Benjamin	0	5	0
Davis, Henry	1	1	0
Holloway, E. A.	0	2	6
Jones, L. J. W.	0	2	6
Long, E. A.	0	2	6
Newby, Charles A.	1	1	0
Pullin, William H.	0	10	6
Sansom, Henry	0	10	6
Skidmore, John	0	2	6
Smith, Samuel A.	1	1	0
Smith, Samuel H.	0	5	0
Spilsbury, James	0	5	0
Stanley, Herbert	0	10	6
Taylor, E. H.	0	2	6
Thornton, Edward	0	5	0
Leatherhead.			
Waugh, Mrs. Alexander	0	10	6
Lechlade.			
Ballard, Edwin	0	5	0
Ledbury.			
Freeman, Ernest	0	10	6
Leeds.			
Archer, Joseph S.	0	2	6
Bilbrough, Joseph B.	0	10	6
Bottomley, A. F.	0	5	0
Branson, F. W.	0	10	6
Cole, E. H.	0	5	0
Exley, George	0	5	0
Fawthorp, James	0	5	0
Ferguson, William K.	0	10	6
Goodall, Backhouse and Co.	2	2	0
Hardcastle, John	0	5	0
Harvey, Thomas	1	1	0
Hirst, Brooke and Hirst	2	2	0
Hirst, David	0	5	0
Iredale, Thomas	0	5	0
Jefferson, Peter	0	10	6
Morgan, Edward	0	5	0
Pierson, Clement	0	5	0
Reynolds, Richard	1	1	0
Smeeton, William	0	10	6
Taylor and Fletcher	1	1	0
Taylor, Samuel	1	1	0
Woolford, James	0	5	0
Leek.			
Blades, Josiah B.	0	2	6
Holdcroft, E. J.	0	2	6
Johnson, William	0	5	0
Leicester.			
Berridge, Alfred	0	5	0
Broof, R.	0	10	6
Burford, S. F.	0	5	0
Butler, E. H.	0	5	0
Butler, J. A.	0	5	0
Butler, T. E.	0	5	0

Leicester—continued.

	£	s.	d.
Cadoux, S. K.	0	5	0
Carr, William	0	10	0
Clark, E. A.	0	5	0
Clark, John W.	2	2	0
Clark, Walter B.	0	10	6
Cleaver, Samuel	0	5	0
Cooper, Henry	0	5	0
Cox, S. G.	0	10	6
Ellis, George	0	5	0
Esam, Richard	0	5	0
Garrett, John	0	5	0
Harvey, William R.	0	10	6
Lloyd, T. H.	1	1	0
Pechey, Thomas P.	0	5	0
Pickering, Henry	0	5	0
Sharp, Edward K.	0	5	0
Wand, Stephen	0	10	6
West, J. L.	1	1	0
Wilby, Frederick W.	0	10	6
Woolley, G. J. B.	0	5	0

Leigh.

	£	s.	d.
Bennett, John W.	0	5	0

Leighton Buzzard.

	£	s.	d.
Herington, Joseph	1	1	0

Leith.

	£	s.	d.
Alexander, W. G.	0	5	0
Black, George	0	5	0
Cairns, T. B.	0	5	0
Crichton, Alexander	0	10	0
Bowman, J.	0	10	0
Dow, William	0	2	6
Duncan, Flockhart, Powell and Co.	0	10	6
Finlayson, Thomas	0	5	0
Gutherie, Andrew D.	0	2	6
Mair, Alexander	0	2	6
Smith, Wilson and Sutherland	0	10	6

Lenton.

	£	s.	d.
Wilson, Thomas	0	5	0

Leominster.

	£	s.	d.
Davis, David F.	1	1	0
Ellwood, M. J.	0	5	0

Lerwick.

	£	s.	d.
Porteous, Arthur A.		2	5

Leven.

	£	s.	d.
Gibson, Adam	0	10	6

Lewes.

	£	s.	d.
Briscoe, Charles (West Firle)	0	5	0
Head, John	0	10	6
Head, John T.	0	10	6
Martin, Thomas	0	10	6

Leyland.

	£	s.	d.
Hackforth, Frederick	0	10	6

Lincoln.

	£	s.	d.
Battle, Son and Maltby	0	10	6
Tomlinson, Charles K.	1	1	0
Woodcock, Page D.	0	5	0

Liskeard.

	£	s.	d.
Young, Richard	0	5	0

Little Chishill.

	£	s.	d.
Jefferson, Thomas	0	10	6

Littlehampton.

	£	s.	d.
Longman, J. H.	0	2	6
Smart, C. F.	1	1	0

Little Sutton.

	£	s.	d.
Sherlock, John	0	5	0

Liverpool.

	£	s.	d.
Abraham, Alfred Clay	1	1	0
Abraham, Thomas Fell	1	1	0
Adams, Thomas E.	0	10	6
Adams, T. E., jun.	0	5	0
Albright, Henry	0	10	6
Alexander, George	0	5	0
Alexander, John	0	10	6
Ashbourne, C.	0	5	0
Ayrton and Saunders	0	10	6
Bathgate, William Lorimer	0	10	6
Bell, W.	0	5	0
Billington, Frederic	0	5	0
Blabey, J. J. (Woolton)	0	10	6
Blackbourne, H. J.	0	5	0
Blood, Charles (Formby)	0	5	0
Blundell, John	0	10	0
Bond, Henry	0	2	6
Bowman, William	0	10	6
Brown, Edwin	0	2	6

Liverpool—continued.

	£	s.	d.
Brown, Joseph	0	2	6
Buck, J. M.	0	10	6
Buck, Richard C.	0	5	0
Budden, Frederick	0	2	6
Caley, J. C.	0	5	0
Chemists' Association	2	2	0
Clark, F.	0	5	0
Clarke, R. T.	0	5	0
Clay, Dod and Case	1	1	0
Collins, E. de Tedney	0	5	0
Coupland, Henry	0	10	6
Dale, John	0	10	6
Dickins, B.	0	5	0
Drawbridge, Joseph G.	0	10	6
Drawbridge, T. F.	0	5	0
Drew, S.	0	5	0
Edisbury, John	0	10	0
Edwards, E. W.	0	2	6
Ellams, George	0	10	0
Elliott, Robert John	0	10	6
Evans, Sons and Co.	5	5	0
Fergusson and Co.	1	1	0
Field, C.	0	10	6
Fingland, James	0	10	0
Fleming, Mrs.	0	5	0
Flint, John	0	10	6
Furniss, Thomas	0	5	0
Gabites, W.	0	5	0
Galloway, James B.	0	5	0
Girvan, John	0	5	0
Greenall, Alfred	1	1	0
Greig, James	0	5	0
Hackett, Thomas	0	10	0
Hannaford, William	0	5	0
Harris, F. G.	0	10	6
Hay, Thomas	0	10	6
Hocken, Joshua	0	10	6
Hodges, E. G.	0	5	0
Huggett, Sydney	0	10	0
Hughes, Michael	0	5	0
Hughes, Thomas I. J.	0	5	0
Hunt, Thomas	0	10	6
Jackson, F.	0	2	6
Jackson, H.	0	10	6
James, John	0	5	0
Jones, Frank	0	2	6
Jones. R. H.	0	5	0
Jones, William	0	5	0
Kirk, W. P.	0	5	0
Lee, Samuel	1	1	0
Lett, Arthur J.	0	5	0
Macdonald, John	0	2	6
Machin, Frederick J.	0	10	6
McGuffie and Co.	1	1	0
Manduell, Thomas	0	2	6
Maries, D. R.	0	5	0
Maskery, Samuel	1	1	0
Midgley, John E.	0	2	6
Parkinson, Richard	0	10	6
Parry, William	0	5	0
Pheysey, Richard	0	10	6
Richardson, Richard T.	0	10	6
Ridgway, T. E.	0	5	0
Rodgerson and Co.	0	2	6
Sawden, Alfred	0	10	6
Shaw, John	0	10	6
Sleggs, G. R.	0	5	0
Smith, J. J. (Walton-on-the-Hill)	0	5	0
Smith, R. G.	0	5	0
Sumner, Robert, and Co.	1	1	0
Symes, Charles	3	3	0
Taylor, Charles	0	10	0
Taylor, George	0	10	6
Thomas, Robert	1	1	0
Thompson and Capper	1	1	0
Thompson and Co.	1	1	0
Thompson, John	0	5	0
Troughton, Christopher	0	5	0
Williams, William	0	5	0
Williams, William	0	2	6
Woodhead, H. C.	0	10	0
Wright, William	0	10	6
Wyatt, H.	0	5	0
Wyatt, H., jun.	0	5	0

Llandilo.

	£	s.	d.
Williams, W. J.	0	2	6

Llandudno.

	£	s.	d.
Penney, W. S.	0	10	6

Llanelly.

	£	s.	d.
Evans, G.	1	1	0

Llanfyllin.

	£	s.	d.
Williams, William	0	10	6

Llangollen.

	£	s.	d.
Jones, Humphrey	0	5	

Llanrwst.

	£	s.	d.
Jones, Owen	0	2	

Lockwood.

	£	s.	d.
Lister, C. E.	0		

Loddon.

	£	s.	d.
Ellis, T. W.	0	10	

London.

	£	s.	d.
Allden, John	0	10	
Allen, Charles B.	1	1	
Allwright, Isaac B.	0	10	
Andrews, Frederick	0	10	
Applegate, Edwin	0	10	
Arkinstall, William	1	1	
Armstrong, Richard	0	10	
Atkinson, James	0	2	
Atkinson, John G.	0	5	
Attwood, Alfred	1	1	
Attwood, Henry E.	1	1	
Austin, Henry Felix	1	1	
Babb, James	0	5	
Baines, James C.	0	10	
Baker, Alfred P.	0	10	
Ball, The Chemists' (Committee of), per J. F. Savory.	21	0	
Ball, The Junior Pharmacy, per W. H. Kerr	21	0	
Barber, Joseph	0	10	
Barnard, John	1	1	
Barnes, James Benjamin	1	1	
Barret, Edward Louis	1	1	
Barron, Frederick	5	5	
Bartlett, G. F. H.	0	5	
Bartley, George A.	0	10	
Barton, William H.	0	10	
Bascombe, Frederick	0	5	
Bate, Henry	0	10	
Baxter, William	1	1	
Beasley, Frederick	0	5	
Beddard, John	1	1	
Bedford, C.	0	10	
Beere, L. E.	0	5	
Bell, Matthew W.	1	1	
Bell, William H.	1	1	
Bennett, George	0	5	
Bennett, Thomas	0	5	
Bently, William Jas.	0	10	
Best, James	0	10	
Bettinson, W. T.	0	5	
Betty, R. B.	0	2	
Bevan, William	0	5	
Bigg, Thomas	1	1	
Bindloss, G. F.	0	5	
Bingley, Richard	0	10	
Birch, Henry C.	1	1	
Bird, Augustus	2	2	
Bird, Matthew M.	0	5	
Bird and Storey	1	1	
Bird, Robert	0	10	
Bishop, Henry	0	2	
Blake, Charles A.	0	10	
Bland, John	0	10	
Blyth, Utton	0	5	
Boothby, H. N.	0	5	
Bourdas, Isaiah	1	1	
Bowen, John W.	0	5	
Bradshaw, C. H.	0	10	
Brand and Co.	1	1	
Branford, A. J.	0	2	
Bray, William	0	10	
Bridges, C. W.	0	5	
Bright, Frederick	0	5	
Brisley, George	0	5	
Brodribb, J. B.	0	10	
Brookes, Samuel	0	10	
Brown, Alfred James	0	10	
Brown, H. F.	0	10	
Buckle, Christopher Francis	0	10	
Bullock, J. Lloyd and Co.	2	2	
Bunker, James	0	2	
Burgess, Willows and Francis	1	1	
Burgoyne, Burbidges, Cyriax and Farries	2	2	
Burn, Henry	0	5	
Burton, Joseph	0	5	
Bush, Arthur	0	5	
Butler, Charles	0	10	
Butler, E. D. Barry	0	10	
Butt, Edward Northway	5	5	
Butterfield, E.	0	10	
Butterworth, John	0	5	
Cadman, Daniel C.	1	1	
Campbell, E. K.	0	3	

London—continued.	£	s.	d.
annon, Charles	1	1	0
arteighe, Michael	1	1	0
artwright, William B.	0	10	6
aseley, Thomas	0	5	0
atterns, Heneage P.	0	10	6
awdell, George	0	10	6
hapman, Joseph J.	0	5	0
hapman, Walter	0	10	6
harity, William	0	10	6
heetham, W. H.	0	10	6
hurchill, J. and A.	1	1	0
app, Edward F.	0	10	6
ark, John A.	1	1	0
arke, Isabella Skinner	0	10	6
eaver, E. L.	0	10	6
ift and Crow	1	1	0
ocker and Son	0	10	6
olchester, William M.	0	5	0
olchester, William M., jun.	0	5	0
oldwell, David B.	0	10	6
ole, A. C.	1	1	0
oleman, John	0	5	0
oles, Ferdinand	0	10	6
oles, J. W.	0	10	6
ollett, Charles B.	0	5	0
ollier, Henry	0	5	0
onstance, Edward	0	10	6
onstance, Herbert E.	0	10	6
onstance, Sidney W.	0	10	6
ooper, Albert	1	1	0
ooper, Henry	0	10	6
ooper, Wm. Henry	0	10	6
ooper, William Temple	0	10	6
orbyn, Stacey and Co.	1	1	0
ornelius, James	0	10	6
ory, J. T. H.	0	10	6
osway, Edwin C.	0	10	6
ottrill, John W.	0	10	6
ouper, F.	0	10	6
racknell, Herbert*	0	5	0
ranwell, W. B.	1	1	0
rosby, James	0	10	6
ross, Henry	0	2	6
royden, Charles	0	10	6
ull, Joseph	0	10	6
urtis, Fred. G.	0	5	0
udson, Horace C.	0	5	0
ampney, Richard S.	0	10	6
arby and Gosden	2	2	0
arnill, Charles	0	5	0
avenport, Horace	1	1	0
avenport, J. T.	2	2	0
avies, John	0	5	0
avies, Llewelyn	0	2	6
avies, Robert H.	1	1	0
avis, H. S. E.	0	10	6
avy, Yates and Routledge	2	2	0
ay, Thomas Sweeting	0	10	6
ean, S.	0	5	0
eane (Henry) and Co.	1	1	0
e Peare, John Thomas	0	5	0
ewar, Mary Ann	0	10	6
inneford and Co.	2	2	0
odman, Robert	0	2	6
odridge, Thos. M.	0	2	6
oulton and Co.	1	1	0
rane, William	0	10	6
rew, Henry Wm.	0	5	0
rury, Sydney	0	5	0
yer, E. H.	0	5	0
ymott, Frank	0	5	0
yson, William B.	1	1	0
ade, George	1	1	0
ade, James	1	1	0
astman, J. E.	0	10	6
dwards, Charles	0	10	6
dwards, William Staples	0	5	0
lliott, J. D.	0	10	6
lvey, Thomas	1	1	0
mslie, Joseph	0	5	0
pps, James	1	1	0
vans, Lescher and Webb	1	1	0
ve, Charles	1	1	0
vershed, G. S.	0	5	0
yre, Jonathan S.	0	10	6
allowfield, Jonathan	1	1	0
armer, John	0	5	0
erguson, W. H.	1	1	0
itch, Robert Owen	0	10	6
itt, Francis E.	0	10	6
ord, Charles	0	5	0
orrest, Richard	1	1	0
ox, William	1	1	0
rancis, G. Bult	1	1	0
rancis, George Baggett	1	1	0
rancis, Matthew R.	0	10	6
rancis, W. H.	0	10	6

London—continued.	£	s.	d.
Froom, William Henry	1	1	0
Frost, W. T.	0	10	6
Fryer, Arthur	0	5	0
Gadd, Charles	0	10	6
Gadd, Robert	0	10	6
Gale, Samuel	1	1	0
Garman, E. C.	0	5	0
Garner, James	0	10	6
Garner, Thomas	0	5	0
Garnham, A. W.	0	5	0
Gaunt, Rann Dolphin H.	1	1	0
Gedge, William S.	0	10	6
Gerrard, A. W.	0	10	6
Glasspoole, H. G.	0	10	6
Godfrey, H. E.	0	5	0
Goff, Richard	0	5	0
Golding, John F.	1	1	0
Goodall, William A.	0	5	0
Goodchild, Alfred C.	0	5	0
Goodger, David	0	10	6
Goodwin, John	1	1	0
Gorton and Sons	0	10	6
Gossling, William R.	0	5	0
Gower, A. J.	0	5	0
Granger, Edwin John	1	1	0
Green, Samuel	0	5	0
Green, W J.	0	10	6
Greenish, T. Edward	0	10	6
Greenish, Thomas	1	1	0
Griffiths, Alfred William	0	10	6
Gristock, Thomas	1	1	0
Groves, H. F.	2	2	0
Gudgeon, Frederick G.	0	2	6
Gulliver, William	0	10	6
Gulliver, Wm. Inchle	0	5	0
Hadfield, Henry M.	0	5	0
Hairsine, H. S.	1	1	0
Hall, Ralph	0	10	6
Hampson, Robert	1	1	0
Hanbury, Cornelius	1	1	0
Hannah, Charles	0	10	6
Hardy, Samuel C.	1	1	0
Harris, Daniel R.	0	10	0
Harris, Frank William	0	5	0
Harris, Robert	0	10	6
Harrison and Horne	0	10	6
Hart, Thomas	0	2	6
Harvey, Edward	1	1	0
Harvey, John William	0	2	6
Harvey, William	0	5	0
Harwood, Charles	0	10	6
Hatfield, George B.	0	10	6
Hatfield, George W.	0	5	0
Hawkins, Thomas	1	1	0
Hayhoe, W.	0	5	0
Hayward, Charles	0	10	6
Hearn, John	0	5	0
Heath, Frederick D.	0	5	0
Heathcoat, Thomas	0	10	6
Henty, Henry Martin	0	5	0
Herbert, William	0	5	0
Hick, John	0	5	0
Hickey, Evan Lewis	0	10	6
Hickman, William	0	10	6
Higgins, James	0	10	6
Hill, Arthur B.	1	1	0
Hill, Arthur S.	2	2	0
Hill, William	0	5	0
Hills, Henry William	0	10	0
Hills, Thomas Hyde	10	10	0
Hills, Walter	1	1	0
Hobbs, John K.	0	5	0
Hodgkinson, George A.	0	10	6
Hodgkinson, Stead and Treacher	2	2	0
Hodgkinson (Thomas), Prestons and King	2	2	0
Hodgkinson, William	1	1	0
Hodgson, Alfred	0	5	0
Hodsoll, Thomas W. H.	1	1	0
Hogg, E. G.	0	10	6
Hogg, Robert	0	10	6
Holford, T. Constantine	0	10	0
Holl, Edmund	0	5	0
Holmes, A. J.	0	5	0
Holmes, C. J.	1	1	0
Holmes, Walter M.	0	10	6
Hooper, Leonard	1	1	0
Hopkin, William King	2	2	0
Hora, Henry Whinfield	1	1	0
Hora, W. T.	0	5	0
Horncastle, John	1	1	0
Howard, George	1	1	0
Howard, J. H. H.	1	1	0
Howe, J. M. W.	0	2	6
Howell, Maurice	0	10	6
Howlett, Samuel	1	1	0
Hucklebridge, J. M.	1	1	0

London—continued.	£	s.	d.
Hudson, T. F.	0	5	0
Huggins, Richard	0	10	6
Hughes, Evan	0	10	0
Hugill, John	1	1	0
Hugill, John H.	1	1	0
Hunt, Charles	1	1	0
Hurley, Edward W.	0	5	0
Huskisson, Henry Owen	1	1	0
Hussey, Robert	0	5	0
Hyslop, John Cahill	1	0	0
Icke, Henry S.	0	10	6
Idris and Co.	2	2	0
Ingham, John	0	5	0
Ingram and Royle	1	1	0
Ive, William	1	1	0
Izod and Son	1	1	0
Jacka, Vivian T.	0	10	6
Jacks, D. R.	0	5	0
Jackson, C.	0	10	6
Jackson, William F.	1	1	0
Jackson, William H.	0	5	0
Jagg, J. Henry	0	10	6
Jameson, W. G., junr.	1	1	0
Jarvis, John S.	0	10	6
Jarvis, Thomas	0	10	6
Jeffcoat, Joseph	1	1	0
Jenkins, Henry	1	1	0
Jewell, J. R.	0	5	0
Johnson and Sons	1	1	0
Jones, Edwin	0	5	0
Jones, Henry Stevens	0	5	0
Jones, John H.	0	10	6
Jones, Thomas	0	5	0
Jones, W. Cadwaladr	1	1	0
Jones, W. H.	0	2	6
Jones, William	0	10	6
Jones, William	0	5	0
Jones, William E.	0	2	6
Jones, William John	0	10	6
Jones, William N.	0	2	6
Jones, William O.	0	10	6
Jozeau, G.	1	1	0
Keer, Thomas H.	0	10	6
Kemp, Robert	0	10	6
Kent, James S.	0	10	6
Kent, Thomas	0	10	6
Kent, Thomas Ramsey	0	10	6
King, Henry	0	10	0
King, William	0	5	0
Kingsford, Frederick	1	1	0
Kinross, W. M.	0	6	0
Kirk, Snowden	0	10	6
Kitson, Samuel	0	2	6
Laing, John S.	0	5	0
Lance, W. N. G.	0	10	6
Large, John H.	0	10	6
Lavers and Son	1	1	0
Lawrence, Frederick	0	10	6
Laws, John	0	10	6
Lawson, Arthur	0	5	0
Leath and Ross	2	2	0
Leech, Elizabeth	0	10	6
Legg, H. A.	0	10	6
Lescher, Joseph S.	1	1	0
Lewinton, Alexander B.	1	1	0
Lewis, Thomas	0	5	0
Leyland, Thomas W.	0	2	6
Little, John A.	0	5	0
Lloyd, Thomas	0	10	6
Long, Henry	1	1	0
Longley, Charles	0	5	0
Lovegrove, G. E.	0	5	0
Lowe, William E.	2	2	0
Luff, Richard	0	10	6
Lugar, Henry	0	5	0
McDougall, James	0	2	6
MacGeorge, William	0	10	6
Madeley, E. S.	0	10	6
Maizey, E.	0	10	6
Marks (Henry) and Sons	1	1	0
Marsh, E. R.	0	10	6
Marston, John Thomas	0	10	6
Marten, Frederic	0	5	0
Martindale, William	1	1	0
Mathews, Henry	0	10	6
Mathews, J. H.	0	10	6
Matthews, Edward	0	10	0
Matthews, J. H.	0	5	0
Matthews, Thomas	0	5	0
Maw, C. Trentham	1	1	0
Maw, Charles	1	1	0
Maw, Son and Thompson	2	2	0
Mead, Charles J.	1	1	0
Meggeson and Co.	1	1	0
Mellin, Charles J.	0	5	0
Mennell, Z.	0	10	6
Merrell, James	1	1	0

London—continued.	£	s.	d.
Middleton, Francis	1	1	0
Millhouse, H. H.	0	5	0
Millei, Cecil B.	0	5	0
Miller, Charles Bayfield	0	15	6
Miller, W. E.	0	5	0
Mills, W. D.	0	2	6
Milward, S.	0	10	6
Minshull, Flora	0	5	0
Minshull, Rose C.	1	1	0
Moore, John	0	5	0
Morrell, F. K.	0	5	0
Morrell, Thomas	0	5	0
Morris, Thomas	1	1	0
Mortiboy, John	1	1	0
Morton, Henry	0	2	6
Mutch, John Pratt	0	5	0
Muter, Dr. John	3	3	0
Naylor, W. A. H.	0	5	0
New, Walter W.	0	10	6
Newey, J. T.	0	10	6
Newton, T. A. C.	0	5	0
Newzam, Henry Samuel	0	10	6
Nicholls, Joseph C.	0	5	0
Nicholson, Thomas T.	0	5	0
Nicholson, W. O.	1	1	0
Nind, George	0	10	6
Nobbs, W. N.	0	10	6
Norburn, A. H.	0	5	0
North, George T.	0	10	6
Notcutt, W. B.	0	5	0
Orpe, Thomas M.	0	10	6
Padman, Thomas	0	10	6
Palmer, Francis	0	10	6
Palmer, Robert	1	1	0
Paramore, Dr. R.	0	5	0
Parker, J. W.	0	5	0
Parker, Robert Henry	0	10	6
Parkes, J. C.	0	10	6
Parkes, J. P.	1	1	0
Parkinson, Charles	0	10	6
Parkinson and Son	1	1	0
Parrott, Joseph	0	10	6
Parry, C. D.	0	5	0
Parsons, G. H.	2	2	0
Pasmore, F. R.	0	10	6
Passingham, G. W.	0	10	6
Pattison, George	1	1	0
Peacock, George	0	5	0
Peck, Edward	0	5	0
Peel, Alfred	0	10	6
Penrose and Son	1	1	0
Pepper, John	0	10	6
Pharmacy Club (per Richard Bremridge, Hon. Sec.)	10	10	0
Phillips, A. J.	0	5	0
Phillips, A. W.	0	2	6
Phillips, W. T.	0	5	0
Pickard, William	2	2	0
Pidduck, J. W.	0	10	6
Pike, William	0	10	6
Pinyon, William	0	5	0
Pipe, Walter	0	10	6
Place, John N.	0	10	6
Plaister, W. J.	0	10	6
Plowman, Sidney	1	1	0
Poingdestre, C. R.	0	10	6
Pond, B. C.	0	5	0
Pond, George P.	1	1	0
Potts, Robert A.	1	1	0
Powell and Sons	1	1	0
Powell, T. H.	1	1	0
Prebble, John G.	0	5	0
Preston, Richard	0	10	6
Pretty, Charles	0	5	0
Price, Robert John	0	2	6
Prichard, Edward	1	1	0
Prime, Thomas R.	0	10	6
Radermacher, C. J.	0	10	6
Rawlinson, Ralph	1	1	0
Read, John Henry	0	5	0
Reece, Thomas	0	5	0
Reed, Charles W.	0	10	6
Rees, Harding	0	10	6
Richardson, James	0	5	0
Richardson, John	0	5	0
Ricketts, James	0	5	0
Ridding, William	0	10	6
Rigg, G. F.	0	5	0
Roach, H. W.	1	1	0
Roach, Pope	1	1	0
Robinson, Charles J.	0	10	6
Robinson, H. S.	0	5	0
Robinson, R. A.	0	10	6
Robinson, William P.	0	10	6
Rogers, James	0	10	0
Rose, Alfred	1	1	0
Rowden, Lewis	0	5	0

London—continued.	£	s.	d.
Rowe, Robert	1	1	0
Rowntree, Thomas	0	10	6
Rowson, Henry	1	1	0
Rutter, Edmund Yates	1	1	0
Rutter, John	0	5	0
Sadgrove, A. A.	0	5	0
Sadler, William	0	10	6
Sadler, William, jun.	0	5	0
Sandford, Geo. W.	2	2	0
Sandy, Frederick William	0	10	6
Sangster, Arthur	1	1	0
Saunders, C.	0	10	6
Saunders, Thos. S.	1	1	0
Schacht, William	0	10	6
Scoley, Thomas E.	0	5	0
Sedcole, J. W.	0	10	6
Sell, W. H.	0	10	6
Selleck, Edward	0	10	6
Shapcott, W. H. P.	0	2	6
Sharman, Wm.	0	5	0
Shephard, Thomas F.	0	10	6
Shepley, Frederick Thos.	0	5	0
Sherwood, N.	0	5	0
Shields, R. H.	0	5	0
Shirley, J. G.	2	2	0
Shirley, S. S.	0	10	6
Shone, Owen E.	0	2	6
Silverlock, Henry	5	5	0
Silvers, Francis T.	0	10	6
Sims, C. R. H.	0	5	0
Skinner, A. J. P.	0	5	0
Skinner, Robert	0	5	0
Slipper, James	0	10	6
Smart, John	0	10	6
Smart, W.	0	10	6
Smith, C. B.	0	5	0
Smith, Harry J.	0	2	6
Smith, John Ord	0	10	6
Smith, Percy John	1	1	0
Smith, William	0	10	6
Smith, William Frederick	1	1	0
Smith, William L.	0	10	6
Spyer, Newton	0	10	6
Squire, P. and P. W.	5	5	0
Stableforth, J. W.	0	5	0
Stacy, Frederick	0	5	0
Stacy, Samuel Lloyd	1	1	0
Stammwitz, Louisa	1	1	0
Stamp, Edward B.	0	10	6
Stansfield, Richard	0	5	0
Starkie, Richard S.	1	1	0
Steer, Philip R.	0	10	0
Stenson, Joseph	0	5	0
Stephens, Henry I.	0	5	0
Stevens, Felix	0	5	0
Stevens, Peter Augustus	0	10	6
Stickland, W. H.	1	1	0
Stiling, John E.	0	10	6
Stoneham, Philip	0	10	6
Strickett, John	0	10	6
Strongitharm, W. G.	0	5	0
Summers, James R.	0	10	6
Swan, M. E.	0	5	0
Swift, Francis	0	10	6
Symons, William H.	1	1	0
Taplin, William Gilbert	1	1	0
Taubman, Robert	0	10	6
Taylor, George S.	1	1	0
Taylor, Horatio	0	10	6
Taylor, John	0	10	6
Taylor, Matthew	0	10	6
Taylor, Peter	0	5	0
Tebbutt, Edwin	0	10	0
Tench, Richard	1	1	0
Thomas Harry A.	1	1	0
Thomas, Henry	1	1	0
Thompson, Arthur S.	0	5	0
Thompson, C.	0	10	6
Thompson, Henry	0	10	6
Thompson, Henry Ayscough	1	1	0
Thompson, John	1	1	0
Thorn, John James	1	1	0
Tijou, Tom	0	5	0
Tingle, Ellen	0	5	0
Tomlinson, Thomas	1	1	0
Trask, Thomas	1	1	0
Tregear, A. F.	0	5	0
Trick, William B.	0	5	0
Troke, Charles	0	10	6
Tugwell, William H.	0	10	6
Turner, Charles E.	0	10	6
Turner, Edward A.	1	1	0
Tyrer, Peter	0	10	6
Van, Frederick W. S.	0	5	0
Vialls, J. B.	1	1	0
Vincent and Son	1	1	0
Voelcker, Augustus	1	1	0

London—continued.	£	s.
Walker, Byatt A.	0	5
Walker, Charles	0	5
Wallis, George	0	5
Wallis, John T. W.	0	10
Wallis, Owen	0	10
Ward, Francis	1	1
Waring, A. W.	0	5
Warren, Francis W.	0	5
Warren, William	0	10
Wastie, Francis	0	5
Watson, William	0	10
Watts, Alfred	0	5
Weatherley, Richard J.	0	5
Webb, E. A.	1	1
Wells, Thomas	0	5
Weston, Samuel John	1	1
Westrup, Joseph B.	0	10
Whiffen, Thomas	5	5
Whigham, Robert L.	0	5
White, Charles	1	1
White, Charles E.	0	5
White, W. T.	1	1
Whittle, Elias C. C.	0	5
Wickham, W.	0	10
Wigg, Henry J.	1	1
Wiggins, Henry	0	10
Wilkes, Henry	0	5
Wilkinson, Benjamin John	0	5
Wilkinson, Robert	0	10
Wilkinson, Thomas	1	1
Will, William W.	0	5
Willats, Richard	0	5
Williams, Hugh	0	5
Williams, James	0	10
Williams, James	0	5
Williams, John	2	2
Williams, Joseph J.	0	5
Williams, J. W.	1	1
Wills and Wootton	1	11
Wilson, John C.	0	5
Winter, William	0	10
Wisken, Robert	0	5
Wodderspoon and Co.	1	1
Woodland, John	0	10
Woolldridge, John	0	10
Woollings, Frank	0	2
Wooster, J. R.	2	2
Wootton, Alfred C.	2	2
Wright, Layman and Umney	2	2
Wyatt, Francis J.	0	10
Wylde, George	0	10
Yates, Samuel P.	0	5
Young George	0	5

Long Bennington.

Bemrose, John	0	10

Long Sutton.

Winfrey, Riohard	0	5

Longton.

Hemming, George Thomas	0	5
Litchfield, John	0	10
Prince, Arthur G.	0	10
Sibary, George	0	10
Turner, Thomas	0	5

Looe.

Poad, John	0	5

Loughborough.

Handley, Thomas	0	10
Paget, John	0	5

Louth.

Dennis, J. W.	0	5

Lowestoft.

Chaston, Anna Maria	0	10
Good, Thomas	0	10
Moverley, Robert	0	10
Sale, Thomas John	0	5
Stebbing, W.	0	5
Wright, Arthur	0	5

Ludlow.

Bessell, J. W.	0	5
Cocking, George	0	5
Marston, Alfred	0	5
Nickson, James	0	5
Smith, F. W.	0	2
Woodhouse, George	0	5

Luton.

Hall, Ephraim	0	5

Lutterworth.

Brown, Thomas	0	10

	£	s.	d.
Lyme Regis.			
Henley, George	0	5	0
Lymington.			
Allen, Adam U.	0	5	0
Badcock, Henry	0	10	0
Lymm.			
Evans, Isaac H.	0	5	0
Henshall, James	0	5	0
Lytham.			
Hartley, John	0	5	0
March, Richard	0	5	0
Macclesfield.			
Bates, William I.	0	10	6
Bower, John	0	5	0
Cooper, Thomas	0	5	0
Duncalf, Thomas H.	0	10	6
Thomas, Richard	0	10	6
Wood, Richard	0	10	6
Macduff.			
Henry, J. Hay	0	5	0
Machynlleth.			
Rees, Edward	0	5	0
Maidenhead.			
Walker and Son	1	0	0
Walton, Ralph	0	10	6
Maidstone.			
Corfe, Alfred	0	5	0
Evans, D. C.	0	2	6
Jennings, Francis R.	0	5	0
Ridley, Charles H.	0	5	0
Rowcroft, Albert E.	0	5	0
Stonham, Thos. G.	0	10	6
Wells, W. George	0	2	6
Maldon (Essex).			
Crick, George E.	0	10	6
Wallworth, David	0	10	6
Malmesbury.			
Brown and Ratcliffe	1	1	0
Malton (Yorks).			
Buckle, James	0	5	0
Hardy, George	0	5	0
Laverack, W. H.	0	5	0
Longbotham, Mrs. M.	0	5	0
Malvern Wells.			
Clark, Edward J.	0	5	0
Wakefield, Cecil H.	1	1	0
Manchester.			
Ashford, R.	0	5	0
Balmforth, A.	1	1	0
Baron, Richard E.	0	2	6
Bates, Frederic W.	0	5	0
Benger, F. Baden	1	1	0
Bew, John	1	1	0
Biggin, Samuel	0	5	0
Blyton, John	0	10	6
Bond, W.	0	5	0
Boor, Frederick	0	10	6
Booth, William G.	0	10	6
Brooks, Joseph	1	0	0
Brown, William Scott	1	1	0
Bushby, Thomas	0	5	0
Carter, William	0	10	6
Casey, Edward	0	2	6
Darling, William	1	1	0
Dawson, Robert	0	5	0
Edwards, George	0	5	0
Elborne, William	0	5	0
Eyre, J. J.	0	5	0
Gibbons, Thomas G.	1	1	0
Gibbons, Walter	0	10	6
Gibson, Joshua	0	5	0
Gibson, Robert	1	1	0
Hall, Stacey	0	5	0
Hardeman, John	0	10	6
Hart, James	1	1	0
Holt, John	0	2	6
Hughes, Evan G.	0	10	6
Hunt, L.	1	1	0
Jackson, A. H.	0	10	6
Jackson, George	0	10	6
Jackson, Thomas	0	10	6
Jones, Joseph	0	5	0
Jones, J.	0	5	0
Jones, P. V.	0	2	6
Kellett, Henry (Salford)	1	1	0
Kemp, Harry	0	5	0
Lambert, Thomas (Bradford)	0	5	0
Manchester—continued.			
Lane, William	0	5	0
Lowe, Walter	0	10	6
McCormick, F. H.	0	5	0
Marsden, Thomas B. (Withington)	0	5	0
Marshall, H. W.	0	5	0
Massey, John	0	5	0
Maunder, Robert	0	10	6
Methuen, Richard	0	10	6
Midgley, Charles	0	10	6
Mitchell, John	0	5	0
Moir, David	0	5	0
Morris, J. L.	0	5	0
Mumbray, H. G.	0	5	0
Mundey, H.	0	5	0
Newbould, T. A.	0	10	6
Nuttall, R. H.	0	15	6
Oakley, Joseph	0	5	0
Oldfield, Pattinson and Co.	1	1	0
Osborne, T. C. E.	0	5	0
Paine, Standen	1	1	0
Pickup, Robert L.	1	1	0
Pidd, Arthur J.	0	10	6
Ransome, Thomas	1	1	0
Roberts, John	0	10	6
Rowland, E. E.	0	5	0
Royle, John	0	5	0
Saunderson, George C.	0	10	0
Scaife, Samuel	0	10	6
Slack, John L.	0	5	0
Standring, Son and Co.	1	1	0
Stones, William	1	1	0
Sutcliffe, C. H.	0	5	0
Sutherland, Joseph	0	10	0
Swinn, Charles	0	10	6
Sylvester, Paul	0	5	0
Terry, Thomas (Withington)	0	5	0
Thornley, C.	0	10	6
Tomkins, Dr. Henry	0	5	0
Tompsett, Leighton S.	0	5	0
Turner, W. S.	0	2	6
Twemlow, Richard	0	10	6
Walsh, Edward	0	10	6
Walton, H.	0	5	0
Wealthall, Alfred	0	10	0
West, Thomas	0	5	0
Westmacott, George H.	0	10	6
Wheeldon, James	0	5	0
Whittaker, Ellis (Salford)	0	10	6
Wilkinson, George	0	5	0
Wilkinson, William	1	1	0
Wood, George E.	0	5	0
Woolley, Sons and Co.	3	3	0
Wright and Barnaby	1	1	0
Yates, Ebenezer	0	5	0
Mansfield.			
Adams, Benjamin	1	1	0
Oldham, John	0	10	6
Patterson, Douglas J.	0	5	0
Margate.			
Baily, John	0	10	6
Cadby, Saml. K.	0	5	0
Candler, Joseph T.	0	10	6
Gale, Henry	0	10	6
Haffenden, James	0	5	0
Harvey, William S.	0	10	6
Wootton, Edward S.	0	10	6
Market Drayton.			
Cooke, William H.	0	5	0
King, William George	0	10	6
Market Harborough.			
Deacon, Fanny E. (Fleckney)	0	5	0
Markinch.			
Robertson, Andrew	0	2	6
Maryport.			
Cockton, John	0	5	0
Masham (Yorks).			
Barker, Mathew M.	1	1	0
Kendall, George	0	5	0
Matlock Bath.			
Platt, William	0	5	0
Mayfield.			
White, Edward A.	0	5	0
Mere (Wilts).			
Bracher, Edwin	0	7	6
Merton.			
Johnson, Joseph	0	10	6
Mexborough, New.			
Shields, Robert J.	0	10	6
Micheldean.			
James, Henry	0	5	0
Middlesborough.			
Buck, Thomas	0	5	0
Harrington, P. J.	0	5	0
Hume, William A.	0	5	0
Sowerby, Richard	0	5	0
Taylor, H. H.	0	5	0
Taylor, William R.	0	5	0
Midhurst.			
Cowap, Samuel E.	0	5	0
Millom.			
Roberts, John L.	0	2	6
Minchinhampton.			
Simpkins, John	0	10	6
Mintlaw (N.B.).			
Hardie, Alexander	0	5	0
Mirfield (Yorks).			
Crook, Charles	0	5	0
Monmouth.			
Key, Hobson	0	10	6
Montrose.			
Burrell, George	0	5	0
Davidson, A.	0	5	0
Morecambe.			
Birkett, John	0	5	0
Morpeth.			
Marshall, G. T.	0	5	0
Mussoorie (India).			
Samuel, James B. and Edward	1	1	0
Nailsworth.			
Mason, William W.	0	2	6
Nantwich.			
Manley, Henry (Aston)	0	2	6
Naples.			
Bateman, J. M.	0	19	6
Natal.			
Taylor, Edward	0	6	10
Neath.			
Hayman, Alfred	0	10	6
Hutchins, Charles	0	2	6
Needham Market.			
Harrington, Allen	0	10	6
Nelson.			
Collins, M. A.	0	5	0
Nether Stowey.			
Ham, John	1	1	0
Newark.			
Bennett, William	0	5	0
Bilson, F. E.	0	5	0
Cooling, W. J.	0	5	0
Foster, H. P.	0	5	0
Sneath, Thomas D.	0	5	0
New Barnet.			
Young, Robert Fisher	0	10	6
New Brighton.			
Rose, Charles	0	5	0
New Brompton (Kent).			
Willis, Henry J.	0	5	0
Newbury.			
Davis, Henry J.	0	5	0
Pratt, Thomas H.	0	5	0
Newcastle-on-Tyne.			
Bascombe, William	0	5	0
Bolan, John	0	10	6
Coates, John M.	0	10	6
Frater, G.	0	5	0
Gatward, Oswald	0	5	0
Hunter, Frederick W.	0	5	0
Ismay and Sons	0	10	6
Johnstone, W. B. (Byker)	0	5	0
Mann, Robert	0	10	6
Marley, William	0	10	6
Martin, N. H.	1	1	0
Mawson, R. O.	0	5	0
Owen, William	0	10	6
Payne, J. B.	0	5	0
Proctor, Barnard S.	1	1	0
Rheeder, T.	0	5	0

Newcastle-on-Tyne—continued.

	£	s.	d.
Smith, G. F.	0	10	6
Stuart, Charles E.	0	10	6
Swan, Joseph W.	1	1	0
Watson, Mason	0	10	6
Weddell, George	0	5	0
Wilkinson, T. T.	0	5	0
Wray, E.	0	2	6
Wright, Alfred	0	10	6

Newcastle-under-Lyne.

Cartwright, William	0	10	6
Heathcote, Thomas S.	0	10	6

New Malden.

Stone, Thomas W.	0	5	0

Newmarket.

Barrow, Frank A.	1	1	0

Newport (I. W.).

Millidge, Alfred	0	5	0
Shepperd, William J.	0	2	6

Newport (Mon.).

Faulkner, H.	0	5	0
Garrett, T. P.	0	5	0
Gratte, Henry J.	0	5	0
Morgan, Mrs.	0	2	6
Paine, Charles	0	10	6
Phillips, John	0	10	6
Phillips, J. W.	0	5	0
Price, George	0	5	0
Seys, James A.	0	5	0
Young, John	0	10	6

Newport (Salop).

Picken, Thomas William	0	10	6

New Radford.

Jenkins, John Thomas	0	5	0

Newthorpe.

Robinson, Whiteley	0	5	0

Newton Abbot.

Butland, Charles	0	5	0
Poulton, John	0	5	0
Price, John	0	2	6
Wright, W.	0	5	0

Newtown (Mont.).

Morgan, Richard	0	10	6

New Whittington.

Slater, Arthur	0	5	0

Nice (France).

Jobson, Thomas	0	5	0
Woods, William H.	0	5	0

Norbiton.

Greenwood, J.	0	10	0
Playford, F. W.	0	2	6

Northallerton.

Fairburn, Joseph	0	10	6
Squince, John A.	0	5	0
Warrior, Henry	0	5	0
Warrior, William	0	10	6

Northampton.

Ashford, Evan Charles	0	5	0
Barry, James	1	1	0
Berry, J. P.	0	5	0
Bingley, John	0	10	6
Gulliver, George E.	0	5	0
Harris, Jane L.	0	5	0
Kirby, Frederick	0	5	0
Mayger, William D.	1	11	6
Merrick, Thomas J.	0	10	0
Negus, Samuel	0	15	0
Osborne, George C.	0	5	0
Saul, W. B.	0	5	0
Sindall, J. W. (Executors of)	0	5	0
Woolston, Thomas H.	0	5	0

North Kelsey.

Dixon, James	0	3	0

North Newbald.

Everatt, Robert	0	2	6

North Walsham.

Bailey, George Wm.	0	5	0

Northwich.

Lee, William	0	5	0
Ramsey, Joseph	0	5	0

Norwich.

	£	s.	d.
Caley, Albert J.	0	10	6
Cooke, William	0	5	0
Corder, Octavius	1	1	0
Cossey, John	0	5	0
Cripps, Johnson (Hackforth)	0	5	0
Cubitt, Charles	0	10	0
Forster, A. W.	0	2	6
King, H. A.	0	5	0
Mallett, H. P.	0	5	0
Roberts, R.	1	1	0
Robinson, James	0	5	0
Sutton, Francis	0	10	6
Taylor, H. E.	0	5	0
Thompson, H.	0	2	6
Watson, J. E. H.	0	10	0

Nottingham.

Beardsley, J.	0	5	0
Beverley, R. H.	0	5	0
Bolton, Charles Alfred	0	10	6
Chemists' Association	5	5	0
Dadley, Elijah	0	10	6
Dennis, John L.	0	10	6
Edgson, Hugh	0	10	6
Fitzhugh, Richard	1	1	0
Fletcher, Thomas	0	5	0
Flowerdew, W. C.	0	2	6
Holgate, S. V.	2	2	0
Jackson, Roberts	0	10	6
Lomas, Joseph	0	5	0
Lumby, Fred.	0	5	0
Manfull, H. J.	0	5	0
Mason, Thomas	0	10	6
Parker, W. H.	0	5	0
Patchitt, Edwin C.	1	1	0
Pearson, Edward	1	1	0
Potts, R. S.	1	1	0
Rayson, J. T.	0	5	0
Smithurst, John	0	5	0
Taylor, Thomas C.	0	10	6
Warriner, C. W.	0	5	0
White, Frank	0	10	6
Whitworth, John	0	10	6
Wilford, J.	0	10	0

Nuneaton.

Iliffe, George	0	5	0
Lester, Henry	0	5	0

Oakham.

Wellington, James	0	10	6

Old Brompton.

Stokes, Walter E.	0	10	0

Oldbury.

Holmes, Joseph P.	0	5	0

Oldham.

Bagshaw, William	0	10	6
Bates, H.	0	10	6
Berry, Thomas	0	5	0
Braddock, George	1	1	0
Brelsford, James	0	5	0
Glover, John S.	0	10	6
Goodall, Frederick	0	10	6
Hargraves, H. L.	0	10	6
Haslop, William	0	5	0
Lord, Robert B.	0	5	0
Potts, Walter	0	5	0

Olney (Bucks).

Wright, Ann	0	5	0

Ormskirk.

Garside, S. A.	1	1	0

Oswaldtwistle.

Haworth, William	0	5	0

Oswestry.

Evans, John	0	10	6
Roberts, William Carey	0	2	6
Smale, Mary E.	0	5	0
Smale, Richard B.	0	5	0
Vaughan, David	0	10	6

Otley (Yorks).

Blade, E.	0	5	0
Pratt, Richard M.	0	10	6

Oundle.

Turner, Robert	0	10	6

Over Darwen.

Shorrock, R.	0	5	0

Oxford.

	£	s.	d.
Bloxham, W. E.	0	5	0
Clayton, C.	0	2	6
Cousins, Thomas G.	0	5	0
Druce, George C.	0	5	0
Hill, James H.	0	5	0
Hitchcock and Son	1	1	0
Houghton, Thomas	0	10	6
Jenkins, Alexander	0	5	0
Luff, William	0	5	0
Modlen, Robert	0	5	0
Prior, George T.	0	10	6
Squire, James	0	5	0
Thurland, Henry	0	10	6
Walsh, Edward	0	10	6
Way, J. F.	0	5	0

Padiham.

Brewster, Thomas	0	5	
Webster, Paul	0	10	

Paignton.

Sherriff, George	0	5	

Paisley.

Cullen, Thomas	0	5	

Partick (N.B.).

Rait, Robert C.	0	10	

Pau (France).

Jarvis, John	1	1	
Smith, Charles C.	0	5	

Paulton (Somerset).

Bush, Thomas	0	5	

Pembroke Dock.

Lane, William	0	5	

Penarth.

John, W. D.	0	5	

Pendleton.

Hume, Thomas	1	1	
Robinson, Benjamin	0	10	

Penrith.

Kirkbride, William	0	5	
Redfern, Tom	0	5	

Pen-y-graig.

Lloyd, Rees	0	5	

Penzance.

Buckett, A. H.	0	5	

Perth.

Blair, R. P.	0	5	
Donald, David	0	7	
Newby, W. H.	1	1	

Peterborough.

Bodger, J. W.	0	5	
Bridges, G. A.	0	10	
Bright, Richard	0	10	
Carlton, Arthur	0	10	
Heanley, Marshall	0	10	
Knight, W. T.	0	5	
Pearson, John H.	0	10	
Sturton, J. R.	0	10	
Turner, R. P.	0	2	
Whitwell, Ewen	0	5	
Willson, Stephen J.	0	10	

Petherton.

Wellington, Frederick G. N.	0	5	

Petworth.

Morgan, Frank G.	0	10	

Pinner.

Trist, Richard	0	5	

Plymouth.

Adams, W. T.	0	5	
Allen, Joseph	0	10	
Balkwill, A. P.	0	10	
Barge, John	0	5	
Bennett, R. M.	1	1	
Burdwood, James	0	5	
Goodwin, Medmer	0	10	
Hearder, H. P.	0	10	
Hetherington, J. H.	0	5	
Hill, Richard C.	1	1	
James, John B.	0	10	
Luke, R. S.	0	5	
Maitland and Son	0	5	
Marsh, John	0	5	
Maurice, James	0	10	
Roper, R. F.	0	5	
Saunders, R. A.	0	10	
Sloggett, Thomas C.	0	5	
Turney, Samuel B.	0	5	
Woods, William	0	10	

	£	s.	d.
Pontardulais.			
Bowen, Ebenezer	0	10	
Pontefract.			
Bratley, William	0	5	0
Pontypool.			
Ford, Edward B.	0	10	6
Pontypridd.			
Key, W. H.	1	1	0
Poole.			
Atkins, T. W.	0	2	6
Hamilton, Julius	0	5	0
Penny, William	0	2	6
Williams, William F.	0	2	6
Port Elizabeth (Cape Colony).			
Willet, John A.	0	5	0
Porthcawl.			
Thomas, J. J.	0	5	0
Portishead.			
Frowd, Edward F.	0	10	6
Portobello.			
Kemp, David	0	10	6
Nesbit, John	1	1	0
Portsmouth.			
Parsons, William	0	10	6
Portsoy.			
Clark, James	0	5	0
Port St. Mary.			
Whineray, Edward	0	5	0
Preston.			
Barnes, L. R.	0	5	0
Barnes, T.	0	5	0
Carter, James (Bamber Bridge)	0	5	0
Foster, E.	0	5	0
Hinkley, E.	0	2	6
Miller, Nathaniel	0	5	0
Parker, Thomas	0	5	0
Ryder, John L.	0	5	0
Scott, Joseph	1	1	0
Sharples, George	0	5	0
Tomlinson Brothers	0	10	0
Waterworth, Alfred	0	10	6
Willan, William	0	5	0
Prestwich.			
Mercer, A.	0	10	6
Queenstown (Cape Colony).			
Mager, W. K.	0	10	6
March, William	0	5	0
Ramsey (Hunts.).			
Palmer, Frederick W.	0	5	0
Ramsgate.			
Franks, Alfred	0	5	0
Morton, Henry	0	5	0
Saunders, Charles J. H.	0	2	6
Reading.			
Bradley, Charles	0	5	0
Cardwell, E.	0	10	6
Craft, James	0	5	0
Cross, John	0	2	6
Davies, John	0	2	6
Hayward, William G.	0	5	0
Knowles, I. H.	0	5	0
Noad, Joseph	0	5	0
Powell, John	0	5	0
Rowell, John C.	0	5	0
Tunbridge, Frederick	0	5	0
While, William J.	0	5	0
Young, J. M. (Theale)	0	5	0
Reddish.			
Robinson, John T.	0	2	6
Redditch.			
Moule, William	0	5	0
Redhill.			
illitoe, F. S.	1	1	0
Retford.			
Baker, William	1	1	0
Slater, Francis	0	10	6
Rhymney.			
Dixon, Franklin	1	1	0

	£	s.	d.
Richmond (Surrey).			
Bletsoe, John	0	10	6
Clarke, Thomas M.	0	10	0
Hornby, Alfred	0	5	0
Lissiter, F. W.	0	2	6
Mumbray, R. G.	0	5	0
Parrott, John	0	10	6
Thacker, William	1	1	0
Richmond (Yorks).			
Thompson, John Thomas	0	5	0
Ringstead.			
Abington, Herbert J.	0	5	0
Ripon.			
Thornley, F.	0	2	6
Rochdale.			
Bamford, J. W.	0	5	0
Hadfield, James	0	5	0
Highley, William	0	5	0
Kerr, William	0	2	6
Mason, Arthur	0	5	0
Mercer, Thos. W.	0	5	0
Partington, William	0	2	6
Robinson, Ralph	0	5	0
Scott, W. H.	0	2	6
Taylor, Edward	0	5	0
Taylor, E. B.	0	2	6
Taylor, John	0	2	6
Whittaker, J. W.	0	2	6
Wood, John	0	5	0
Rochester.			
Barnaby, Henry	0	10	0
Foster, Alexander J.	0	5	0
Frost, John H.	0	5	0
Hewitt, Joseph S.	0	5	0
Rock Ferry.			
Dutton, John	0	10	0
Roehampton.			
Swain, James	0	5	0
Romford.			
Lasham, John W.	0	10	6
Pertwee, Edward	0	10	6
Romsey.			
Blissett, W.	0	10	6
Francis, George	0	5	0
Ross.			
Matthews, Thomas A.	0	5	0
Rothbury.			
Farrage, Robert	0	10	6
Rotherfield.			
Field, William	0	5	0
Rotherham.			
Horsfield, J. M.	0	5	0
Rothesay.			
Duncan, William	0	5	0
Macintosh, Archibald	0	5	0
Rugby.			
Chamberlain, A. G.	0	5	0
Lauder, Henry	0	5	0
Taylor, Robert	0	5	0
Rugeley.			
Hawkins, Henry F.	0	10	0
Ruthin.			
Magin, Arthur E.	0	2	6
Ryde (Isle of Wight).			
Brown, William Harry	0	2	6
Dixon, Henry	0	10	6
Flower, Thomas S.	0	5	0
Gibbs, William	0	10	6
Miller, Charles S.	0	5	0
Pollard, Henry H.	0	10	6
Smith, Tenison	1	1	0
Smith, William	0	2	6
Wallis, George	0	2	6
Rye (Sussex).			
Smith, Alfred W.	0	5	0
Waters, William A.	0	10	6
Saffron Walden.			
Machon, H.	0	15	6
St. Albans.			
Allenby, Henry	0	2	
Ekins, Arthur E.	0	10	6
Myers, L. J.	0	5	0

	£	s.	d.
St. Andrews.			
Cleghorn, Dr. H	0	10	6
Govan, Alexander	0	10	6
Kennedy, William	0	5	0
Kermath, W. R.	0	10	6
Kirk, John J.	0	2	6
St. Bees.			
Broomfield, R. W.	0	5	0
St. Blazey.			
Nettle, W. R. P.	0	5	0
St. Clears.			
Williams, Evan	0	10	6
St. Davids.			
David, Albert	0	2	6
St. Day.			
Corfield, Charles	0	10	6
Corfield, Thomas J. T.	0	10	6
St. Helens.			
Cotton, John	1	1	0
Harrison, James	0	5	0
Sherlock, Thomas	0	5	0
St. Just.			
Wearing, John	0	2	6
St. Leonards.			
Feaver, John	0	10	6
Maggs, F. W.	0	5	0
Maggs, Samuel B.	0	10	6
Neve, Francis C.	0	10	6
Skinner, W. M.	0	10	0
Thomas, Horace	1	1	0
St. Neots.			
Gudgeon, Geo. B. (Kimbolton)	0	5	0
Mellor, J. G.	0	5	0
Sale.			
Smith, Allen	0	5	0
Salisbury.			
Atkins, Samuel Ralph	1	1	0
Atkins, William R.	0	10	6
Hardy, R. E.	0	5	0
Newton, J. W.	0	10	6
Orchard, E. J.	0	10	6
Rowe, J	0	5	0
Westmoreland, W. H.	0	2	6
Saltash.			
Mathew, William H.	0	5	0
Saltburn-by-the-Sea.			
McLean, Kenneth	0	5	0
Taylor, William	0	5	0
San Remo (Italy).			
Squire, Frank R.	1	1	0
Sandgate.			
Jenner, William M.	0	5	0
Kennett, Edward	0	2	6
Walton, George C.	0	10	6
Sandwich.			
Baker, Frank	0	10	6
Dixon, William (Ash)	0	5	0
Williamson, J.	0	5	0
Sawston.			
Crampton, John	0	5	0
Scarborough.			
Chapman, Henry	0	5	0
Clare and Hunt	1	1	0
Cuttle, Arthur E.	0	2	6
Hughes, John E.	0	10	6
Smith, John F.	0	5	0
Whitfield, John	1	1	0
Seacombe.			
Holt, Richard W.	0	5	0
Walker, J. H.	0	5	0
Seaham Harbour.			
Storey, W.	0	5	0
Selby.			
Burton, John	0	5	0
Cutting, Thomas John	0	5	0
Selkirk.			
Dunn, Thomas	0	5	0
Settle.			
Shepherd, J. W.	0	5	0
Shaftesbury.			
Barry, Frederic	0	5	0

	£	s.	d.
Shanklin (Isle of Wight).			
Brown, Andrew Henry	0	10	6
Deeks, W. T.	0	2	6
Sheepshed.			
Moore, Thomas	0	5	0
Sheffield.			
Bradwall, J. H.	0	2	6
Carr, George	0	5	0
Clayton, William	0	10	6
Cubley, G. A.	0	10	6
Dunnill, G. H.	0	5	0
Ellinor, George	0	10	6
Elliott, John G.	1	0	0
Fletcher, Howard Bennett	0	10	6
Fox, A. R.	0	10	6
Froggatt, F. W.	0	2	6
Froggatt, John	0	2	6
Furness, Joseph M.	0	5	0
Hall, Thomas H.	0	10	6
Harrison, Henry	1	0	0
Learoyd, E. R.	0	5	0
Maxey, W. H.	0	5	0
Miller, John T.	0	5	0
Otley, John	0	10	6
Owen, George G.	0	10	0
Preston, Job	0	10	6
Priestley, Henry	0	10	6
Salisbury, John M.	0	10	6
Turner, John	0	5	0
Ward, William	0	10	6
Watson, H. J.	0	5	0
Watson, Robert W.	0	10	6
Westbrook, Dr. Charles	1	1	0
Wilkinson-Newsholme, G. T.	1	1	0
Shefford (Beds).			
Baigent, William Henry	0	10	6
Shepton Mallet.			
Cottrill, Gilbert Jones	0	5	0
Fudgé, Charles William	0	5	0
Shields, North.			
Bambridge, A. J.	0	5	0
Burn, Thomas	0	2	6
Gibson, James	0	10	6
Hogg, Joseph F.	0	2	6
Irvin, William G.	0	2	6
Stobbs, Robert	0	10	6
Wilson, Richard H.	0	2	6
Shields, South.			
Forrest, Robert	0	10	6
Mays, Robert J. J.	0	10	6
Noble, John	0	5	0
Shifnal.			
Clarke, Thomas E.	0	5	0
Shildon.			
Veitch, Thomas D.	0	5	0
Shrewsbury.			
Adams, William	0	5	0
Blunt and Moses	1	1	0
Cross, William G.	1	1	0
Goucher, John	0	10	6
Goulbourne, William	0	5	0
Jones, William	0	10	6
Longhurst, Edward	0	5	0
Pattison, Henry	0	2	6
Salter, Joseph B.	0	10	6
Sidcup.			
Gordelier, Frank H.	0	10	0
Sidmouth.			
Chessall, Rowland	0	5	0
Silverdale.			
Wilson, Edward	0	5	0
Sittingbourne.			
Gordelier, William G.	1	1	0
Slough.			
Elliman, Samuel F.	0	10	6
Griffith, Richard	0	10	6
Smallthorne.			
Fletcher, Thomas	0	10	6
Snaith.			
Bean, John	0	10	6
Southam.			
Archer, Thomas	0	2	6

	£	s.	d.
Southampton.			
Bienvenu, John	1	1	0
Bishop, Samuel	0	5	0
Borchert, Heinrich T. G.	1	1	0
Culverwell, John S.	0	5	0
Dawson, Oliver R.	0	10	6
Fletcher, J. B. (Totton)	0	10	0
Fresson, F. H.	0	10	6
Hughes, J. H.	0	5	0
Humby, Lewis W.	0	5	0
Johnson, W. E.	0	2	6
Miller, J.	0	10	6
Mumford, Alfred	0	10	6
Pell, John	0	5	0
Randall, William B.	1	1	0
Rubie, J. T.	0	5	0
Spearing, James	0	10	6
Troake, C. F.	0	5	0
Southborough.			
Rogers, Oliver	0	5	0
Southend.			
Dawson, George R.	0	5	0
South Molton.			
Cocks, James	0	2	6
Swingburn, Richard H.	0	10	6
Southport.			
Ashton, William	1	1	0
Ball, Henry	0	10	6
Ellis, George	0	5	0
Gillett, Joseph	1	1	0
Horsefall, John	0	10	6
Kershaw, James	0	10	6
Loadman, James	0	5	0
Mainwaring, R.	0	10	0
Radley, William V.	0	10	6
Righton, James	0	10	6
Round, Frederick	1	1	0
Steel, Alexander	0	10	6
Surr, Edward	0	10	6
Sykes, Thomas H.	0	10	6
Whitworth, James	0	10	6
Wimpenny, James M.	0	5	0
Wright, Thomas D.	1	1	0
Southsea.			
Bridge, G. E.	1	1	0
Childs, James L.	0	10	6
Cruse, Thomas H.	1	1	0
Ford, Horace S.	0	5	0
Futcher, Alfred J.	0	10	6
Parris, T. W.	0	5	0
Rowell, Robert H.	0	10	6
Sangster, John G.	0	5	0
Sapp, John J.	0	10	6
Southwell.			
Downing, J. H.	0	5	0
Southwold.			
Critten, Robert P.	0	2	6
Sowerby Bridge.			
Stott, William	0	10	6
Spalding.			
Asling, Brelsford	0	5	0
Donington, Robert	0	5	0
Shadford, Major	0	5	0
Steeper, Samuel	0	5	0
Spennymoor.			
Burden, Thomas A.	0	5	0
Stafford.			
Averill, Henry Alcock	1	1	0
Averill, John	1	1	0
Stalybridge.			
Brierley, Richard	0	5	0
Simpson, Allwood	0	5	0
Stamford.			
Dickinson, Frederick	0	10	0
March, Frederick	0	5	0
Stevenage.			
Fresson, Lewis Francis	0	10	6
Stockport.			
Chemists' Association	1	1	0
Johnson, Thomas J.	0	5	0
Kay, Brothers	2	2	0
Lowndes, Hervey	0	5	0
Orton, William B.	0	2	6
Sidley, Thomas I.	0	10	6
Towle, Samuel	0	10	6

	£	s.	d.
Stockton, South.			
Fryer, John	0	2	6
Ronchetti, T. A.	0	5	0
Stockton-on-Tees.			
Allan, James H.	1	1	0
Bainbridge, Robert R.	0	2	6
Brayshay, Thomas	1	1	0
Brayshay, William B.	1	1	0
Thompson, Thomas	0	10	6
Thomson Brothers	0	10	6
Stoke-on-Trent.			
Adams, Frank	0	10	6
Adams, William H.	0	10	6
Harris, Robert H.	0	5	0
Jones, John	0	10	0
Wilson, Clement Fisher	0	5	0
Stone (Staffs).			
Jenkins, Thomas H.	0	10	6
Slater, Thomas	0	10	6
Slater, Thomas, jun.	0	5	0
Stoneham.			
Sutton, Charles W.	2	2	0
Stonehouse.			
Daymond, Samuel	0	2	6
Netten, Henry J. T.	0	5	0
Rossiter, John	1	1	0
Snell, H. B.	0	10	6
Stony Stratford.			
Cashmore, James F.	0	5	0
Cox, Julia Jane	0	10	6
Robinson, William H.	0	10	6
Stourbridge.			
Bland, Thomas F.	0	10	6
Burgess, William	0	5	0
Clark, Thomas P.	0	5	0
Hughes, Samuel	0	10	6
Jones, Rowland G.	0	5	0
Loverock, Henry	0	5	0
Morris, Alfred P.	0	10	6
Perks, Francis	0	10	6
Whitwell, George	0	5	0
Wyatt, John	0	10	6
Stowmarket.			
Gostling, George J.	0	10	6
Simpson, Robert G.	0	5	0
Wilson, Thomas	0	5	0
Stratton.			
Pickard, Henry	0	5	0
Strichen.			
Lee, Alexander M.	0	5	0
Strood.			
Picnot, Charles	1	1	0
Stroud.			
Blake, William Frederick	0	10	6
Coley, Samuel J.	0	10	6
Sunbury-on-Thames.			
Truman, H. V.	0	2	6
Sunderland.			
Aslin, John	1	1	0
Fairman, George P.	0	10	6
Fowler, William	0	2	6
Harrison, John	0	10	6
Harrison, W. B.	0	10	[illegible]
Hopper, Richard	0	2	6
Leadbetter and Son	0	2	6
Mitchinson, John	0	2	6
Purse, Alfred D.	0	5	0
Ritson, Thomas	0	10	[illegible]
Surbiton.			
Acfield, William	0	5	0
Mence, W. C.	0	10	[illegible]
Sutton-in-Ashfield.			
Littlewood, Samuel	0	5	0
Swaffham.			
Bell, Frederick R.	0	5	0
Finch, Jacob	0	10	[illegible]
Swansea.			
Bonnett, Frederick	0	2	6
Cule, Taliesin	0	10	6
Davies, John	0	5	0
Davies, John	0	10	6
Davies, John	0	2	6
Davies, J. M.	0	5	0
Evans, D. L.	0	2	6
Frick, M.	0	5	0

Swansea—continued.	£	s.	d.
George, William	0	10	6
Grose, Nicholas M.	1	1	0
Hughes, James	0	5	0
Jones, H. Ellis	0	2	6
Jones, Moses	0	10	6
Keall, F. P.	0	10	6
Lloyd, John W.	0	5	0
Lowther, W.	0	5	0
Powell, D.	0	5	0
Rees, Daniel	0	5	0
Richards, J.	0	5	0
Roberts, J. K.	0	5	0
Williams, D.	0	5	0
Williams, J. T.	0	10	6
Yorath, Christopher	0	5	0
Swindon.			
Cook, W. R.	0	5	0
Green, John	0	5	0
Smith, William John	0	5	0
Tarporley.			
Aston, Walter	0	5	0
Taunton.			
Biffen, Thomas	0	10	6
Field, W. C.	0	10	6
Gregory, George H.	0	5	0
Hambly, Charles J.	0	10	6
Kirkpatrick, Samuel	0	5	0
Redman, Sidney	0	5	0
Sargent, John C.	0	10	6
Woollatt, Richard	0	5	0
Tavistock.			
Gill, William	0	2	6
Teignmouth.			
Cocking, Frederick J.	0	5	0
Cornelius, Joseph	0	10	6
Evans, Joseph J. O.	0	5	0
Pryer, H.	0	5	0
Tenbury.			
Slade, John	0	10	6
Tenby.			
Davies, Moses P.	0	5	0
James, George	0	5	0
Williams, William	0	10	6
Tewkesbury.			
Allis, Francis	0	5	0
Walker, Joseph	0	5	0
Wilkes, D. T. (Bredon)	0	2	6
Thame.			
Sutton, W. D.	0	5	0
Thirsk.			
Smithson, F. W.	0	2	6
Thornhill (N.B.).			
Fingland, James	0	5	0
Thornton Heath.			
Knott, Samuel	0	5	0
Thornton-in-Craven.			
Wilson, Thomas	1	1	0
Thrapston.			
Pars, R. C.	0	10	6
Titchfield.			
Smith, W. O.	0	10	6
Tiverton.			
Havill and Son	0	5	0
Rossiter, Thomas E.	0	5	0
Sanders, George Lee	0	5	0
Todmorden.			
Stevenson, W.	0	2	6
Torquay.			
Bathe, William	0	5	0
Bridgman, William Louis	0	5	0
Cocks, John W.	0	5	0
Cutmore, —	0	2	6
Farr, Edward H.	0	5	0
Guyer, James B.	0	10	0
Hearder, W.	0	5	0
Horton, Thomas	0	5	0
Knight, Benjamin	0	5	0
Ness, Thomas H.	0	5	0
Riches, Thomas	0	5	0
Shapley, Charles	0	10	0
Sloman, Richard	0	10	6
Smith, Edward	0	10	6
Smith, William	0	2	6
Taylor, John	0	10	6

Totnes.	£	s.	d.
Michelmore, P. W.	0	5	0
Morse, C. H. Stafford	0	5	0
Tredegar.			
Giles, Mrs.	0	2	6
Giles, William E.	0	2	6
Phillips, Charles L.	0	5	0
Treherbert.			
Jones, Rees T.	0	5	0
Trowbridge.			
Hayward, W. H.	0	5	0
Truro.			
Anstey, J. U.	0	5	0
Bucher, W. H.	0	5	0
Feaver, Samuel	0	10	6
James, Hamilton	0	5	0
Newby, Richard T.	1	1	0
Ninnis, T. M.	0	5	0
Percy, Thomas B.	1	1	0
Tunbridge.			
Gower, Alfred	0	10	0
Millidge, Thomas E.	0	10	6
Tunbridge Wells.			
Arnold, Spencer	0	10	6
Batting, Thos. G.	0	10	6
Cheverton, George	1	1	0
Dunkley, Edward	0	10	6
Howard, George W.	0	10	6
Howard, Richard	0	10	6
Mason, Michael	0	5	0
Sells, Robert J.	0	10	6
Whitrow, Benjamin	1	1	0
Tunstall.			
Keightley, Joseph	0	5	0
Tutbury.			
Green, Isaac	0	5	0
Tweedmouth.			
McIntyre, Peter S.	0	7	6
Twickenham.			
Alexander, William	0	5	0
Amoore, Lewis P.	0	10	6
Bishop, Thomas	0	10	6
Peake, Henry F.	0	5	0
Shelley, Henry	0	10	6
Twyford.			
Brooker, A. W.	0	5	0
Tynemouth.			
Atkinson, Joseph	0	5	0
Uckfield.			
Salter, Benjamin	1	1	0
Ulverston.			
Willan, Robert	0	10	6
Upton-on-Severn.			
Gibbs, John	0	10	6
Urmston.			
Duncalf, Richard	0	5	0
Usk.			
Marsh, G. W. F.	0	10	6
Uttoxeter.			
Johnson, John B.	0	10	6
Parker, Alfred	0	5	0
Woolrich, Charles B.	0	10	6
Ventnor (Isle of Wight).			
Littlefield, J. W.	1	1	0
Weston, Charles	1	1	0
Wadebridge.			
Philp, J.	0	5	0
Wakefield.			
Cardwell, James	0	5	0
Chaplin, John Lambert	0	10	6
Clarkson, B. F.	0	5	0
Duffin, Thomas	0	10	6
Hudson, Frank	0	5	0
Ibbotson, Fred	0	5	0
Moorhouse, Walter	0	5	0
Saville, George	0	10	6
Shaw, Mary	0	10	6
Smith, G. E.	0	10	6
Wice, J. H.	0	10	6

Wallingford.	£	s.	d.
Ashmall, George	0	5	0
Payne, Sidney	1	1	0
Upton, Eustace J.	0	10	6
Walmer.			
Wood, Henry	0	5	0
Walsall.			
Bate, Joseph William	0	5	0
Elliott, George	0	5	0
Partington, John J.	0	5	0
Walsham-le-Willows.			
Harrington, Arthur	0	5	0
Waltham.			
Teat, Thomas	0	5	0
Waltham Abbey.			
Griffiths, J. M.	0	10	6
Marshall, A.	0	10	6
Walton-on-Thames.			
Davies, C. E.	0	5	0
Power, Edward	0	10	6
Wantage.			
Marks, F. C.	0	5	0
Ware.			
Medcalf, Benjamin	0	10	6
Medcalf, Benjamin Pearce	0	10	6
Wareham.			
Marshallsay, Richard J.	0	5	0
Randall, Thomas	1	1	0
Warminster.			
Rogers, John M.	0	2	6
Rogers, Sydney	0	2	6
Warrington.			
Greenough, H. F.	0	2	6
Woods, J. H.	0	10	6
Young, John R.	0	10	6
Warwick.			
Hutton, Harry	0	2	6
Watford.			
Chater, Edward M.	1	1	0
Chater, Matthew Taylor	1	1	0
Cottle, Alfred James	0	5	0
Maries, H. D.	0	5	0
Wath-upon-Dearne.			
Hick, Allan	1	1	0
Watton.			
Vincent, Lacey A.	0	5	0
Weaverham.			
Manifold, John J.	0	10	6
Wednesbury.			
Gittoes, Samuel J.	0	10	6
Wells (Norfolk).			
Mann, George F.	0	5	0
Rump, Robert R.	0	5	0
Wells (Somerset).			
Manning, Richard James	0	10	6
Slater, Jonathan	0	5	0
Welshpool.			
Griffiths, Thomas	0	5	0
Welton.			
Myers, George Henry	0	5	0
Welwyn.			
Lawrance, Edmund	0	10	6
Wem.			
Bailye, W. R.	0	5	0
West Bromwich.			
Bullus, John	0	5	0
Haddock, Benjamin	0	10	6
Tunley, John	0	5	0
Westbury.			
Taylor, Stephen	0	2	6
Westbury-on-Trym.			
Collie, John C.	0	5	0
Westgate-on-Sea.			
Bessant, Frederick R.	0	10	6
Hutchinson, George B.	0	5	0

West Malling.

	£	s.	d.
Oliver, Henry C. H.	0	2	6
Stedman, Richard B.	0	5	0

Weston-super-Mare.

	£	s.	d.
Parkes, Harry C.	0	5	0
Duckett, F. W.	0	10	6

Wetherby.

	£	s.	d.
Jackson, John	0	5	0

Weybridge.

	£	s.	d.
Griffin, Thomas	0	10	6

Weymouth.

	£	s.	d.
Cole, W. B.	0	5	0
Gregory, William	0	5	0
Groves, Thomas B.	0	10	6
Hill, Henry	0	5	0
Livesey, James T.	0	2	6
Smith, Joseph	0	5	0
Stedman, Samuel S.	0	5	0
Targett, Charles G.	0	5	0
Tottle, Henry John	0	5	0

Whitby.

	£	s.	d.
Corner, Thomas B.	0	10	6
Frank, John	1	1	0
Stevenson, John	0	10	6

Whitechurch (Hants).

	£	s.	d.
Bailey, John H.	0	2	6

Whitehaven.

	£	s.	d.
Wilson and Kitchin	1	1	0

Wick (N.B.).

	£	s.	d.
Miller, Kenneth	0	5	0

Wigan.

	£	s.	d.
Dawson, Francis Robert	0	5	0
Hothersall, John	0	10	6
Johnson, Thomas	0	10	6
Kellett, Richard E.	0	5	0
Litherland, H.	0	5	0
Phillips, Jonathan	0	10	6

Wilmslow.

	£	s.	d.
Charnley, Charles	0	10	6

Wimbledon.

	£	s.	d.
Dowdeswell, Jonathan	0	5	0
Spencer, W. G.	0	5	0

Wimborne.

	£	s.	d.
Huntley, G. F.	0	10	6
Jones, Henry	0	10	6

Winchcombe.

	£	s.	d.
Hall, Alfred L.	0	5	0

Winchester.

	£	s.	d.
Barratt, F. J.	0	5	0
Knight, George E. Moses	0	5	0
Powell, Edward	1	1	0
Powell, Edward F.	0	10	6

Windsor.

	£	s.	d.
Collins, Henry G.	0	5	0
Dakin, John P.	0	2	6
Grisbrook, Edward	0	5	0
Harmer, J. D.	0	5	0
Russell, Charles J. L.	0	10	6
Westlake, Bernard	0	10	6
Wood, Robert	0	5	0

Wingate.

	£	s.	d.
Cross, John T.	0	10	0

Wingham.

	£	s.	d.
Palmer, Henry B.	0	5	0

Winslow.

	£	s.	d.
Parrett, Edward	0	5	0

Wisbeach.

	£	s.	d.
Maxey, John T.	0	5	0

Wishaw.

	£	s.	d.
Macfarlane, T. B.	0	5	0

Witham.

	£	s.	d.
Green, Robert P.	0	10	6
Ward, Francis E.	0	5	0

Witney.

	£	s.	d.
Purdue, Thomas	0	5	0

Wokingham.

	£	s.	d.
Spencer, Thomas	0	10	6

Wolverhampton.

	£	s.	d.
Cannell, William	0	10	6
Coleman, William	0	10	6
Fleeming and Son	0	10	6
Gibson, F. J.	0	5	0
Hamp, John	0	5	0
Stanway, Edward Thomas	0	10	6
Weaver, Alfred C.	0	10	6

Woodbridge.

	£	s.	d.
Betts and Son	0	10	6

Worboys.

	£	s.	d.
Nichols, Arthur F.	0	2	6

Worcester.

	£	s.	d.
Ferneley, Charles	0	10	6
George, Henry	0	10	6
Hall, Frederick J.	0	5	0
Hinks, John	0	10	6
Horniblow, W. T.	0	5	0
Kitson, Edward J.	0	10	6

Worcester—continued.

	£	s.	d.
Lunn, Thomas	0	10	6
Masters, Charles	0	5	0
Steward, John A.	0	10	6
Timms, Mrs.	0	10	6
Twinberrow, John	1	1	0
Virgo, Charles	1	1	0

Workington.

	£	s.	d.
Bowness, William	0	5	0
Mason, Joseph R.	0	5	0

Worksop.

	£	s.	d.
Baxter, George	0	5	0
Jones, George W.	0	5	0
Wyatt, William	0	5	0

Worthing.

	£	s.	d.
Chaplin, Alfred	0	10	6
Cortis, A. B.	1	1	0

Wrotham.

	£	s.	d.
Romans, Thomas W.	0	10	6

Wycombe.

	£	s.	d.
Harding, Robert	0	5	0
Lansdale, John A.	0	5	0
Wilford, J.	0	5	0

Wyke.

	£	s.	d.
Drake, William	0	5	0

Wymondham.

	£	s.	d.
Skoulding, William	0	5	0

Yarm.

	£	s.	d.
Reed, George	0	10	6

Yarmouth.

	£	s.	d.
George, Alfred W.	0	2	6
Mornement, Henry J.	0	5	0
Poll, W. S.	0	2	6
Pratt, Edward J.	0	5	0
Steward, Alfred	0	5	0
Welch, Alfred E.	0	5	0

Yaxley.

	£	s.	d.
Farr, Joseph	0	10	6

Yeadon.

	£	s.	d.
Blatchley, Thomas	0	10	6

Yeovil.

	£	s.	d.
Harwood, Henry T.	0	10	6

York.

	£	s.	d.
Batty, Thomas	0	5	0
Capes, John Henry Cooper	0	5	0
Croskell, C.	0	10	6
Davison, Ralph, Executors of the late	1	1	0
Parker, Thomas	0	5	0
Saville, John	1	1	0
Wand, Thomas	0	5	0

DONATIONS RECEIVED DURING 1883.

	£	s.	d.
Atkins, Samuel Ralph, Market Pl., Salisbury	21	0	0
Barnett, John Arthur, 23, Cromwell Place, South Kensington, London, S.W.	5	5	0
Bird, Augustus, Wood Lane, Shepherd's Bush, London, W.	10	10	0
Buck, Thomas, Stamford Hill, London, N.	105	0	0
Fennings, Alfred, West Cowes, Isle of Wight	5	10	0
Humpage, Amelia (in memory of her Father, B. Humpage), 5, William's Terrace, Chiswick, London, W.	50	0	0
Ive, William, 115, Gloucester Road, South Kensington, London, S.W.	10	10	0
Jamie, Robert, Singapore	5	5	0
Matterson, Edward Hardwick, Bradford Road, Dewsbury	21	0	0
Maw, Charles, 7 & 12, Aldersgate Street, London, E.C.	105	0	0
Maw, Charles Trentham, 7 & 12, Aldersgate Street, London, E.C.	26	5	0
Probyn, Clifford, 55, Grosvenor St., London, W.	10	10	
Roberts, Jane Elizabeth, Malta Villa, Grove Road, Surbiton	5	5	0
Thomas, John Darby Dermott, Ashley Road, Bristol	5	5	0

ABSTRACT OF RULES IN REFERENCE TO VOTES AT THE ELECTIONS OF ANNUITANTS.

Annual Subscribers of—Half-a-crown are entitled at each election of Annuitants to ONE Vote.
Five Shillings ... ... TWO Votes.
Half-a-guinea ... ... FIVE Votes.
One Guinea ... ... TEN Votes.
And to increase in the same proportion.
Five Guineas are entitled to ... ... FIVE Votes for life.
Ten Guineas ... ... TEN Votes for life.
And to increase in the same proportion.

Should any Subscriber or Donor, or the widow of any Subscriber or Donor, become a Candidate for an annuity, such number of votes shall be placed to his or her credit, at the first succeeding election, as shall be represented by the whole amount of subscriptions or donations to the Benevolent Fund he or she (or, in the case of a widow, her husband) may have contributed.

Cheques and post office orders to be made payable to ELIAS BREMRIDGE.

FORM OF BEQUEST TO THE BENEVOLENT FUND.

"*I give and bequeath the sum of* *unto the* PHARMACEUTICAL SOCIETY OF GREAT BRITAIN, *the same to be paid out of my pure personal estate, and to be applied for the purposes of the* BENEVOLENT FUND *of the said Society.*"

THE COMPOSITION OF POTASSÆ SULPHAS CUM SULPHURE.*

BY T. MABEN AND M. DECHAN.

Having found in the course of business that the potassæ sulphas cum sulphure of commerce varied considerably in character, our attention was directed to the preparation of the substance, and it subsequently occurred to us to ascertain its composition and, if possible, the causes of the variations therein. This very old remedy was at one time held in high estimation, but of late years it has fallen into disuse, save in its connection with the preparation of artificial Harrogate salts. So far as we know, its composition has never been systematically investigated, which is, however, hardly to be wondered at, seeing that the substance has only a limited application.

The directions for the preparation of pot. sulph. c. sulph. are as follows:—"Take equal parts of nitrate of potass and of sulphur and mix them thoroughly. Throw the mixture in small successive portions into a red hot crucible and when the deflagration is over and the salt has cooled, reduce it to powder and preserve it in well-closed bottles."† When prepared strictly in accordance with these directions, the salt obtained varies very little in composition, provided small quantities only are operated with; with large quantities considerable variation may be expected.

The colour of the substance ranges from yellowish-white to grey. The more yellow powder is obtained when the preparation is conducted throughout at a red heat, the colour varying slightly with the temperature. If a glazed crucible is employed and care taken in the preparation, the salt should always be more or less of a yellow colour.

Very different opinions have been expressed regarding its composition, but this is not at all surprising; considering the difficulty of obtaining specimens of the salt identical in every respect, it would be a matter for surprise had it been otherwise. One author states that the popular idea that it contains sulphate of potass with a little sulphur is, so far, incorrect; another, that it is composed of "sulphate mixed probably with some sulphite;" while a third thinks that in the reaction that takes place "sulphuret with sulphite, hyposulphite or sulphate are probably formed." Christison found that "sulphuretted hydrogen is not disengaged on a strong acid being added," while the late Mr. John Mackay‡ states that this gas was given off on the addition of water. Mr. Mackay's opinion was that the substance consists of sulphate and sulphuret of potash and free sulphur in the respective proportions of 55, 35 and 10.

It is more than probable, in consideration of these conflicting opinions, that the authorities cited have been describing, under the same name, salts in some respects quite distinct from each other, and our own experience strongly supports this conjecture.

We have met with specimens of the salt that did not give off appreciable quantities of sulphuretted hydrogen on the addition of a strong acid, while other specimens evolved an abundant supply of that offensive gas on being mixed with cream of tartar and water.

The cause of this variation is, as already stated, the degree of heat employed. Thus, we found that if the crucible is brought to a dull red heat before commencing operations, and this temperature maintained throughout, the percentage of sulphide is reduced to a minimum. If, on the other hand, the mixed powders are thrown into the crucible before red heat is attained, even though deflagration takes place, or if the heat is withdrawn before the operation is complete, the proportion of sulphide is certain to be higher than in the former case. If prepared in small quantities there is no difficulty in having a compound practically free from sulphide, as the necessary temperature for this end can be well kept up, but with large quantities this is not possible.

It is quite easy, therefore, to account for the different results obtained by Christison and Mackay. The former would doubtless prepare only a small quantity, and that at a red heat according to the directions, while the latter operated with large quantities, and he expressly states that he began to throw in the mixture before red heat was attained, one of his reasons for so doing being that the loss was greater at the higher temperature. We have verified this statement, having found that from 40 to 45 per cent. of finished product can be obtained according to the temperature employed.

We have analysed the seven samples which are on the table, the detailed results being as follows:—

	1	2	3	4		6	7
Potassic sulphate . .	95·9	92·5	97·75	96·5	97·0	96·0	97·5
Potassic sulphide . .	0·6	1·2	0·4	0·1	0·7	0·8	0·6
Free sulphur	1·0	0·4	0·5	0·5	0·4	0·5	Trace
Insoluble matter . .	0·5	4·1	0·5	1·5	0·6	0·5	0·25
Moisture and loss . .	2·0	1·8	0·85	1·4	1·3	2·2	1·65
	100·0	100·0	100·00	100·0	100·0	100·0	100·00

Nos. 1, 2, 3 and 6 were bought in the usual course of business; Nos. 4, 5 and 7 were prepared by ourselves. No. 4 was prepared in very small quantity and at red heat; No. 7 was also prepared at red heat, but in larger quantity, and No. 5 was prepared at the lowest temperature at which deflagration took place. No. 2 contains a trace of sulphite from which the others are free. None of the samples contain hyposulphite. The insoluble matter in No. 2 was chiefly iron; the salt had evidently been prepared in an iron crucible. No. 4 was prepared in a Hessian crucible, which may account for the larger proportion of insoluble matter in it than in Nos. 5 and 7.

The sulphate was estimated with barium in the usual way. The sulphide, being present in rather small quantities for weighing, was estimated by means of sodic nitroprusside, the colour reaction of which is exceedingly delicate, though, without special precautions being taken, it is difficult to obtain reliable results by means of this reagent. The sulphide was present as one of the polysulphides, probably the pentasulphide. Owing to the intense heat required in the preparation, it is almost impossible for hyposulphite to be formed, while with the nitric acid as an additional oxidizer, the presence of sulphite other than as traces can hardly be expected.

It will be noticed that while all the samples contain sulphide, No. 2 alone can be said to have more than a trace. It is perfectly possible, however, that the salt may be prepared under such conditions that it will contain a larger percentage of the sulphide should such be desired. So far as we can judge all the samples on the table have been carefully pre-

* Read at an Evening Meeting of the North British Branch of the Pharmaceutical Society, February 20, 1884.

† 'Edin. Pharm.,' 1841.

‡ *Pharm. Journ.*, [1], i., p. 319.

pared according to the directions already quoted, but we have met with those regarding which this could not be said.

The question now arises, ought pot. sulph. c. sulph. to contain sulphide or not when used to make Harrogate salts? It is well known that this preparation has very little relation to the Harrogate mineral water, and, but for the sulphurous odour, would bear no resemblance whatever to it. As, however, Harrogate salts is a standard article, and in very great request as a family remedy, it is of importance that its composition should be as uniform as possible. Some might argue that since Harrogate water gives off sulphuretted hydrogen, so also ought a solution of Harrogate salts; while others might very fairly hold that the artificial compound has no relation to, and whatever may have been the original idea, it ought not now to be regarded as a substitute for, Harrogate water.

If the general opinion of the trade was in favour of a compound containing no sulphide the wholesale houses would soon satisfy the demand, and *vice versâ*. At present each maker will doubtless have his own standard, and unless the substance be always got from the same source its character is sure to vary. Indeed, as we have pointed out, variation may even occur to a considerable extent in different samples supplied by the same house. It is with the view of directing attention to this, the effects of which had frequently given us annoyance before we recognized its cause, that we have placed on record the results of our investigation.

PIPITZAHOIC ACID OR VEGETABLE GOLD.

BY THOMAS GREENISH, F.C.S.

At the annual general meeting of the German Apotheker Verein, which took place last autumn (1883), in Wiesbaden, there was exhibited by Herr Vigener, of Bieberich, a sample of a Mexican drug, rad. pereziæ, called by the natives "raiz del pipitzahuac." This root, but little known in Europe, has long been medicinally employed in Mexico, where it is much esteemed by the natives as an agreeable and energetic purgative. Prepared with brandy, it is considered by them a universal remedy for all diseases, including cholera. It is chiefly found in North Mexico in the valley of Tenancingo in the province of Toluca. Together with the root there were shown some samples of pipitzahoic acid which had been extracted from it in a more or less impure condition, varying with the solvents used—one specimen being in fine flakes, the result of subsequent sublimation, and of a brilliant golden yellow colour, hence the name "vegetable gold" applied to this product of the root.

The first notice of this drug in European scientific literature is in 1855, when Dr. Schaffner, a young German pharmacist, obtained of Dr. Leopold Rio de la Loxa, Professor of Chemistry and Pharmacy in Mexico, a sample of the pipitzahoic acid isolated first by him in a crude state by the dry distillation of the root, and also a second specimen of the acid, one of greater purity, the result of extraction with alcohol and subsequent crystallization.

A small quantity of this acid was forwarded to Professor Liebig for analysis, and he handed it over to his assistant, Weld. A notice of this analysis will be found in the *Annalen der Chemie und Pharmacie*, 1855. The sample was found to be soluble in spirit, but not completely soluble in absolute alcohol or ether, and almost insoluble in water; but as the pure acid is soluble in absolute alcohol and ether, Weld concluded that the sample was contaminated with some foreign resinous substance. On the evaporation of the alcoholic solution the pipitzahoic acid crystallized in leafy tufts and from the ethereal solution in small shining oblique-rhombic tabular crystals. The acid, of a golden colour, remains unaltered in the air; it is almost insoluble in water, easily soluble in alcohol and in ether, from which it is precipitated by water in a voluminous yellow mass. It melts at 100° C. to a red fluid which on cooling assumes a crystalline form. At a temperature only a little above 100° C. it volatilizes without decomposition and condenses in golden yellow leaves. The small quantity of acid at the disposal of Weld did not allow of his making further experiments, but the chemical formula he gives as $C_{30}H_{20}O_6$.

From 1855 to 1876 the literature of chemistry, pharmacy or medicine makes no mention of this substance, but Mr. J. R. Jackson, in his report on the Chemical and Pharmaceutical Products in the Philadelphia Exhibition, 1876, referring to the Mexican exhibits says, "Amongst chemical products are first pipitzahoic acid and pipitzahuina, the extracts of a composite plant variously stated by different writers as, *Perezia fruticosa*, *Acourtia rigidia*, *Dumerilia alamani*, and in the Mexican catalogue as trixis pipitzahoac. The organic compounds extracted from this plant are described as interesting not only because of their novelty but of their prospects of future usefulness. Pipitzahoic acid is of a 'brilliant golden colour and of a soft silky texture, being contained either in an amorphous state or crystallized in small prisms and laminæ.' At present pipitzahoic acid is employed in medicine as a drastic purgative; it can also be used as a colouring matter."

It is remarkable that a substance so interesting as this acid should have received so little attention; but this may probably be due to the difficulty experienced in procuring a supply of the raw material. Yet the fact of it being extensively used in Mexico as a domestic purgative points to the probability of its existence there in some quantity, and within easy reach of the natives requiring it.

The method adopted by Herr Vigener to obtain the acid which he exhibited was making a tincture with 1 part of the powdered root and 5 parts of nearly absolute alcohol; to the tincture thus prepared, boiling water was added to a point of dilution when the acid separated from the fluid in crystalline scales; by repeated solution and recrystallization it was obtained in a tolerably pure state. All his samples, however, the results of extraction by different menstrua, on being sublimed, left more or less of a tarry residue. The sublimed product had also a trace of it, but he purposed experimenting further in this direction, and hoped by repeated sublimation to obtain an acid in a state of greater purity and free from the contamination. The fine purple colour which this acid yields when mixed with alkalies or alkaline carbonates induced Herr Vigener to think that in chemical investigation there was a future for this substance as a colour indicator.

Pipitzahoic acid appears to be an anthraquinone derivative, but differs from every other through the property it possesses of subliming without decomposition at a very low temperature, even that of a water-bath, and subsequently condensing in golden crystals.

Through the courtesy of Herr Vigener I was presented with a few of the roots and a very small quantity of his sublimed acid, and on my return to England it occurred to me that a histological investigation embodying the chief characters of the root without needless detail would possess some interest, more especially as the pipitzahoic acid is allied to and possesses some features in common with chrysophanic acid.

Botanically, the Perezia plant belongs to Mutisiaceæ, a subdivision of the Labiatifloræ (Compositæ); it has no representative in Europe, but is found, with allied plants, in Central America and Mexico.

The roots, as furnished me, were in pieces of from 8–10 cm. long and 2 mm. thick, externally of a brown or reddish-brown colour, more or less furrowed longitudinally on the surface, apparently through the shrinking of the root in the process of drying; its taste was decidedly bitter, leaving a pungency on the tongue which remained after the bitterness had passed off, and this pungency was somewhat persistent.

In a transverse section of the root the yellow spots of pipitzahoic acid were visible to the naked eye, and more distinctly seen in their relation to the other parts when the section was slightly magnified with a lens, as in fig. 1. A segment of the

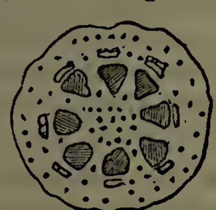

Fig. 1. Section of root, slightly magnified.

same section more highly magnified is seen in fig. 2.

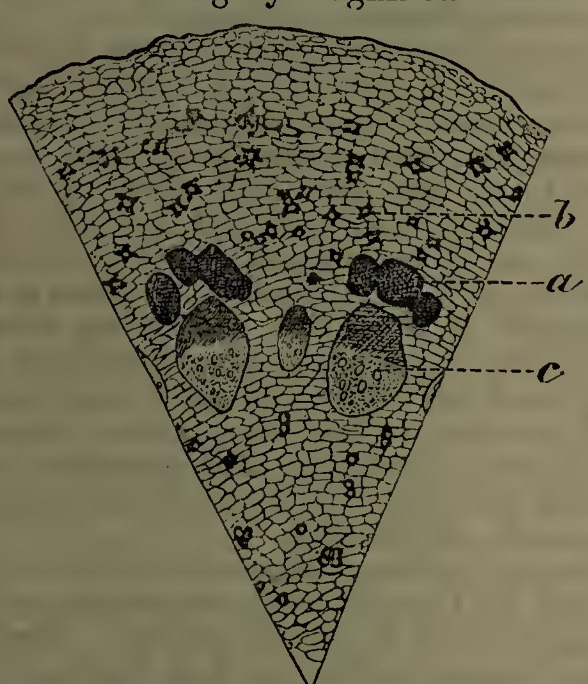

Fig. 2. Transverse section; *a*, pipitzahoic acid; *b*, stone cell; *c*, vascular bundle.

The outer cortical layer consists of a double row of thickened tabular cells, tangentially disposed and deeply coloured; this is followed by a layer, several cells deep, of collenchymatous tissue passing inward to the fundamental parenchyma of the root. *a* represents the pipitzahoic acid in its secreting cells, in groups of from three to five; the acid is in yellow lumps of a crystalline structure. These depositories of the acid, striking in the entire section, are arranged in a circle and correspond to the fibrovascular bundles indicated by *c*. The stellate spots *b* scattered throughout the fundamental tissue from the collenchyma to the centre of the root are due to certain cells only of the tissue becoming thickened by secondary deposit, and converted into sclerenchymatous or stone cells with laminated structure, the intercellular spaces being filled with a dark coloured deposit. These cells are found mostly single, but occasionally in groups of two, three or more. Fig. 3 is a longitudinal section showing, in

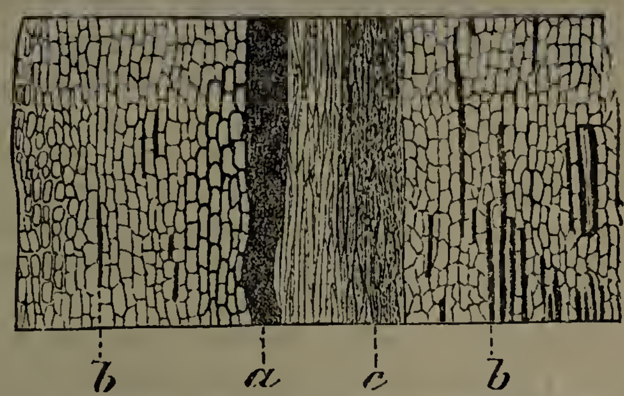

Fig. 3. Longitudinal section.—*a*, pipitzahoic acid *b*, stone-cell; *c*, vascular bundle.

addition to the relative positions of the cells referred to, the more characteristic constituents of the root as pipitzahoic acid, and the dark deposit around the stone cell traversing the length of the root. Fig. 4

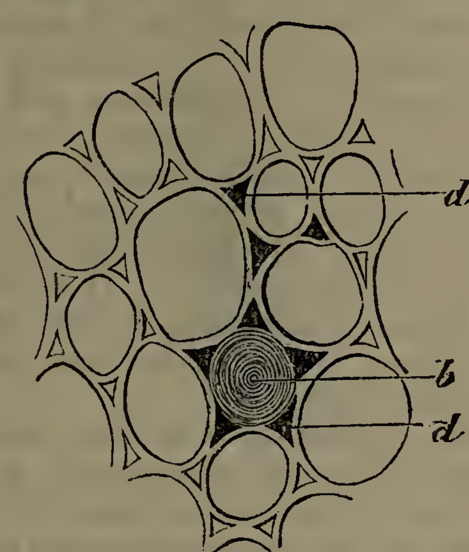

Fig. 4. Transverse section, showing a stone-cell.—*b*, stone-cell; *d*, intercellular secretion or deposit.

is a still further enlargement of the stellate spots as seen in fig. 2, the intercellular dark deposits with and without the presence of a stone cell are depicted in this drawing. Fig. 5 is a longitudinal section

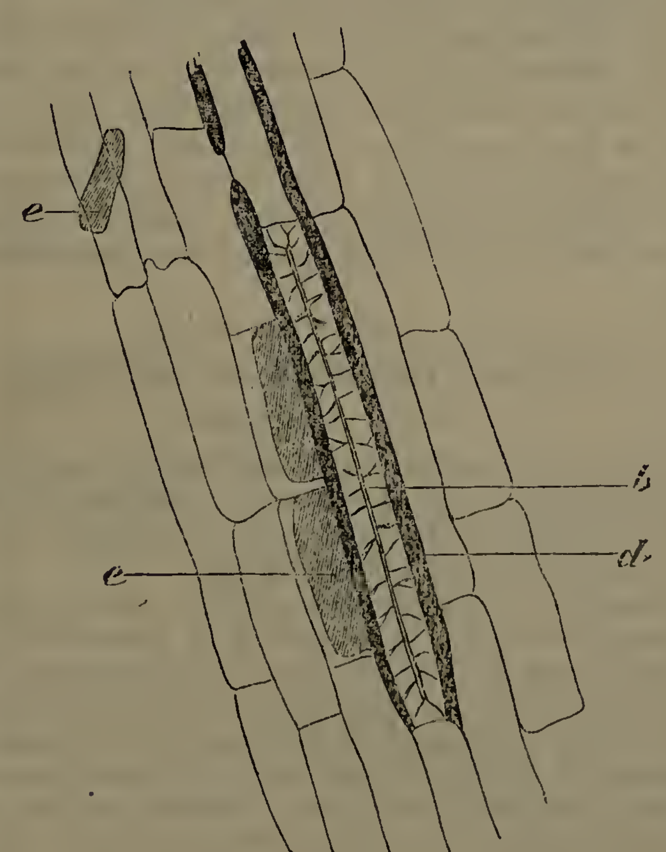

Fig. 5. Longitudinal section, showing a stone-cell. *b*, stone-cell; *d*, intercelluar secretion; *e*, inulin.

showing a stone cell in its entire length and surrounded throughout by the deposit just referred to. Most of the parenchymatous cells contain grains of inulin, which are seen at *e*, *Perezia* being one of the Compositæ, and containing inulin as the equivalent of starch present in the plants of other orders.

This brief account of the microscopical structure of the Perezia root will, with the drawings, serve to make the more salient features in its histology intelligible. The quantity of root placed at my disposal was only 2 grammes, and that of acid 0·33 of a gramme; it must, therefore, be obvious that few experiments beyond those afforded by micro-chemistry could be undertaken.

A transverse section of the root in which the lumps of pipitzahoic acid were visible was subjected to micro-sublimation on a microscopic glass slide, and at a little over 100° C. the acid sublimed on the cover-glass in yellow crystals. An alcoholic tincture of the root, yellow from solution of the acid, brought into contact with a dilute solution of caustic alkali or alkaline carbonate, developed that fine purple colour which induced Herr Vigener to suggest a probable future for the acid as a colour indicator in chemical investigations. The tincture on evaporation yielded crystals of pipitzahoic acid.

I was unable to satisfy myself as to the character of the intercellular dark deposit *d*. It was not affected by alcohol, ether, benzol, chloroform or turpentine; neither did caustic alkali dissolve it; it was decomposed by nitric acid. If from the negative results of these experiments I may be allowed to offer an opinion, it would be that the deposit in question is dried latex.

When the pipitzahoic acid first came under my notice it occurred to me as probable that its formation might be due to a degradation of tissue and a rearrangement of its elements similar to that which takes place in araroba or goa powder; but a careful anatomical investigation does not support that view. It appears to be a true secretion in certain cells occupying the same relative position throughout the root, and unaccompanied by any of that breaking down of the surrounding cells so marked in the microscopical investigation of araroba.

The *Perezia* may prove a valuable medicinal plant, but to determine that point there are yet wanting those careful therapeutic investigations which should precede the appearance in general practice of any new drug, a series of well conducted experiments which very few seem capable of conducting, and for the results of which still fewer have the patience to wait.

DIASTATIC FERMENT OF BACTERIA.*

BY J. WORTMANN.

Recent investigations have conclusively established the universal occurrence of diastatic ferments in different parts of plants, and have thrown a new light on the processes of nutrition and fermentation.

According to earlier observations, the presence of diastase in the plant was limited to germinating wheat or barley, and knowledge in regard of its wider diffusion has been advanced by the recent works of Gorup-Besanez, Will, Kranch, and especially Baranetzky. The researches of Musculus, E. Schulze, O'Sullivan, and others, have afforded an insight into the quantitative relations and the modifying external factors of temperature and acidity concerned in the action of diastase in the transformation of starch into glucose.

Having in view the action of bacteria as causes of putrefaction or fermentation, in which the destruction of the putrescible or fermentescible body is accomplished by the appropriation for the purpose of nutrition by the bacteria of constituent nitrogen or carbon, the question may be asked—Can bacteria also obtain their carbon from starch, just as by the researches of Pasteur and Cohn they have been proved to be capable of obtaining it, not only from sugar but from ammonium tartrate? Are bacteria, by the secretion of a starch-transforming ferment analogous to diastase, or in any other but not clearly defined way, capable of transforming starch into soluble, diffusible, and nutrient combinations? Notwithstanding the numerous investigations into the chemical and physiological relations of bacteria, very little has been made out in regard to their action on starch—a circumstance from which it may be presumed that the solution of starch by bacteria can be effected only in certain instances. In his work, 'Ueber die niederen Pilze,' Naegeli refers to the secretion by these organisms of a special energetic ferment capable of changing milk-sugar into fermentescible sugar, starch and cellulose into glucose, and of dissolving coagulated albumin and other albuminates, and Sachsse alludes to the circumstance of starch solution undergoing no change so long as it is protected from the influence of organic germs by which otherwise it quickly undergoes transformation.

Some experiments, made by the author in the summer of 1881 with milky juices, led him to believe that certain appearances of corrosion exhibited by the starch granules present must be due to the action of bacteria. The result of further precise experiments, undertaken to decide this point, led to the conclusion that bacteria are capable of drawing their supply of carbon from starch, and that the appearances of solution or corrosion exhibited by the solid starch granules are identical with those caused by the action of diastase or saliva.

The method used by the author was as follows:—To about 20 or 25 c.c. a mixture of inorganic salts (sodium chloride, magnesium sulphate, potassium nitrate, and acid ammonium phosphate) in equal proportions was added to the extent of 1 per cent. The same quantity of solid wheat-starch was then added, and the liquid then inoculated with one or two drops of a strongly bacterial solution, shaken, corked, and allowed to remain in a room at a temperature of 18° to 22°. [*Bacterium termo* was the predominating organism in the inoculating fluids employed.] In from five to seven days, the first signs of commencing corrosion of the starch grains become visible, the larger grains being the earliest attacked, and much later, when these have almost completely disappeared, the lesser granules are attacked.

In a second series of experiments soluble starch was substituted for the solid form, the progress of the reaction being watched by the aid of iodine. Samples taken from time to time exhibited at first the blue colour, then violet or dark red, passing to wine-red, and, finally, when the starch had disappeared, underwent no change.

As Baranetzky has shown, the starch granules of different kinds are acted on with very unequal rapidity by the diastatic ferments of plant juices, the strongest ferment of all—malt diastase—being well known to have no perceptible influence, even after long exposure, on solid potato-starch granules, whilst wheat and buckwheat are dissolved with facility.

Experiments were made with a view to ascertain whether the action of bacteria on starch was analogous; in these, wheat-starch grains are shown to be by far the most readily attacked by bacteria—in several instances having even completely disappeared before other sorts of starch were attacked. Differences were also noticed in regard to the times when palm-starch, canna-starch, turmeric-starch, and iris-starch were attacked, their degree of resistance being in the order given. Potato-

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* From *Zeitschr. Physiol. Chem.*, vi, 287–329. Reprinted from the *Journal of the Chemical Society.*

starch alone resisted attack. When wheat-starch in the solid state was mixed with starch solution or with starch-paste, the solution became entirely (and the paste in greater part) changed before the solid granules were attacked.

With regard to this unequal power of resistance shown by different kinds of starch, the author concludes from his further observations, that the difference of rapidity with which a given kind is attacked and dissolved by a ferment is inversely proportional to its density, provided always that the granules in question are entire and uninjured by cracks or fissures. In the same way are explained the differences in point of time in which granules of the same kind are sometimes observed to undergo change accordingly as these are intact or otherwise.

The cause of potato-starch, or of bean-starch, and, even under certain conditions, wheaten starch resisting attack, in spite of the abundant presence of bacteria, is apparently to be sought for in the fact that other more easily accessible sources of carbon nutriment were also present, certain albuminoid constituents of the potato slices or of the beans employed affording this more readily than the starch granules, just as in the experiments, above cited, with wheaten starch solution and solid wheaten starch, the former was preferentially attacked; only after all, or at the least chief portion of the albuminoids present, had been used up was the starch in these cases attacked.

Experiments were also made with the same results in which, after Cohn, ammonium tartrate was employed along with starch as a nutrient medium for the bacteria, with the result that so long as even a trace of this salt was present with the starch, the latter was not attacked by bacteria in the slightest degree, but, on its disappearance, appearances of solution became at once visible in the starch granules. Another point was also established in the course of these experiments, that if air is excluded, no appearances of corrosion or solution of the starch granules are manifested.

Other researches were made to answer the problem as to whether the nature of this action of bacteria on starch was such that an unformed ferment analogous to diastase was secreted by those organisms to which the corrosive appearances may be ascribed, these being, as already stated, precisely similar to the resulting action of diastase itself.

That the starch in the process became changed in part to glucose was easily ascertained by testing with Fehling's solution, and a detailed series of experiments, made with a view to eliminating if possible the ferment itself, yielded evidence showing that bacteria possess the remarkable property of producing a starch-transforming ferment only when no source of carbon other than starch is at their disposal, and this ferment is incapable of changing albumin into peptone, just as in the case of diastase. It is well known that the pepsin of gastric juice acts only in an acid medium. The plant juices which possess a diastatic property exhibit likewise a more or less acid reaction, so that as Baranetzky assumes, the co-operation of an acid in the case of diastase is a necessary condition of its activity. The solutions in which starch in one or another form was submitted to the action of bacteria were always slightly acid, due to the presence of acid ammonium phosphate, and when the solutions were purposely made neutral, the process of starch transformations went on more slowly. Detmer some time since has shown that addition of small quantities of citric acid to a solution containing diastase, hastens its action on starch. The author's observations are in harmony with this, but in addition show that the process of starch transformation by bacteria is capable of going on in the absence of acid, and that the bacteria do not yield any acid in the process. The results of the author's researches may be briefly recapitulated.

1. Bacteria are capable of acting on starch, whether in the solid state, as paste, or in solution, in a manner analogous to diastase.

2. As in the case of diastase, different kinds of starch are attacked by bacteria with different degrees of rapidity.

3. The action of bacteria on starch is manifested only in the absence of other sources of carbon nutriment, and when access of air is not prevented.

4. The action of bacteria on starch is effected by a ferment secreted by them, and which, like diastase, is soluble in water, but precipitable by alcohol.

5. This ferment acts precisely as diastase in changing starch into a sugar capable of reducing cupric oxide, but is not possessed of peptonizing properties.

6. The ferment itself is also capable of acting on starch in the absence of oxygen.

7. The ferment is secreted by the bacteria also in neutral solution of starch, and exerts its influence under these conditions.

8. This influence is expedited in slightly acid solutions.

The author concludes his paper with speculations as to the conditions under which bacteria are capable of generating this amylolytic (diastatic) ferment, instead of the ordinary peptonizing one.

MEDICATED WATERS.*

BY JOSEPH W. ENGLAND, PH.G.

The U. S. Pharmacopœia of 1870, in the formulæ for these waters, gave in all cases, either one or the alternative of two processes. First: Distillation of the odorous part of the plant with water, after previous comminution and maceration if necessary; or, second: Trituration of the volatile oil of the plant with magnesium carbonate, the addition of distilled water and filtration.

During the process of "distillation" the water carries over with it in suspension the vapour of the oily product used and both are condensed in the receiver in separate layers. The oily portion is separated by suitable apparatus, leaving the water impregnated with its taste and fragrance. The fragrance is at first masked with a foreign odour that gradually disappears on exposure to air; leaving the true one, partially modified to one of finer quality, through the supposed presence of certain volatile acids and compound or mixed ethers. Distillation while admittedly the best in comparison with the present methods pursued, is to a great extent in the limited uses of most pharmacists impracticable for general employment. It requires for its successful exercise, the manufacture on a large scale, great care and skill on the part of its operators, and the use of vegetable products of quality seldom found in commerce to secure the best results. Its general application, therefore, is far from being a universal one.

The process of triturating the oil with magnesium carbonate is directed for the property possessed of reducing, mechanically, the size of the oily globules in order to present a greater surface to the solvent action of the water. The main objection to its use, rests upon the fact of its appreciable solubility in distilled water and to a still greater extent, when ordinary water containing in solution, as it usually does, carbonic oxide. The medicated waters thus made and holding in solution this alkaline-earth salt may, when prescribed with alkaloids, their salts or certain metallic oxides, precipitate them from solution on standing and possibly lead to grave and serious results. To overcome this defect the substitution of paper-pulp, chalk, pumice stone, or charcoal has been proposed. These, however, are poor expedients and all fail through their inherent lack of the necessary power of diffusion of the oily ingredient upon trituration. The advantages of the "trituration process" to the general pharmacist are so manifold that they scarcely need comment. The readiness of manufacture on a small scale, the short time necessary for its performance with results

* From the *American Journal of Pharmacy*, February, 1884.

equally satisfactory, except in a few isolated instances, and the cheapness of preparation, are a few of the points of value which yield it preference for general usage.

The late revision of the U. S. Pharmacopœia discards, entirely, the use of the "trituration process" and employs in its stead a method which consists, simply, in the distribution of the oil, in small portions at a time, upon cotton; picking the same apart after each addition until the whole is thoroughly impregnated with it, packing in a conical glass percolator and displacing with distilled water. The exceptions to this mode are bitter almond water, prepared by direct solution of the oil in water by agitation, and rose and orange flower waters made by distillation. A practical acquaintance with this process does not impress one with either its worth or general utility. Its supposed advantages are more than counterbalanced by the very unsatisfactory results arising from its use. In the first place when the oil is added to the cotton, no matter how faithfully its dissemination may be executed, a large proportion is necessarily lost upon the fingers in picking the fibres apart. Then when it is placed in the percolator, if packed too loose, the added water rushes through without dissolving any of the oil. If too tight, the process is impeded to such an extent that percolation becomes impossible. The right degree of packing is hard to obtain and when secured yields but little better results. As to the use of distilled water, very few follow the pharmacopœial directions in this particular. Without exceptions, all pharmacists with whom the author has conversed substitute ordinary water and claim in extenuation, that extreme purity of that liquid is unnecessary, and that they are perfectly justified in the replacement from the fact that distilled water is frequently of a musty, unpleasant odour, vapid and disagreeable taste, and as likely may contain metallic impurities from the uncertain, careless methods of commercial manufacture; further their efficiency is called into question from the physiological fact that distilled water is difficult of digestion and not as acceptable to irritable stomachs. These statements may be regarded as extreme, yet it must be admitted that the greatest efficiency of all medicines is desired, in a physiological sense as well as a pharmaceutical one. If the reasons advanced are tenable and do not arise from economic considerations they are certainly worthy of further notice. Certain it is that the products made by them, seem to give equal satisfaction with those made by standard authority. In whatever way we view the U.S. (1880) process, its wasteful and objectionable manipulations are so evident, that if the imperfections in the directions of the earlier Pharmacopœia (1870) were open to severe comment, those of the latter (1880) are doubly so by comparison.

As previously stated, the greater the subdivison of an oil, when brought in contact with an aqueous solvent, the larger the quantity that will necessarily be taken up in solution. As an aid to this fact and also their supposed insolubility, rests the adaptability of the bodies mentioned above as diffusive agents. Some of the objections to the use of magnesium carbonate and several of its proposed substitutes have already been noted. Upon trial I have found precipitated calcium carbonate to be preferable, mechanically, to the magnesium salt; yet it is open to the same adverse criticisms. Another possibly important objection to the use of alkaline earth carbonates, which has not been previously discussed, may reside in the fact of the presence of odorous volatile acids, ethers, etc., in the volatile oils used and the neutralization of those acids by the alkaline carbonates, to form neutral and inodorous bodies, which may or may not be soluble. This view is a plausible one when we consider the delicate chemical constitution of the oils in general, especially those containing the previously mentioned compounds. Upon this fact may be based the superiority of "distilled" over "triturated" waters, as in distillation the water is impregnated with the oil direct and unchanged; while in trituration, if performed with carbonates, some changes undoubtedly ensue, since the products from the latter process are of less fine qualities than those of the former; although both may be made from the same oil. It is absolutely necessary on this account, to use a body free from these objectionable features and one which has all the essential requisites in the greatest degree. After numerous trials I have found precipitated calcium phosphate to possess all the desired properties and to yield products that were in all respects the equal of those obtained by distillation.

This lime salt is a neutral, impalpable solid, wholly insoluble in water, neutral or carbonated, and when used permits filtration much more readily and effectively than any other medium. In diffusive power it is fully the equal of any of the bodies previously mentioned; leaving nothing to be desired. Before its use, although generally very pure, tests should be always applied to determine that fact. It should be wholly soluble in dilute hydrochloric acid without effervescence (absence of carbonates). Its washings with distilled water should yield no opalescence or precipitate with test solutions of silver nitrate (absence of chlorides), barium chloride (absence of sulphates) or ammonium oxalate (absence of soluble lime salts).

When diffusive agents are used, they require long and persistent trituration with the oil to effect thorough and minute subdivision. In order to promote this diffusion, a plan of diluting the oil with a small quantity of alcohol was tried and found to work admirably. The presumed presence of alcohol in medicated waters thus made, has no foundation in fact, if the directions in the general formula, hereinafter given, are followed, as the rubbing to dryness necessarily volatilizes the whole of it.

General Formula. — Triturate, in a mortar of broad surface, the oil dissolved in the alcohol, with the precipitated calcium phosphate, until a dry powder is secured and all the alcohol has volatilized, then add the water in small portions at a time, stirring after each addition, until the intended quantity to be made is completed. Lastly, filter; returning to the filter the first portions, if cloudy."

The following formulæ, under each heading, are expressed in two ways. One according to the method of the U. S. P. of 1870, and the other like that of the U. S. P. of 1880.

Aqua Anethi, Br.—Oil of dill, $\frac{1}{2}$ a fluid drachm; alcohol, $1\frac{1}{2}$ fluid drachms; precipitated calcium phosphate, 2 drachms; distilled water, a sufficient quantity to make the finished product measure 2 pints. Or, oil of dill, 2 parts; alcohol, 6 parts; precipitated calcium phosphate, 8 parts; distilled water, a sufficient quantity to make the finished product weigh 1000 parts.

Aqua Anisi, U. S.—Oil of anise, $\frac{1}{2}$ a fluid drachm; alcohol, $1\frac{1}{2}$ fluid drachms; precipitated calcium phosphate, 2 drachms; distilled water a sufficient quantity to make the finished product measure 2 pints. Or, oil of anise, 2 parts; alcohol, 6 parts; precipitated calcium phosphate, 8 parts; distilled water, a sufficient quantity to make the finished product weigh 1000 parts.

Aqua Aurantii Florum, U. S.—Oil of neroli (Bigarade), 12 minims; alcohol, $1\frac{1}{2}$ fluid drachms; precipitated calcium phosphate, 2 drachms; distilled water, a sufficient quantity to make the finished product measure 2 pints. Or, oil of neroli (Bigarade), 2 parts; alcohol, 15 parts; precipitated calcium phosphate, 20 parts; distilled water, a sufficient quantity to make the finished product weigh 2500 parts.

Aqua Amygdalæ Amaræ, U. S.—Oil of bitter almonds, 15 minims; distilled water, a sufficient quantity to make the finished product measure 2 pints. Or, oil of bitter almonds, 1 part; distilled water, a sufficient quantity to make the finished product weigh 1000 parts. Dissolve the oil directly in the water by agitation. Since 1 part of the oil is soluble in 300 parts of water, no further directions are necessary.

Aqua Camphoræ, U. S.—Camphor, 2 drachms; alcohol, 1½ fluid drachms, precipitated calcium phosphate, 4 drachms; distilled water, a sufficient quantity to make the finished product measure 2 pints. Or, camphor, 8 parts; alcohol, 6 parts; precipitated calcium phosphate, 15 parts; distilled water, a sufficient quantity to make the finished product weigh 1000 parts. Reduce the camphor in a mortar to a thin, smooth paste with the alcohol, add the precipitated calcium phosphate, and proceed as in general formula.

Aqua Cinnamomi, U. S.—Oil of cinnamon (Ceylon), ½ a fluid drachm; alcohol, 1½ fluid drachms; precipitated calcium phosphate, 2 drachms; distilled water, a sufficient quantity to make the finished product measure 2 pints. Or, oil of cinnamon (Ceylon), 2 parts; alcohol, 6 parts; precipitated calcium phosphate, 8 parts; distilled water, a sufficient quantity to make the finished product weigh 1000 parts.

Aqua Fœniculi, U. S.—Oil of fennel, ½ a fluid drachm; alcohol, 1½ fluid drachms; precipitated calcium phosphate, 2 drachms; distilled water, a sufficient quantity to make the finished product measure 2 pints. Or, oil of fennel, 2 parts; alcohol, 6 parts; precipitated calcium phosphate, 8 parts; distilled water, a sufficient quantity to make the finished product weigh 1000 parts.

Aqua Menthæ Piperitæ, U. S.—Oil of peppermint, ½ a fluid drachm; alcohol, 1½ fluid drachms; precipitated calcium phosphate, 2 drachms; distilled water a sufficient quantity to make the finished product measure 2 pints. Or, oil of peppermint, 2 parts; alcohol, 6 parts; precipitated calcium phosphate, 8 parts; distilled water, a sufficient quantity to make the finished product weigh 1000 parts.

Aqua Menthæ Viridis, U. S.—Oil of spearmint, ½ a fluid drachm; alcohol, 1½ fluid drachms; precipitated calcium phosphate, 2 drachms; distilled water, a sufficient quantity to make the finished product measure 2 pints. Or, oil of spearmint, 2 parts; alcohol, 6 parts; precipitated calcium phosphate, 8 parts; distilled water, a sufficient quantity to make the finished product weigh 1000 parts.

Aqua Pimentæ, Br.—Oil of allspice, ½ a fluid drachm; alcohol, 1½ fluid drachms; precipitated calcium phosphate, 2 drachms; distilled water, a sufficient quantity to make the finished product measure 2 pints. Or, oil of allspice, 2 parts; alcohol, 6 parts; precipitated calcium phosphate, 8 parts; distilled water, a sufficient quantity to make the finished product weigh 1000 parts.

Aqua Rosæ, U. S.—Oil of rose, 6 minims; alcohol, 1 fluid drachm; precipitated calcium phosphate, 2 drachms; distilled water, a sufficient quantity to make the finished product measure 2 pints. Or, oil of rose, 2 parts; alcohol, 30 parts; precipitated calcium phosphate, 40 parts; distilled water, a sufficient quantity to make the finished product weigh 5000 parts.

In conclusion, the author, in advocating the adoption of the preceding formulæ would say that any means used to insure success, are always secondary in importance to the quality of the materials used. No process, however good in itself, can hope to remedy defects in the qualities of its ingredients, or the hasty, careless manipulations of its operators. With these guarded against, there need be no disappointment in the results obtained.

AMERICAN DRUGS.*

BY J. MOELLER,

Botanist and Microscopist of the Imperial Forest Institute, Mariabrunn, near Vienna.

(*Continued from page* 565.)

4. HERBA MONARDÆ FISTULOSÆ (WILD BERGAMOT, HORSEMINT).

The coarsely-cut dried leaves gathered when the plant is in bloom. The square often violet-tinted stem is almost bare, except that it is quite hairy and somewhat swollen at the points whence the leaves proceed in pairs. These (Fig. 6*a*) are approximately oviform, somewhat pointed, rounded at the base, short-stemmed, coarsely

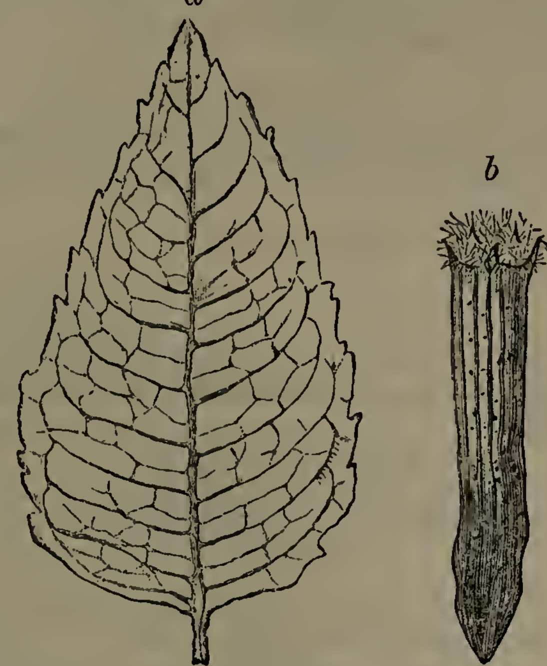

Fig. 6.

indentated at the edge, 5 cm. long, 3 cm. broad (those around the flowers being smaller, narrower and contracted towards the stem), with prominent middle and secondary nerves, the latter anastomosing towards the border. The leaves are rather smooth on both sides. The microscope, however, shows that these leaves are densely covered with small hairs, mostly but ·05 mm. in length, and consisting of but a single cell (Fig. 7)

Fig. 7.

highly interspersed with larger ones, particularly towards the edges, where they often consist of many cells. The scattered spots prove to be indentations in which the characteristic oil glands of the labiatæ are to be met with on their short broad stems. The flowers are arranged in dense pseudo verticils in the axils of the leaves, and are encircled by a thick-leaved bristly border. The calyx is nearly a centimetre in length, skinny, tubular, multiribbed, five-pronged, ciliated at the edge, naked and smooth on the inside, slightly hairy on the outside, displaying under the magnifying glass yellow glands (or glandular heads). The large double-lipped, flesh-coloured flowers are now but seldom found in the calyx.

The plant when dried has no specific odour; but when pulverized it has a penetrating aromatic odour, resembling peppermint. Its taste is strongly aromatic—almost free of bitterness.

Monarda fistulosa, L, is indigenous in the western states of the American Union. It is one of the plants most frequently met with in the territories of Montana and Dakota. It is nearest akin with the rosemary family. It is now about three years since wild bergamot (called also horsemint) was first applied as a curative. It was resorted to in cases of intermittent fever instead of quinine.

Dr. Woodward's (*Ther. Gaz.*, 1880, p. 224) reports of his experiments are as follows:—"I found that a drachm of the fluid extract every three hours, from the time of the height of the fever to the end of the attack, or

* Reprinted from the *Therapeutic Gazette.*

until a prickling sensation is felt throughout the body, or profuse sweating sets in, is the most appropriate dose for adults. In cases of simple intermittent fever, without any complications, this remedy has never disappointed my expectations, and I prefer it to quinine or any other febrifuge."

Dr. Woodward, however, does not undertake to call monarda an infallible specific for fevers, but maintains that it is well worthy of the careful notice of the medical profession.

(*To be continued.*)

THE USE OF LITMUS, METHYL ORANGE, PHENACETOLIN AND PHENOLPHTHALEIN AS INDICATORS.*

BY ROBERT T. THOMSON.

(*Continued from p. 672.*)

Table III.

Determination of ammonia existing as hydrate.

Ammonia (NH_3) employed for each test . . ·547 gram.

Name of Indicator.	C.C. of Normal Acid consumed.	Grams of NH_3 obtained.
Litmus	32·4	·550
Methyl orange .	32·4	·550
Phenacetolin . .	32·4	·550
Phenolphthaleïn .	31·5—31·4	·535—·533

Before writing the above, I had not met with any mention of phenolphthaleïn as an indicator for the estimation of ammonia, but, quite recently, it has been recommended for this purpose by Richter, in a paper on a "New Volumetric Determination of Potassium Bichromate, and its use as a Standard for Caustic Alkalies" (see *Chem. News*, xlvii., 19). The process he has devised may be thus briefly described. To the caustic soda, potash or ammonia solution which has been previously coloured with phenolphthaleïn, add standard dichromate of potassium till the reddish-yellow colour produced is changed to a full yellow. At this point the alkali is neutralized, a monochromate of the alkali or alkalies is formed, and the reddish tinge due to the presence of the phenolphthaleïn in the alkaline solution is discharged when the least excess of acid chromate is consumed. The quantities advised for use are such that the solution in which the titration has been accomplished should measure 150 or 200 c.c., and contain about 1 gram of the monochromate of potassium. A solution of this salt, of the strength mentioned, is to be used as a comparison in deciding at what point the end reaction occurs. Following these instructions as closely as possible, I prepared a decinormal solution of potassium bichromate (14·76 grams per litre), and, also, decinormal solutions of caustic soda, potash and ammonia, the alkali liquors being tested against decinormal sulphuric acid. Fifty c.c. of the soda solution were transferred to a beaker, diluted with 50 c.c. of water coloured with phenolphthaleïn, and the decinormal bichromate solution added from a burette. The fine red tint soon changed to reddish-yellow, which lost little or none of its intensity till it nearly reached the neutral point. The end-reaction was thus easily observed, especially when compared with the solution of monochromate of potssium of nearly the same strength as that operated upon. It must be carefully noted, however, that the change in colour is not instantaneous, as it is by titration with a mineral acid, so that when the test is nearly finished, a minute or two must be allowed to pass after each addition before coming to any conclusion as to whether the end-reaction has taken place. Otherwise a high result will be the consequence. The results of two tests were, that 50 and 50·1 c.c. of the decinormal bichromate were consumed, which are as near the truth as possible.

With regard to the determination of the potash, it is sufficient to mention that the results were substantially the same as those obtained with soda.

In estimating the ammonia in 50 c.c. of the decinormal solution of ammonia, the addition of the bichromate produced at first the reddish-yellow colour, which slowly disappeared on further addition, and gave place to the full yellow when 45·7 c.c. had been consumed in the one case, and 46 c.c. in the other. This gives a result so much below the truth, as to be equivalent to 8 per cent. of the whole ammonia present. From these results it is quite plain that Richter has not tested ammonia specially with phenolphthaleïn as indicator, but has simply assumed that it would act in precisely the same manner as potash and soda.

Table IV.

Comparison of results obtained in the estimation of alkalies by Richter's bichromate and the ordinary acid methods, phenolphthaleïn being the indicator.

Amount of soda used for each test . . ·1550 gram.
Do. potash do. . . ·2355 gram.
Do. ammonia do. . . ·0850 gram.

Name of Alkali determined.	C. C. of $\frac{N}{10}$ $K_2Cr_2O_7$ consumed.	Gram of Alkali obtained.	C.C. of $\frac{N}{10}$ acid consumed.	Gram of Alkali obtained.
Soda (Na_2O) . . .	50·1	·1553	50·1	·1553
Soda (Na_2O) . . .	50·0	·1550	50·1	·1553
Potash (K_2O) . . .	50·1	·2359	50·1	·2359
Potash (K_2O) . . .	50·2	·2363	50·0	·2355
Ammonia (NH_3) . .	46·0	·0782	47·1	·0800
Ammonia (NH_3) . .	45·7	·0777	46·9	·0797

V.—Determination of Alkalies existing as Carbonate and Bicarbonate.

It is not worth while going fully into the results of the tests made on this part of the subject. As almost all the noteworthy points have been already mentioned, I will just note a few necessary precautions. As is well known, litmus can be used in the direct estimation of soda and potash existing as carbonate or bicarbonate by an acid, but can only be applied to the determination of ammonia in that form when excess of acid is added, the solution boiled to expel carbonic acid, and titrated back with an alkali. The same remarks apply to phenacetolin.

Methyl orange can be employed equally well in the estimation of alkali in any of the alkaline carbonates, but special mention may be made of its application to the determination of ammonia in the commercial carbonate. This substance is a compound of bicarbonate and carbonate of ammonium, and when dissolved in water the latter of these salts takes up the elements of water and produces normal carbonate of ammonium. The sample tested did not contain any impurities except water, and 2·5 grams converted into chloride and dried at 100° C. showed ·725 gram of ammonia, while two experiments made with 2·5 grams, which consumed 43·1 and 43·05 c.c. of normal sulphuric acid, gave respectively ·732 and ·731 gram of ammonia.

Phenolphthaleïn, as stated before, cannot be used for the estimation of ammonia, and in the determination of soda and potash existing as carbonate or bicarbonate (the latter giving no colour with this indicator till decomposed by boiling), a somewhat tedious boiling is required unless excess of acid be added, the solution boiled and titrated back with caustic soda.

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* Read before the Chemical Section of the Philosophical Society of Glasgow, January 22, 1883, and reprinted from the 'Proceedings.'

VI.—Behaviour of the Indicators with the Sulphates, Nitrates and Chlorides of the Alkalies.

Having considered the use of the indicators for the estimation of the alkalies when pure compounds are operated upon, we now come to the behaviour of the indicators with the common impurities present in commercial samples. This section, however, is chiefly concerned with the action (if any) of the neutral salts produced during titration. Litmus and phenacetolin are quite as delicate in presence of quantities of the sulphates, nitrates and chlorides of sodium, potassium and ammonium equivalent to 1·55 gram of soda (Na_2O) per 100 c.c. When these amounts of these salts were tested with the volume of methyl orange solution used in the foregoing experiments, it was found, as has been already stated, that about ·2 c.c. of normal acid was required to bring out the full pink colour as against ·05 c.c. when distilled water only was employed, although a distinct change was produced with ·05 c.c. in the former case. On the other hand, the delicacy of phenolphthaleïn is not affected by the salts of sodium and potassium mentioned above, but quantities of sulphate, nitrate and chloride of ammonium, equivalent to ·85 gram of ammonia per 100 c.c., required about 1·5 c.c. of normal caustic soda to produce even the faintest red colour, showing that ammonia and its salts must be carefully excluded when this indicator is made use of.

VII.—Effect of the Sulphites of the Alkalies.

A sample of ordinary normal sulphite of sodium was selected, tested for impurities, and the sulphurous acid, sulphuric acid, and soda determined to make certain that it was of the proper composition. This was found to be the case, and a solution was prepared of which 50 c.c. (the amount used for each test) contained 3·15 grams of sulphite of sodium. This is equal to 1·55 gram of soda (Na_2O).

Litmus.—On adding the normal acid to the portion tested with this indicator, the solution remained quite blue till about 12 c.c. had been added, but after that it became purple and slowly passed into the red. The end-reaction was observed by comparing with a solution containing the same quantity of litmus reddened. 24·9 c.c. were consumed, which is equal to ·771 gram of soda, or very nearly half that contained in the sulphite of sodium. When boiled, the colouring matter is destroyed.

Methyl orange.—In this case 25·1 c.c. of the normal acid were consumed, which is equal to ·778 gram of soda —a result slightly higher than that obtained by litmus, but still practically the same. The end-reaction was, unlike that of litmus, very sharp and decided.

Phenacetolin. — With phenacetolin the result was exactly the same as that procured with methyl orange; but, as in the case of litmus, the colour changed so gradually that the end-reaction was not very sharply defined.

Phenolphthleïn.—Sulphite of sodium is practically neutral to phenolphthaleïn, but, as has been shown, it is strongly alkaline to the other three indicators. Only ·2 c.c. of normal acid was necessary to discharge the red colour in the cold, but when boiled 4 c.c. were required. On cooling and titrating back, 3·8 c.c. of normal alkali were consumed; so that when this method is employed, the practical neutrality of sulphite of sodium may be depended upon, provided too much acid is not added before boiling. If a large excess of acid were used the boiling would expel sulphurous acid, and a high result would be the consequence.

It need only be added that potassium and ammonium sulphite act towards these indicators in the same way as the sodium compounds, except in the case of the ammonium salt with phenolphthaleïn, which cannot be used in presence of ammonium compounds.

Table V.

Results obtained in the titration of sodium sulphite with normal acid.

Amount of Na_2SO_3, used for each test. 3·15 grams.
Equal to Na_2O . . . . 1·55 grams.

Name of Indicator	C.C. Normal Acid consumed.	Grams Na_2O obtained.
Litmus	24·9	·772
Methyl orange	25·1	·778
Phenacetolin.	25·1	·778
Phenolphthaleïn (cold) .	·2	·006
Phenolphthaleïn (boiled) .	4·0	·124

VIII.—Effect of Thiosulphate of Sodium.

This salt, which is known better as the hyposulphite of soda, is perfectly neutral to litmus, methyl orange, phenacetolin and phenolphthaleïn.

IX.—Effect of Sulphide of Sodium.

To obtain pure normal sulphide of sodium a solution of sulphuretted hydrogen was prepared, the strength of which was determined by oxidization in an alkaline solution with peroxide of hydrogen, and precipitation with chloride of barium. Exactly enough hydrate of sodium was now added to form Na_2S, and the solution made up to such a volume that 50 c.c. (the quantity operated upon) contained ·284 grams of the sulphide.

Litmus.—When thoroughly boiled after each addition of acid to expel the sulphuretted hydrogen, an excellent result was obtained, 7·2 c.c. of normal acid being consumed. This is equal to ·280 grams of sulphide of sodium.

Methyl orange.—With this indicator the same number of c.c. of acid was consumed as with litmus. The liberated sulphuretted hydrogen had evidently no effect on the colour, as the end reaction was quite sharp. This has been pointed out by Lunge.

Phenacetolin behaves in much the same way as litmus, the boiling off of the sulphuretted hydrogen being necessary to the obtaining of a decided change in colour when the end of the experiment is reched. The result was the same as that obtained with litmus.

Phenolphthaleïn gave rise to the characteristic red colour with the sulphide of sodium; but this colour was discharged after the addition of 3·55 c.c. of normal sulphuric acid. This is practically equal to half of the sodium sulphide, and shows that the sodium hydrogen sulphide—which is formed by the combination of the normal sulphide with the liberated sulphuretted hydrogen—is neutral to phenolphthaleïn. On boiling the solution the red colour returned, and, altogether, 7·15 c.c. of the acid were consumed—the whole of the sodium sulphide being thus estimated.

Potassium and ammonium sulphides have exactly the same same effect as the sodium compound, always excluding phenolphthaleïn with regard to the ammonium salt.

Table VI.

Results obtained in the titration of sodium sulphide by normal acid.

Amount of Na_2S employed for each test . . ·284 gram.

Name of Indicator.	C.C of Normal Acid consumed.	Grams of Na_2S found.
Litmus	7·2	·280
Methyl orange	7·2	·280
Phenacetolin	7·2	·280
Phenolphthaleïn (cold) .	3·55	·138
Phenolphthaleïn (boiled) .	7·15	·278

(*To be continued.*)

THE PUBLIC PRESS ON THE SALE OF POISONS.

From the OLDHAM CHRONICLE, *February* 23.

"Much attention has been drawn lately to the unfortunate facility with which poisons can be obtained by persons with suicidal tendencies, or for such purposes as the poisoning cases at Liverpool, and it is to be hoped the subject will not be dropped before something is done to remedy the grievance. It is a crying evil, and we are not surprised at newspapers all over the kingdom calling for some alteration of the present state of things, which is disgraceful to a civilized community. The Pharmacy Act, of 1868, was intended to abolish this practice; but, unfortunately, it has proved inadequate. By that Act it was made compulsory on chemists, under heavy penalties, to label certain scheduled articles with the vendor's name and address, the name of the substance, and the word "poison." In this class were included laudanum, paregoric, and all preparations of opium, oxalic acid, and many other deadly drugs; while in respect to vermin killer, prussic acid, and others, the sale was also to be registered, and the articles only to be sold to persons known to the vendors, or introduced by a witness known to the seller. The same law also enacted, for the safety of the public, that after December 31, 1868, it should be unlawful for any person to sell or keep open shop for the purpose of retailing, dispensing or compounding poisons who was not a registered chemist, and that no person should assume the title of chemist, or any such similar name, under the penalty of £5; and it was also enacted that no person should be enrolled as a chemist unless he showed his fitness for the work by passing certain severe examinations approved of by the Privy Council. There is nothing in it to prevent an unregistered man keeping a chemist's shop, provided he does not call himself a chemist, druggist or pharmacist. He can call his shop a "drug shop," or himself an "herbalist" or "drysalter," and not offend, so long as he does not sell poisons enumerated in the Act. But this he is bound to do after a time from the fact that they are things in daily demand, and when his customers ask for syrup of squills or some other simple cough remedy they are annoyed at not being supplied with paregoric or syrup of poppies to go with it, and so he has to break the law to retain his business. Hence the great danger to the public. People who knowingly break the law for the purpose of gain have easy consciences, and to this source many mysterious deaths might be traced, but for one fact, viz., that these illegal traders seldom label the goods they sell, and so the chance of being detected is lessened. Another great evil is the habit, that is daily gaining ground, of small grocers and hucksters selling "Godfrey's Cordial," cough mixtures, and other articles containing opium, in violation of the Act. The extent to which these things are done is shown by the evidence given at an inquest, at St. Helen's, a few days ago. Superintendent Johnson, in answer to the coroner, stated that in St. Helen's alone there were ninety-three such shopkeepers, who sold preparations containing opium and other powerful drugs, such as the preparation that had caused the death of the child upon whose body the inquest was held. The jury, very properly, desired to make a presentment that these people should be absolutely prohibited from selling these things, and that the law should be put in force against them. But then arises the question—whose business is it to carry out the law, and why is it not done? The answer is, "Everybody's business is nobody's business." It is in the power of the Registrar of the Pharmaceutical Society only to recover penalties for falsely using the title of "chemist," but it is free for anyone to prosecute and recover penalties from all persons who sell poison otherwise than in accordance with the Act. It is a matter for the police to take up, and, perhaps, this would have been done long ago but for a want of knowledge of the provisions of the Act."

MENTHOL CONES AND THE MEDICINE STAMP ACT.

We have been favoured by Messrs. T. Christy and Co. with copies of the following correspondence:—

"The Commissioners, "*February* 15, 1884.
"Inland Revenue,
"Solicitor's Department, No. 84,
"Somerset House.

"Sirs,—Referring to our two interviews with you on the subject of menthol cones, we understand—

"1. That if pure menthol (*Mentha arvensis, f. piperascens*) is used, under these circumstances we may use labels and forms of advertisement advocating these cones as a remedy and relief in cases of nerve pain, neuralgia, headache, etc.

"2. Should wax or any other substance be added to the menthol, then it will be liable to the usual patent medicine stamp.

"3. Should advertisements in the papers, handbills or circulars of any firm recommend any 'mixture of menthol,' it is liable to the Act, and must be sold under a stamp.

"4. It has been suggested that as the wax prevents the menthol in the cone causing too much irritation of the skin, and again as the wax facilitates the plan of fixing the cone in a holder which is part of the box, that if a declaration were made on the label,—

Menthol . 90 per cent.
Wax . . 10 per cent., or

'Menthol cone with 10 per cent. of wax,' this would place it outside the claim for a stamp?

"We beg your reply to this letter making any point more clear that you may consider obscure, and we will make this decision known to the trade.

"We are,
"Your obedient servants,
(Signed) "THOMAS CHRISTY AND CO."

"R 1363, Stamps 18784.

"Inland Revenue,
"Somerset House, W.C.,
"*February* 21, 1884.

"Gentlemen,—The Board of Inland Revenue have had before them your letters of the 13th, 15th and 16th inst. to their solicitor in regard to the penalties incurred by your having sold unstamped 'Menthol Cones,' a preparation composed of menthol and wax, advertised for the relief of headache, toothache and neuralgia; and I am to acquaint you that upon the understanding that you will in future conform strictly to the provisions of the law, they have ordered that no further proceedings be taken in the matter.

"In reply to the inquiries contained in your letter, I am directed to state—

"1. That if pure menthol only be used, without any mixture with any other ingredient whatsoever, labels and advertisements recommending it as a remedy may be used without any liability to stamp duty being incurred.

"2. That should wax or other substance be added to the menthol it will, as recommended, be liable to stamp duty.

"3. That advertisements, handbills or circulars recommending any 'mixture of menthol,' would render the preparation chargeable.

"4. That a declaration on the label that the preparation consisted of—

Menthol . 90 per cent.
Wax . . 10 per cent.

would not avoid liability.

"I enclose for your information extracts from the Acts of Parliament regulating and imposing the stamp duty on medicines.

"I am, Gentlemen,
"Your obedient servant,
(Signed) "W. H. COUSINS."

The Pharmaceutical Journal.

SATURDAY, MARCH 1, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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ANTISEPTIC DRESSINGS.

ONE very perceptible result of the recent enormous development of the antiseptic mode of treatment in surgical cases, which is now commonly designated under the term "Listerism," is that the surgeon has attained to a wider perception of the services that the pharmacist is able to render to him as well as to other practitioners of the healing art. On the other hand, the pharmacist has watched with an interest at least as keen as that of other members of the community the gigantic strides that have been made during the last few years in the treatment of wounds, and has found himself able sometimes—in a humble degree, it may be—to contribute to the progress by the utilization of his technical knowledge in the manipulation of antiseptics. This greater approximation of the surgeon and pharmacist was well illustrated at a recent meeting of the Military Medical Society, at Woolwich, in a most interesting discussion that followed the reading of a paper by Surgeon-Major C. H. GODWIN, on "Antiseptic Surgery in its Application to Field-practice." It is not intended to trespass here upon the domain of surgery by referring in detail to the special subject of the paper; our purpose is rather to mention some statements that were accessory and accidental to the discussion and that seem to us to present points of interest to the pharmacist. But as the value of these points is necessarily dependent upon the importance of the principal topic, we may go so far as to say that from the statistics quoted and the general consensus of opinion in the discussion it is apparent that recovery from a wound—whether inflicted in a battle or by the knife of a surgeon—is largely dependent upon the immediate occlusion, when possible, of the wound by means of suitable antiseptic dressings. Professor REYHER, indeed, has divided his cases into the "*befingerte*" and the "*unbefingerte*," — *i.e.*, cases that had been fingered by somebody before himself and cases which had not,—and one quotation of statistics will serve to show what this difference may mean. In the Russo-Turkish war Professor REYHER happened to have fourteen cases of gunshot wound of the knee-joint, seven of which were "fingered" cases and seven were "unfingered." At the time of writing to Sir JOSEPH LISTER six out of the seven "fingered" cases had succumbed and the seventh was in high fever, whilst all seven "unfingered" cases were alive and only one had suffered from fever, which was attributed to a severe face wound that could not be treated antiseptically.

Of course, therefore, antiseptic dressings naturally formed an element of considerable importance in such a discussion, and it is to mention some of the experience in respect to these, as related by different speakers, that is the special object of our referring to the subject in these columns. The author of the paper does not manifest a very marked preference for any particular dressing, provided that it be light, dry, antiseptic and absorbent, as, for instance, salicylated lint or cotton, boracic lint or cotton, or absorbent cotton; though he thinks a prepared cotton wool has the advantage that even if all the antiseptic has disappeared it would still act as a mechanical filter. Dr. W. F. STEPHENSON referred to the differences between non-volatile antiseptics, of which salicylic acid, and to a lesser degree boracic acid, might be taken as a type, and volatile antiseptics. He pointed out that whilst eucalyptus oil is valuable on account of its non-irritant properties, it is highly volatile and under certain climatic and other conditions might volatilize and leave the dressing in this respect useless. He, however, finds eucalyptus oil useful in the preparation of an antiseptic "cream," which is enclosed in an ordinary collapsing tube such as is used for scent fountains and is thus available in a portable form for anointing fingers or instruments before an operation, or even for pouring into a wound. He also described a dressing made by saturating spongio piline with a definite proportion of salicylic acid and then covering it with a film of wax impregnated with a volatile antiseptic, such as eucalyptol or carbolic acid, by which means he considers an antiseptic absorbent is provided so as to receive any discharge, together with the material for maintaining an antiseptic atmosphere in contact with the surface of the wound. Sir WILLIAM MACCORMAC, whose wide experience in military surgery allows him to speak authoritatively, said that of all known antiseptic substances iodoform seemed for the first dressing of the wounded by far the best, as it possesses the valuable properties of being very little poisonous unless applied in undue quantity, non-irritant to a wounded surface, insoluble in the discharge from a wound, and volatile and antiseptic to a remarkable degree. Deputy-Surgeon-General MARSTON also referred to the use in Egypt of iodoform as an application to wounds or, mixed with other substances, to the eyelids in purulent ophthalmia, and said that since seeing the results there he had had some miniature dredges made for using the remedy. It appears that in an advanced depot for the wounded on the day of the battle of Tel-el-Kebir, the treatment adopted was first to wash the wound and surrounding part with a solution of carbolic acid (1 in 20) and then to dust the wound lightly over with iodoform; next a piece of protective was dipped in the carbolic solution and laid upon the wound, upon which were placed two or three layers of boracic lint and above that the gauze bandage. The cases so treated did very well: when visited at a subsequent date there was no smell; the hospital atmosphere was perfectly pure and the wounds showed little or no discharge. As a material Professor LONGMORE spoke very highly of "wood wool," in respect to its absorptive powers, which he said exceeded those of cotton-wool, tow, or any substance of the kind. But although extremely soft, elastic and absorbent it has the disadvantage of not exercising any antiseptic action upon the discharge taken up by it; consequently although half a grain per cent. of corrosive sublimate is found sufficient to keep the "wood wool" itself aseptic and preserve it from putrefactive change that quantity does not seem sufficient to rely on for the protection of the wound also.

It may be almost assumed that the interest of the meeting to the surgeons present culminated in the speech of Sir JOSEPH LISTER, nor are his remarks by any means devoid of interest to pharmacists. The antiseptic to which he referred chiefly was corrosive sublimate, of which substance he appears to entertain a very high opinion on account of its wonderful effectiveness, combined with its cheapness. Referring to its use with "wood wool," he objected to that substance on account of its bulkiness, and also, like Professor LONGMORE, because the conditions under which the antiseptic is present in it are not satisfactory. Sir JOSEPH LISTER is of opinion that linen rags form at least as effective a material after they have been steeped in a solution of corrosive sublimate and dried. At present he is engaged in making some experiments with a view of obtaining corrosive sublimate in a more convenient form for application, and as a step in this direction he proposes to utilize its great solubility in glycerine. Although this property is not usually mentioned in text-books, it is not a new observation, as the speaker appears to think, for at least a quarter of a century ago corrosive sublimate was included by PARRISH in a list of substances "readily soluble in glycerine," and the fact is mentioned also in STORER's 'Dictionary of Solubilities.' Sir JOSEPH LISTER has found that corrosive sublimate is soluble in one and a half times its weight of glycerine in the cold, and this concentrated solution he proposes to dilute with water as required to form a solution of 1 in 1000, or other desired strength. For the preparation of antiseptic rags he recommends to dilute the glycerine solution with two hundred parts of water and use this aqueous liquor for steeping them in. Sponges also may be preserved in an aseptic condition most advantageously by means of this agent; for although when purified with carbolic acid they remain in a satisfactory condition for a considerable time, eventually the carbolic acid will leave them, in virtue of its volatility, whereas after purification with a solution of corrosive sublimate, sponges will remain aseptic an indefinite time until required for use. In a similar manner, instead of keeping carbolized catgut in oil, the speaker recommended that it be preserved dry, like silk, and simply dipped in the solution of corrosive sublimate for a few minutes when required for use. As to iodoform, Sir JOSEPH LISTER thinks that in the present state of our knowledge it is the agent that promises best as a first dressing for wounds with respect to portability and effectiveness. He considers it to be a very excellent antiseptic, although not the most powerful one; for it does not seem to destroy the poison of erysipelas so easily as carbolic acid, and it has been proved by experiment to be inferior to several antiseptics in destroying various bacteria. Nevertheless, in the form of iodoform wool it constitutes a very effective dressing, whilst in consequence of the non-irritating properties of iodoform and its insolubility in the discharges, he is disposed to think that to dust a wound over with iodoform powder and then cover it over with an absorbent substance, constitutes the best known treatment. For a similar purpose, Dr. LESSER, of Leipsic, has recommended that every soldier should carry in his knapsack a cartridge case full of an antiseptic powder consisting of two parts of boracic acid and one part of iodoform; but Sir JOSEPH LISTER would prefer the use of unmixed iodoform powder, on the ground that boracic acid is by no means so powerful an antiseptic as an equal bulk of iodoform.

An Evening Meeting of the Pharmaceutical Society will be held on Wednesday next the 5th inst., when a communication will be read on "Logwood as a Test for Metals," by Mr. Arthur Weddell, and a paper on "The Chemical Composition and Properties of a Crystalline Principle obtained from Jambosa Root," by Mr. A. W. Gerrard. The chair will be taken at 8.30.

* * *

On another page will be found a portion of a correspondence that has taken place between the Board of Trade and Messrs. T. Christy and Co., with reference to the sale of "menthol cones." It will be seen that the Board has decided that if pure menthol only be used, without an admixture of any other substance, "labels and advertisements recommending it as a remedy may be used without any liability to stamp duty being incurred;" but that should wax or other substance be added to the menthol it will, if so recommended, be liable to stamp duty. No reason is given by the Board for this decision, but in publishing it we think it right to recommend that in the absence of such an explanation the greatest circumspection should be exercised in applying the ruling to what might appear to be analogous cases. At the end of the Schedule to the Patent Medicines Act (42 Geo. III., cap. 60), there are some "special exemptions" mentioned, among which are "all medicinal drugs whatsoever which shall be uttered or vended *entire* without any mixture or composition with any other drug," etc. It may be, therefore, that "menthol" is considered to be an "entire" drug; but we should like to know the opinion of the Board as to the definition of the essential oil of which it originally formed a portion before risking the application of the ruling to such an article.

* * *

A *projet de loi* has been introduced into the French Legislature for the reorganization of the inspection of pharmacies in France. It proposes that pharmacies and the stores of druggists and grocers shall be inspected at least once every year by special inspectors appointed by the Minister of Commerce. These inspectors, of whom there would be about ninety, or one for each department, would also be charged with the supervision and inspection of depots of mineral waters and manufactories of artificial mineral waters. In the pharmacy they would have the power to examine drugs and pharmaceutical preparations, as well as dietetic articles, and to confiscate any that might be found adulterated or to have undergone alteration, and also to deal with breaches of the law as to the sale of poisons or hydrocarbons. The fee payable for the inspection of a pharmacy would remain, as at present, six francs, and four francs for a drug store or grocery. The Bill has aroused the opposition of influential pharmacists, and it appears to be looked upon in some quarters as a covert blow at the Bill of M. Naquet, of which a summary was given in this Journal some months since.

* * *

Some further details have been published respecting the Paris Municipal Laboratory (see before, p. 345), from which we learn that the staff of the establishment consists of a director at a salary of £240, a deputy at £180, one first class chemist at £96, three second class chemists at £64 each and three attendants at £60 each. The "out-door," staff consists of eight first class inspectors who are paid £96 yearly each, eight second class at £72 each, and thirty-two ordinary inspectors. It would appear therefore that in Paris the services of an unskilled inspector are appraised at a higher money value than those of a skilled chemist. The number of the analyses made in the year was 6517, of which 3958 were gratuitous, 378 were paid for, and 2181 were ordered by the inspectors. The results reported were that 1565 samples were good, 1523 passable, 2608 bad, and 562 dangerous.

* * *

In a review of Proctor's 'Practical Pharmacy,' in the current number of the *Dublin Journal of Medical Science*, the writer makes some pertinent remarks upon the probable results of the tendency in the present day of some medical men, either through "ignorance or laziness," to ignore legitimate prescribing altogether. He says—

"Indeed it is by no means an unusual practice among some medical men, when called upon to prescribe, to do so not from any study or knowledge of their own of drugs or of disease, but with the aid of the last list of formulæ of 'selected remedies,' or of 'pills' or 'granules,' with perhaps an accompanying 'Index of Diseases,' that may have been sent to them by the active agent of some enterprising drug firm. Such a system of routine book-prescribing, although it may have some conveniences, is, we think, derogatory, and as likely to become injurious to the profession of medicine as to that of legitimate pharmacy, and certainly cannot add to the credit of either. If the public, as they surely will, find that they are being habitually dosed by book formulæ, they will probably, by procuring these lists for themselves, take their dosing into their own hands; and it is not impossible that, in some cases, by running his eye down the list, a patient might select as good a 'combination' for himself as would have been made by a practitioner who adopts such a system of prescribing."

* * *

In Victoria, towards the end of the year, fifty convictions were obtained in three weeks under the provisions of the Act for regulating the Sale and Use of Poisons, by which the sale of scheduled poisons is restricted to medical practitioners, registered pharmacists, and (in outlying districts) certificated dealers. A considerable proportion of the convictions were for the sale of chlorodyne, although that compound is not mentioned by name in the schedule to the Act.

* * *

It is announced that for the encouragement of original research in sanitary science three Scholarships, each of the value of £250, tenable for one year, are offered for competition by the Grocers' Company. Two of these scholarships will be filled up in May next, and candidates, who must be British subjects, must send in their applications not later than the last day of April.

* * *

On Tuesday the Lord Chancellor informed the House of Lords that in respect to the Institute of Chemistry Bill the examiners had reported that the standing orders had been complied with. The Bill, which has not yet been issued, now awaits a second reading.

* * *

In addition to the gentlemen whose names were mentioned last week we understand that Mr. Thomas Greenish, of London, has been elected an Honorary Member of the Philadelphia College of Pharmacy, and Dr. Symes, of Liverpool, Mr. Richard Reynolds, of Leeds, and Mr. A. W. Gerrard, of London, have been elected Corresponding Members.

* * *

At the next meeting of the Chemical Society, to be held on Thursday, the 6th inst., the following papers will be read.—"On the Hydrolysis of Sulpho-compounds and on the Recovery of Benzenes from their Sulphonic Acids," by Dr. Armstrong and Dr. Miller; a "Note on the Behaviour of the Nitrogen of Coal during Destructive Distillation and a Comparison of the amount of Nitrogen left in Cokes of various Origin," by Mr. Watson Smith; and a "Note on some Experiments to Determine the value of Ensilage as a Milk and Butter-producing Food," by Mr. T. Farrington.

* * *

A meeting of the London Section of the Society of Chemical Industry will be held in the rooms of the Chemical Society, Burlington House, on Monday next, March 3, when papers will be read on—(1) "The Manufacture of Cuprammonium and Zincammonium and their Technical Applications;" (2) "The Filtration of Potable Waters;" (3) "Some Applications of Kieselguhr."

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

February 19, 20, 21 *and* 22, 1884.

Present on each day—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Brady, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Southall, Tanner, Taylor and Thresh.

Dr. Greenhow was present on the 21st on behalf of the Privy Council.

MAJOR EXAMINATION.

19*th*.—*Seven* candidates were examined. *Three* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Haddock, James ....Bedford Leigh.
Randall, William Joseph..... ...Wareham.
Roberts, Edmund..................Upper Norwood.
Wiggin, John Chinery............Ipswich.

MINOR EXAMINATION.

19*th*.—*Twenty-four* candidates were examined. *Fourteen* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Alderton, James ....Leamington.
Arthur, Samuel.....................Redruth.
Barnett, William Zachariah ...London.
Bates, John ....Bicester.
Botham, William Bland ....Sheffield.
Broumpton, Frederick Richd...London.
Clarke, Richard ....Ruthin.
Cockerill, Thomas ....Lynn.
Collen, William Cresswell ......London.
Davis, Frederick ....Oundle.

20*th*.—*Twenty-nine* candidates were examined. *Twenty-four* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Baker, Sidney George ....High Barnet.
Duckworth, William ....Blackburn.
Farlow, James Southward ......London.
Fellows, Vincent Litchfield ...London.
John, Benjamin ....Narberth.

21*st*.—*Thirty* candidates were examined. *Eighteen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Baker, Walter James ....Dorking.
Jackson, Frederick ....Manchester.
Kirby, Herbert Edward.........London.
Leach, John Pickering ....New Shoreham.
Mack, George Henry ....Holt.
Miller, William Henry ....Howden.
Peacock, James, jun. ....Sunderland.
Potter, John Henry...............Nottingham.
Ramsey, William..................Pocklington.
Richards, Thomas Coombs ....London.
Sapsed, William George.........London.
Shallcross, Joseph Richard......Tunstall.

22*nd*.—*Twenty-seven* candidates were examined. *Seventeen* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Crowder, Charles Joseph H. ...London.
Jackson, George Granger ......Buxton.
Johnson, Frederick Edward ...Hull.
Sinclair, Matilda Anne ... .Llandudno.
Smith, Samuel Henry............Leamington.
Southwell, Charles Bullock......Bridgnorth.
Spratling, Walter...................Boston.
Tupholme, Frank..................London.
Wells, Arthur John...............Leamington.
Wookey, Edgar ....Bristol.

PRELIMINARY EXAMINATION.

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

Certificate of the College of Preceptors.

Strutt, George Henry ....Saltley.

Certificate of the University of London.

Green, Henry Selby ....Penzance.

NORTH BRITISH BRANCH.

EVENING MEETING.

The fourth meeting of the present session was held in the Society's Rooms, 119A, George Street, Edinburgh, on Wednesday evening, February 20, at half-past eight o'clock. Mr. John Nesbit, President of the Branch, in the chair.

The minutes of the former meeting were read and confirmed.

DEATH OF EMERITUS-PROFESSOR BALFOUR.

Before proceeding to the business of the evening the President of the Branch said that those present were aware that in the death of Emeritus-Professor Balfour the Society had lost one of its distinguished honorary members. The late professor had in various ways assisted and promoted the work of the Society, and had always shown a kindly interest in the Branch. Most Scotch pharmacists were familiar with Professor Balfour's published writings, and they would join with him in regretting the loss which natural science had received by his death, and in sympathizing with the bereaved family of the professor.

The Secretary to the Branch then intimated the following donations:—

To the Library—

'Year-Book of Pharmacy and Transactions of the Pharmaceutical Conference, 1883.'
From the COMMITTEE OF PUBLICATION.

To the Museum—

Seven specimens of Potassæ Sulphas c. Sulphure.
From Mr. THOMAS MABEN.

Specimen of the fruit of Alexandrian Senna.
From Messrs. CLARK and PINKERTON.

Thanks were accorded to the donors.

A note was then read on—

TARTALINE, A CREAM OF TARTAR SUBSTITUTE.

BY PETER MACEWAN.

My attention has lately been called to a substance which, under the name *Tartaline*, is being sold by grocers as a substitute for cream of tartar, and which from its low price seems to have commanded a ready sale amongst retailers.

The substance comes into the market as a white powder of a strongly acid taste, but devoid of that grittiness which characterizes cream of tartar. When treated with water it behaves similarly to the acid tartrate, adhering to the edge of the vessel and dissolving but slowly in the cold, so that a superficial examination of the substance is apt to convey the idea that it is in some way related to cream of tartar. A more extended examination shows, however, that it is not so. Thus we find that it is completely soluble in a small volume of hot water, the solution formed being intensely acid. A drachm of the substance dissolves in two ounces of cold water in the course of an hour, and this solution by the ordinary tests gives reactions for potash and a trace of iron in combination with sulphuric acid. The powerful acidity of the aqueous solution appeared to indicate that the substance is acid sulphate of potash, and following this indication I found that 0·51 gram of the salt yielded 0·87 gram of barium sulphate = 0·506 gram $KHSO_4$. Another weighed portion lost nothing on exposure in the hot air chamber for an hour. The substance, it thus appears, is simply the acid sulphate of potash, a salt which, though at one time recognized by the Dublin and Edinburgh Pharmacopœias, is now obsolete as a therapeutic agent. Its introduction by grocers as a substitute for cream of tartar is not calculated to render much benefit to the public, for since it possesses weight for weight, fully 50 per cent. more acidifying power than cream of tartar, its use for baking purposes is not likely to give pleasant results. If the substitution stopped here we might safely leave the public to judge of its suitability for domestic purposes, but there is a probability that ignorant retailers may assume that it possesses medicinal properties similar to cream of tartar, and have no hesitation accordingly in supplying it for medicinal purposes. Viewed in this light, the indiscriminate sale of tartaline assumes a dangerous aspect, while to the pharmacist it illustrates a development of a phase of that competition which he has to contend with at the present time.

A vote of thanks was moved by the President, and after a few remarks on the subject, the next paper, on "The Composition of Potassæ Sulphas c. Sulphure," by Messrs. Maben and Dechan, was read by the Secretary to the Branch. The paper will be found printed on p. 967.

The President of the Branch, in moving a vote of thanks to the authors, said that he had observed the difference in the article as prepared at different temperatures, and had noted that the amount of sulphuretted hydrogen liberated by acids varied with different samples. The authors in directing attention to the cause of this variation had rendered good service, for though the compound had only a limited application, it was but right that it should be uniform in composition.

The motion having been heartily responded to, the President called upon Mr. Patrick Geddes to deliver a lecture on—

The Morphology and Physiology of the Cell.

BY PATRICK GEDDES, F.R.S.E.,

Demonstrator of Botany, Edinburgh University.

Twelve months ago, I was invited to lay before you a statement of the position of my studies of the cell, and at that time I pointed out the importance of the cell theory, and outlined the history and the existing state of the subject. The conception of the organism as composed of unit masses of protoplasm, or cells, is really the deepest generalization in morphology. The cell, however, is usually conceived of as essentially comparable to the common amœba, a gelatinous mass of protoplasm of irregular, constantly changing form. I pointed out, however, that this conception was not sufficient to explain all, or even any fair proportion, of the problems which the study of physiology, vegetable and animal, brings before us. For instance, it does not enable us to form any distinct opinion as to whether plants and animals are really distinguishable, or whether, with Haeckel, we must constitute an intermediate group—the Protista—for the lowest vegetable and animal forms. If we are Darwinians at all we must be thorough-going ones. We need not shrink from pushing the theory to its uttermost limits, and considering whether plants or animals are descended from one or two distinct stocks. Then again, on the same theory we are bound to endeavour to account for the variation, or tendency to variation, in organisms which has given rise to such enormous multitudes of plants and animals. I attempted to show that the difficulties were cleared up by substituting for the conception of the cell as a simple amœboid organism the notion of a "cell-cycle,"*—of a cycle of forms through which the cell is observed to pass in certain of the lowes organisms, hitherto generally regarded as aberrant fungi, the *Myxomycetes*. These most commonly occur as vast irregular masses of protoplasm (like the *Æthalium septicum* of tanyards) flowing here and there and in all sorts of grotesque forms. This irregular slimy mass, or *plasmodium*, is compounded from the union of many amœbæ; after a season of movement in that state, it draws itself together into some definite form, generally into a more or less spiroidal mass, which surrounds itself by a cellulose wall, and thus encrusted, lies for a time perfectly quiescent. After a season, however, the protoplasm breaks up into a number of small, but definite, more or less rounded masses, and these ultimately break loose through an aperture in the wall, and swim out as active ciliated organisms. The little masses of protoplasm swim along by a delicate vibratile thread of protoplasm, by which they propel themselves. This thread acts like a tiny oar and enables the organism to find its way through the water. So that here we have a cycle of four distinct phases, the amœboid being one, and only one, of the four. The four phases are called, the encysted, the ciliated, the amœboid and the plasmodium. Now this restatement of the cell theory proposes to refer the constituent masses of plants and animals not to the amœboid alone, but to some one or all of these four phases through which the cells of the lower organisms tend to cycle.

If time allowed I might show that the various groups of lower plants and animals are all distinctly referable to this one series of forms. For instance, simple microscopic plants, like *Protococcus*, which of course are provided with cellulose walls, are very often in the habit of leaving their wall and issuing in the ciliated state, and then settling down again. In the same way a great many of the microscopic animals exhibit more or less of these phases. For instance, the monads which one finds in putrefying infusions are typically ciliated, but their life-history has recently been investigated, and it has been shown that these creatures fall down into an irregular amœboid state, and subsequently encyst themselves. So that, if time allowed, I might justify the proposition that the lower plants and the lower animals are referable to this simple primitive type of the *Myxomycetes*. This diagram expresses the matter in a clearer way. There is a myxomycete; here encysted, here ciliated, here amœboid, and here plasmodium. A bacterium, of which one hears so much, exhibits an alternation between the encysted and the ciliated state. Then again, an ovum or egg-cell corresponds at first to the amœboid state, and later to the encysted. So in this way one gets a conception of plants and animals being much more closely related in cellular structure than is commonly assumed. One regards, in fact, the lower plants and animals, and of course the higher plants and animals also, as being specialized from a form of which this cycle affords us a tolerably distinct idea. I might go on to show that the cells in the higher animals exhibit the same cycle; that, for instance, a blood corpuscle of a sea-urchin, or probably also the diseased cells of higher animals, run through a cycle of the same kind

That, then, is a very rudimentary outline of the theory which underlies the present paper. I propose going on to discuss the problem of the cell structure. What is the internal structure of the cell, and what is the explanation of that very remarkable phenomenon of contractility which protoplasm constantly exhibits? Great attention has lately been paid to this question, but there are still some problems to settle; let us consider some of these. The lowest amœboid forms are simply granular masses of protoplasm of quite irregular shape, and tolerately homogeneous. If you look at higher amœbæ on the other hand, you find that they exhibit a granular interior, and a clear pellucid exterior in which no granules are visible. Again, organisms like the Foraminifera are provided with thread-like, granular and reticulated processes from their protoplasm. On the other hand in forms like the Radio-

* Geddes, 'Proc. Roy. Soc. Edin.,' 1883-4, "A Restatement of the Cell Theory."

laria the processes instead of being granular are perfectly clear and transparent, instead of uniting with each other they remain perfectly distinct, instead of moving and flowing they remain perfectly quiescent. How is that to be explained? As yet no theory affords any ground of explanation.

Again, there are remarkable changes visible in eggs of all kinds of animals before fertilization and during it, and similar remarkable phenomena when cell division is going on. Are these granules I am speaking of really separate grains of denser matter, or the expression of the intersections of a net-work of denser protoplasm? Questions of this kind are at present being hotly debated among histologists. Then again, one of the most difficult problems, one indeed which has been discussed during the last thirty or forty years, is the problem of muscular contraction. No two histologists are agreed about it; an enormous mass of literature has been accumulated, and as yet with comparatively little result, and comparatively little unity of opinion. One cannot always be sure whether the muscle fibres of the lower animals are striped or unstriped. Then again, another series of problems which the investigator must face is that which was raised by Mr. Darwin.* Mr. Darwin put the living cells of the tentacle of the sun-dew under the microscope, and watched what was going on within their delicate cellulose walls. He showed that within this cell, when it was digesting, or when he treated it with some reagent like my dilute solution of carbonate of ammonia, or when he applied heat or electricity, the protoplasm broke up, separated into two distinct substances, one of them remaining very much the same as before, the other forming all sorts of irregular drops, granules and threads, constantly changing and flowing together.

Now, I have gone over a number of difficult questions, the structure of amœba, the question why foraminifera possessed delicate filaments of protoplasm which are granular and moving, while the radiolarians possessed stiff and non-granular threads; the question of the structure of muscle and the question of aggregation. The hypothesis by which I propose to explain and unite all these phenomena is that of extending the conception of aggregation from the vegetable cell to the cell generally. Why should not the granules be simply the expression of the same change which is going on in the insectivorous plant? Why should not protoplasm, in fact, be separating itself into the same two substances which we have there? In the same way the processes of the foraminifera, which are granular, are so because they are aggregating. In the granular interior of the amœba this process is going on; in the clear exterior not so, and therefore the protoplasm remains clear and simple. Let us see what more this conception will do for us. In the first place it suggests,—setting out from these researches of Mr. Darwin—an investigation as to what changes chemical substances produce upon cells. That of course is something which touches upon the general questions of therapeutics and pharmacy in the most direct way.

The question of applying chemical reagents to living cells is, of course, the essence of the whole affair. Now carbonate of ammonia is not all the Pharmacopœia, but it is a substance which yields most striking results when applied to the living cell. For instance, if you apply it to the sun animalcule you will notice the most curious change. The creature actually tumbles down and dies in a few minutes, losing its complex protoplasmic structure, and collapsing into a simple amœba before it breaks up. Well, what is to prevent anyone from applying a whole series of reagents, carbonate of ammonia, alkaloids, different salts and so on, to various organisms; not only to protozoa, but to the simpler plants; not only to the lower organisms, but also to the cells of higher organisms? I have no doubt, for instance, that such reagents would produce a noticeable effect upon the epidermic cells of tadpoles. One could so begin to get some approximation of the therapeutic effects of reagents upon the cells of invertebrates themselves, an investigation which might carry us far. And, again, if time allowed, I might go on to show how this explanation fitted and met various problems, such as those which I have sketched out. Take that of muscular structure alone. If we magnify muscular fibre enormously we see that the fibrils are made up of strongly refracting portions, alternating with clearer spaces, in which dots or granules occur. Some observers say that they do not find these granules. Very good: they observed it when it was in a certain state of contraction.* Others find that the ends have come together and united: they observed it in a state of more complete contraction, and so on. Now that is thoroughly in unison with the conception of aggregation in the vegetable cell; we have a cell which separates into two kinds of protoplasm and nothing more. The union and change of rods and granules are simply the union and change which we observe in the insectivorous plant. This is rendered regular by the definite limit of the fibrils. I might develop this hypothesis, a hypothesis which, on the whole, explains the facts, but which does not as yet of course lay claim to any authoritative verification. I should be very sorry if you understood me to assert that this was demonstrated fact. I offer it simply as a hypothesis. Notice, however, one of the explanations which it affords us. Long ago it was pointed out, by Mr. Herbert Spencer for instance, that we have as yet no clue to the mode in which molecular movement is converted into the movement of masses. By what change is it that the whole fore-arm can be elevated in this way by the use of the biceps muscle? How is it that the multitude of little molecular movements are added up to the large movement of the mass? No explanation is forthcoming on any view but this. If these masses of protoplasms are elongated, they tried to shorten and broaden and draw themselves into a sphere. If all these multitudinous elements of the muscle are drawing themselves towards the spherical form, are shortening and broadening, then of course you have an explanation of that general shortening and broadening which takes place in the contraction of the muscle. In the same way, if we have a drop of oil suspended in the water and it draws together into a sphere, it overcomes a slight resistance, it pushes aside the particles of water which surround it. The same thing will account then for the overcoming of resistance of masses; a muscle is able to lift a weight, because the sum of thousands of millions, perhaps, of elements all contracting and pulling together make up a power which overcomes this large resistance. And so molecular movement is converted into movement of masses; the overcoming of minute resistance is converted into the overcoming of a large mass resistance.

Now, one question more. Why should there be two protoplasms? How is it that if you treat protoplasm with a reagent it breaks itself up into two substances? I do not see how it is possible to explain that; it is an observed fact. I would be glad if any member of the Society would enlighten me on this point; could indicate any parallel case in inorganic or organic substances, where a chemical change separates a substance at first homogeneous into two distinct substances which afterwards reunite into its components, or in which an electric current temporarily segregates a complex mixture. I am not aware that any parallel case exists, but we know that it would be very inportant if something analogous could be found. This is therefore suggested as a problem, without any solution being offered. But let me just point out one interesting corollary from the general notion of cellular therapeutics. Let me start again with an observed

* 'Insectivorous Plants.' London: 1875. Article, "Insect. Plts.," 'Encyclop. Brit.'

* See Professor Rutherford's recent paper. 'Trans. Roy. Soc. Edin.,' 1883.

fact. When amœboid cells unite into a vast compound amœba, there is visible an extraordinary intensification of the activity of the mass, that is to say, when the little amœbæ, a hundred or two of them together, are united into a single compound mass they throw out extraordinarily long processes; they career about under the field of the microscope, sending out filaments of protoplasm enormously longer than any amœba can do. What one amœba cannot do, the union of many amœbæ does in a most striking manner. Why is this? Why should the union of many amœbæ produce such activity? It seems to me that these numerous amœbæ, when they flow together, serve as it were as food to one another, the protoplasm of one is poured into that of others, the waste products, the surplus water and so on, are squeezed out, and in this way we get a vast composite amœba of which the activities are summed up from its components. But more than that we saw how carbonate of ammonia was powerfully stimulating to protoplasm, and Mr. Darwin's researches have shown that alkaloids and waste products are excessively stimulating, and set up the most extraordinary aggregation, so that a poison, for instance, sets up too much of this movement of aggregation in the protoplasm. There, then, is actually a use, not only for the protoplasm, but also for the waste products, the waste product of one cell acts as a stimulant when it unites with the protoplasm of another. So, for instance, one may speculate that the store of alkaloid in a coffee bean is used to stimulate the protoplasm of the germinating plant. We may apply this notion of conjunction of cells to the union of the ovum and spermatazoon in fertilization; we may imagine, and we are reasonably entitled to do so, that the spermatazoon brings not simply an additional mass of protoplasm, but brings something of distinctly different chemical properties, differing perhaps by possessing substances especially stimulating to the vast mass of protoplasm of the ovum.

So far, of course, these considerations are speculative, but before a Society of this kind I think it not illegitimate to call attention to these speculations in cellular chemistry and cellular therapeutics.

The lecturer frequently referred to large coloured diagrams in illustration of different statements, and also rendered the discourse of greater interest by means of extempore drawings.

Mr. H. Bellyse Baildon, in proposing a vote of thanks, said that he had attended a great many evening meetings, but he did not think that he had ever listened with more rapt attention than he did to Mr. Geddes's interesting lecture. He thought that it had a special value in so far as it not only gave the issue of a number of most interesting results of his own, but it pointed out to others a most valuable field for research. The suggestions regarding the effect of chemicals upon cellular tissue of various kinds was most valuable, and skilled microscopists would not fail to obtain good results in carrying out the suggestion. The manner in which the lecturer was received was a sufficient proof of the interest attached to the subject, and this, he felt, was due to Mr. Geddies's wide generalizations, which, while suggestive, gave great interest and stimulus on the study of the subject.

Mr. Napier seconded the motion, which was heartily responded to, and in the course of reply—

Mr. Geddes stated that he thought that skilled pharmacists might conduct some of the researches which he had indicated; they would not require continuous observation, but only frequent glances of attention during several hours. The interest of the admission of a drug did not at all stop when it was conveyed to the stomach, but really began then. The question was how did these drugs affect the cells of the organism? It was really possible to investigate this by means of the microscope, and by applying solutions of proper strength to microscopic organisms or to tissues of animals.

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.

The annual meeting was held on Friday, February 22, at the Museum and Library, Queen's Road; Mr. G. F. Schacht, President, occupied the chair.

The report of the Council and the statement of accounts were received and adopted.

The following gentlemen were elected to serve as members of the Council for the ensuing year, namely—Messrs. Allen, Berry, Pitman, Schacht, Stroud, Warren, White and Wretts.

The Chairman congratulated the incoming Council upon the slight numerical increase upon the lists, both of the members and of the associates of the Society. He was also very glad to hear from his friend, Mr. Warren, who took such anxious care of the Library, that the books were so much read and studied. He hoped when the new Council had fully constituted itself, some good useful scheme for still further developing the benefits of the Association would be arrived at.

DOVER CHEMISTS' ASSOCIATION.

At the quarterly meeting of the Dover Chemists' Association, held on the 21st of February, the following paper was read—

Peroxide of Hydrogen,

its actual strength as found in commerce.

by j. f. brown.

The increasing use of this chemical and its wide variations in price, led me to conclude that a simple test of its quality might be found useful.

The method I propose, is to make its capacity for raising a ferrous salt to the ferric state the measure of its value, thus $2FeSO_4 + O + H_2SO_4 = Fe_2 3 SO_4 + H_2O$, showing that 112 parts of iron require 16 parts of oxygen to bring about the change of state.

Pure unoxidized sulphate of iron would answer the same purpose using 278 parts, and I duplicated some of my testings in this way—without finding any discrepancy, but perhaps the employment of bright polished iron wire is, on the whole, to be recommended in preference.

As a convenient quantity, 44·8 grains of the latter were dissolved by a gentle heat in 15 fl. drs. diluted sulphuric acid in a glass flask lightly stopped with a pledget of cotton to prevent undue access of air; the cooled solution was carefully diluted to 5 fl. oz., transferred to a stoppered bottle and used as quickly as possible.

Five fl. drs. indicating $\frac{8}{10}$ths of a grain of oxygen formed the unit employed, and into this quantity the sample of peroxide to be tested was dropped from a burette until, after brisk stirring, it ceased to strike a blue colour with a drop of freshly made solution of red prussiate of potash.

The quantity used was then noted and the results are thus tabulated:—

Sample A	101	grain measures employed.
„ B	92	„ „ „
„ C	121	„ „ „
„ D	1500	„ „ „
„ F	93	„ „ „
„ G	87	„ „ „
„ H	80	„ „ „
„ I	93	„ „ „
„ J	42	„ „ „
„ K	226	„ „ „

Temperature 58° Fahr. Barometer 30 inches. Since a cubic inch of oxygen weighs ·3422 grain as compared with 252·45 grains, the weight of a cubic inch of water, $\frac{8}{10}$ths of a grain will occupy nearly 590 grain measures, and the actual volume strengths will be obtained by dividing 590 by the number of grain measures used in each case, thus: —

A	contained	5·8 volumes.
B	„	6·4 „
C	„	4 8 „
D	„	·4 „
F	„	6·3 „
G	„	6·8 „
H	„	7·37 „
I	„	6·3 „
J	„	14· „
K	„	2·57 „

Samples A and B were supplied as 10 vols. in the ordinary course of business.

C was old stock and turbid, only just enough being drained out to test with.

D was taken from a freshly opened bottle, supplied by the same wholesale house as A, but was inconceivably weak.

F was obtained for the purpose of testing from the firm who claim priority in introducing this article.

G and H were sent as samples by a leading firm of wholesale druggists as 10 volumes and 20 volumes respectively.

So also were I and J, and the latter was the only sample approaching even remotely, the double strength.

K had, I think, been kept some time.

I would only add that this paper had been projected and worked out before the publication in the Journal of two recent communications on the same subject.

HAWICK PHARMACEUTICAL ASSOCIATION.

The usual monthly meeting was held on Tuesday, February 12, when there was a fair attendance, Mr. Maben, Hon. President, occupying the chair.

The subject under consideration was, "Whether Coated Pills ought to be supplied to the Public."

Mr. J. A. Hislop, in opening the discussion, said that it was perfectly inexcusable to coat pills in order to hide defects arising from bad manipulation, and that it was unnecessary to coat them to cover their nauseous taste, as uncoated pills, after a lapse of twenty-four hours, acquire a hardened exterior, which keeps the taste from being felt for a much longer period than is required to swallow them. He had no objection to coating where this was used to prevent the solution of the pill till it reached the intestines; but where all pills are coated this exception in most cases becomes the rule. Coating is sometimes employed to prevent oxidation or volatilization of active ingredients, but pills of this class should be made when required. Lastly, coating is not sanctioned by authority, therefore should not be used unless specially desired. Mr. Hislop then detailed the results of a series of experiments with uncoated and coated pills, from which it appeared that the latter invariably required much the longer time before complete disintegration took place.

In stating the other side of the question, Mr. J. Craig, jun., said that coated pills keep soft much longer than uncoated pills, because the coating prevents the moisture from evaporating. This is especially desirable in such pills as pil. assaf. co., which if once allowed to harden would pass through the stomach unaltered. It would be wrong to use insoluble varnishes for coating, but pills can be coated so as to be perfectly soluble. Pills containing essential oils or camphor must of necessity be coated to prevent them losing their virtue, and many other pills require coating, otherwise the active ingredient would be oxidized. Then it was desirable to make pills as agreeable to the eye and as tasteless as possible, so that the tendency to nausea in invalids and others who have a difficulty in swallowing pills may be averted, but without coating this could not be done.

In the discussion that followed all present took part, and various opinions were expressed. One member stated that he knew a case where a youth took no fewer than six coated colocynth pills within twelve hours without the slightest effect being produced. The feeling of the meeting was that in some cases coating was necessary, and where not essential it was no disadvantage provided a readily soluble and harmless coating could be obtained. The experience of several members was, however, that the coated pills of commerce were often very unsatisfactory.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, February 21, Dr. W. H. Perkin, President, in the chair.

The following certificates were read for the first time:—H. Cave, F. W. Fleming, E. E. Graves, A. E. Lewis, S. Smith.

During the evening a ballot was held and the following gentlemen were declared by the scrutators, Drs. Wright and Hodgkinson, duly elected Fellows:—L. Archbutt, J. H. Burlans, D. Bain, W. H. Barr, R. A. Bush, P. S. Chantrell, A. F. Damon, H. C. Draper, T. R. Duggan, V. Edwards, W. T. H. Elsley, G. W. Gibson, F. W. Harris, T. Hilditch, R. E. Moyle, P. Morton, W. J. Orsman, F. R. Power, A. E. Simpson, C. W. Sutton, H. G. Shaw, E. F. Smith, F. W. Tompson, A. Tarn, E. W. Voelecker.

It was announced that the following changes in the Vice-Presidents and Council were proposed:—Vice-Presidents, Drs. T. E. Thorpe and W. Weldon, nominated instead of Dr. Crum Brown and Professor Emerson Reynolds, who retire; Council, Drs. Carnelly and Messel, R. J. Friswell and M. Carteighe, nominated in place of Captain Abney, Dr. Mills, Professor McLeod and G. H. Makins. Dr. Hodgkinson, Dr. Thorne and F. W. Toms were appointed Auditors.

The following paper was then read by Dr. Gilbert—

On the Composition of the Ash of Wheat, Grain and Straw grown at Rothamsted in different seasons and by different manures. By Sir J. P. Lawes and Dr. J. H. Gilbert.—This paper gives an account, including duplicates, of two hundred and fifty-three analyses, most of which were made by R. Richter, of Berlin. The ashes were prepared at Rothamsted, being burnt in oblong platinum dishes by surface heat in order to prevent, as far as possible, any fusion. Every ash is of produce of known history of growth as to soil, season and manuring. The experiments are arranged in three series. The first illustrates the influence of fluctuation of season from year to year, under three known, but very different, conditions as to manuring, during sixteen consecutive seasons. The second shows the influence of four characteristic seasons, two favourable and two unfavourable, under nine different conditions as to manuring. The third demonstrates the influence of continuous exhaustion or supply of certain constituents as it represents the proportionally mixed produce for the ten years 1852–61 and the ten years 1862–71 from ten differently manured plots. In the first series the three plots were respectively (1) unmanured; (2) treated with 14 tons farmyard manure per acre; (3) treated with about 200 pounds of ammonium sulphate and 200 pounds of ammonium chloride per acre annually. The principal points of interest in the analyses are the relative quantities of potash and phosphoric acid. The chief conclusions are—that with normal maturation the grain is of nearly uniform composition whatever the manure, that the deviations from normal mineral composition are associated with deviations from normal development of the organic substance, and that the season has much more influence on the mineral composition of the grain than the manure. An obvious difference can nevertheless be detected in the average composition of the grain under the different conditions as to manuring. Thus the grain grown by ammonium salts alone shows exhaustion of potash, and especially of phosphoric acid. In the second series of analyses the following four seasons were selected: 1852, bad both as to quantity and quality of produce; 1856, quantity fair, but quality indifferent; 1858, quantity moderate, quality above the average; 1863, good as to quantity and quality. As to manuring the conditions were unmanured; farmyard manure had ammonium salts alone; ammonium salts and superphosphate; ammonium salts, superphosphate and soda salt; ammonium salts, superphosphate and potash salt; ammonium salts, superphosphate and magnesia salt; and, finally, a mixture of the last three. In the third series of analyses the manures employed were almost the same as those used in the second series, but the analyses relate to a period of twenty consecutive years. The results confirm those obtained in series I. and II. It is seen that the amount of mineral constituents taken up by the plant over a given area depends very directly on the amounts in available condition within the soil and that while the quantity stored in the grain is nearly uniform, the amounts remaining in the straw have a very obvious connection with the supply or exhaustion in the soil. The influence of season is also well marked. The composition of the grain, as to its mineral constituents, seems only to vary with the manure when there is a very abnormal deficiency of one or more constituents, having regard to the amount of growth which is induced by the liberal supply of others. The paper is very lengthy (over 70 pages), and contains eighteen tables of analyses. The authors promise in a future communication to give a similar series of analyses of ashes from barley, leguminous crops, root crops, potatoes, and the mixed herbage from grass land.

The President complimented Dr. Gilbert on the lucidity with which he had communicated the paper; it seemed to him a most interesting fact brought out by this remarkable series of ash determinations, that the composition of the grain should be so uniform.

Mr. T. Farrington gave an instance of the importance of the season with reference to the action of manure with potatoes. In a wet season the addition of kainit was without beneficial influence on the crop, but in a dry season its use was found to be very beneficial; he had also noticed that nitrates had at first more effect than ammonium salts in promoting growth.

Mr. Lloyd was much impressed with the fact that the mineral constituents in a poor crop were relatively larger than in a good crop. The roots probably gathered the mineral constituents independently of the season, and so if the weather was bad and the organic constituents were not formed, the amount of mineral matter would be apparently increased. As the straw seemed to vary more or less with the manure applied, an analysis of the straw ash might perhaps serve as an index of the mineral constituents wanting in the soil.

Dr. Gilbert said that at present it would be difficult to differentiate the mineral constituents of the straw ash. There was no doubt that in bad seasons the maturation of the grain was sluggish and the starch formation was imperfect, and so the percentage of mineral matter was raised.

On the Analysis of Shotley Bridge Spa Water. By H. Peile.—Apparently only one analysis, and that incorrect, has been made of this water. The author has obtained the following numbers indicating grams per litre:—Barium chloride, 0·0569, ammonium chloride, 0·0042, calcium chloride, ·2632, magnesium chloride, 0·0437, lithium chloride, 0·0565, potassium chloride, 0·0513, sodium chloride, 1·7333, calcium bicarbonate, 0·3964, ferrous bicarbonate, 0·0155, magnesium bromide, 0·0075, traces of magnesium bicarbonate and iodide, manganous bicarbonate, silica, phosphates, albumenoid ammonia. The water tastes strongly of iron.

The Society then adjourned to March 6, when a paper by Drs. Armstrong and Miller, "On the Hydrolysis of Sulpho Compounds" will be read.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the above Association, held on Wednesday, February 13, Mr. Parkinson (President), in the chair, a paper on the "Human Eye" was read by W. J. Frankish, M.R.C.S.E.

The lecturer divided his subject into sections. He drew attention to the orbit, the strength of its margins and how well it preserved the eye from injury, as witnessed by the number of persons who at some time in their life have been wounded or contused in the region of the eye, without that organ being injured. How useful and necessary are the eyelids, which by their action are continually wiping off the particles of dust which settle on the cornea, was demonstrated. By means of diagrams he illustrated the cause of long and short sightedness, and showed the action of the muscles which move the eye. The lecturer also by the use of diagrams showed the action of the lachrymal gland, its position, etc., and how the tears are carried off. In explaining the anatomy of the eye the author compared it with the photographic camera and showed the superiority of the eye over any mechanical apparatus by its adaptability to any distance and to any sized picture. There was not time to enter into the phenomena of vision and illusions of sight.

A long discussion followed, in which the President, Messrs. Braithwaite, Burnett, Glew, Hartridge, Parker and Millhouse took part, after which a cordial vote of thanks to Mr. Frankish for his valuable and interesting paper was proposed by Mr. Parker and seconded by Mr. Millhouse, and carried unanimously.

Mr. Frankish having replied, the meeting was adjourned.

Parliamentary and Law Proceedings.

Prosecution under the 17th Section of the Pharmacy Act.

At the Oldham Police Court, on Wednesday, John Wood, 125, Manchester Street, was summoned for illegally selling poisons.

The summons was taken out by Alfred S. Wright, the Assistant Secretary of the Chemists and Druggists' Trade Association of Great Britain. Mr. Porter (Glaisyer and Porter, solicitors, Birmingham) was for the prosecution, and Mr. Hodgkinson for the defence.

Mr. Porter said the summons was taken out under the 17th section, 31 and 32 Victoria, chapter 131, entitled An Act to Regulate the Sale of Poisons, which stated that it was unlawful to sell poisons, wholesale or retail, unless the box, bottle, or vessel, in which such poison was contained was distinctly labelled "poison," with the name and address of the seller, and the name of the poison, and any person convicted under the Act was liable to a penalty not exceeding £5 for the first, and £10 for the second and each subsequent case. The facts of the case were as follow:—On the 14th inst. the Assistant Secretary, from representations made to him, came to Oldham, and went to defendant's shop, and among other things asked for a pennyworth of oxalic acid, which was supplied in a packet, which bore a label on which was the word "poison," but neither the seller's name, or the name of the poison. The case was of great importance to the public, as scarcely a paper could be taken up that did not contain an account of some case of accidental poisoning, in consequence in many cases of the poisons being insufficiently labelled. The object of bringing the case before the public was to show reckless traders that they could not controvert the Act of Parliament in this manner.

Alfred Wright, Assistant Secretary of the Chemists and Druggists' Association of Great Britain, stated that on the 14th inst. he went to 125, Manchester Street, the name over the window being "Wood." He went into the shop and asked for a pennyworth of oxalic acid, and one or two other things. It was handed to him in the packet produced, which had on simply the word "Poison," without the name and address of the seller or the name of the particular poison. The packet was in the same state as when purchased, excepting that a portion had been taken out for analysis.

Mr. Hodgkinson: Is that poison?

Mr. Porter: Most decidedly.

Mr. Hodgkinson: You have not proved it.

The Complainant, cross examined by Mr. Hodgkinson, said: I went into other shops in Oldham, but have not taken out any other summonses. I first asked for a quarter of a pound of linseed meal, then for two pennyworth of laudanum. He supplied the linseed meal, but said he did not keep laudanum. I asked for a pennyworth of rottenstone. That was not poison. I asked for a pennyworth of oxalic acid. He did not say he would not supply it. The defendant remarked, "You must be careful with it; it is poison." I said "I know it." He did not say he was a wholesale dealer, and that he supplied it only in large quantities to wholesale dealers. I have not been prejudiced by the purchase. I do not believe that anyone has been prejudiced by the purchase. The defendant asked if the oxalic acid was for cleaning harness. I said it was for cleaning brass.

Joseph Pendleton, poor-rate collector, said the rates for the premises were paid by the defendant.

Mr. Hodgkinson characterized the prosecution as paltry, and said the complainant went into the shop for the purpose of trapping the defendant. He said he would call the defendant.

The Clerk: He cannot be called, as it is a criminal offence.

Mr. Hodgkinson: It was allowed in O'Donnell's case.

The Clerk: It was a favour; not a right.

Mr. Hodgkinson said he would withdraw from the case, so that the defendant might make his own statement.

The defendant then said that he informed the complainant that he did not sell oxalic acid except by wholesale. The complainant asked for a small quantity for the purpose of cleaning taps. He (defendant) was in a hurry to catch a train, and he put a small quantity in a piece of paper, attaching the word "Poison." He received a penny for the poison produced.

The Bench inflicted a fine of £1, with the ordinary court costs.

Mr. Porter asked for extra costs, observing that the proceedings were taken for the benefit of the public. There had been a couple of journeys by the Assistant Secretary to Oldham, and extra expense for a solicitor's fees. They heard that in Oldham there had been a lot of illegal trading going on.

Mr. Hodgkinson said the Bench had already done that which would meet the justice of the case, considering the circumstances under which the poison was obtained—under false pretences.

Mr. Porter objected to the latter statement.

The Bench: Obtained for the purpose of the prosecution. They declined to alter their decision.—*Oldham Daily Standard.*

Poisoning by Chloral Hydrate in an Infirmary.

An inquest was held at the Gloucester Infirmary on Tuesday afternoon on the body of Anne Frost, who died very suddenly on the previous Friday. The house surgeon stated that Dr. Washbourn, senior physician, prescribed for deceased a sleeping draught. The mixture was to contain syrup of chloral hydrate, and each draught to contain 1 drachm. In such a dose there would be 10 grains of chloral hydrate. The prescription was dictated by Dr. Washbourn and taken down by Mr. Ancrum, who left out the word "syrup." The difference in the amount of chloral hydrate is 60 grains instead of ten. The prescription as taken down by Mr. Ancrum was evidently a mistake. Mr. Ancrum had been a pupil at the infirmary six or seven months The woman died a quarter of an hour after the dose. He should consider she died from syncope, brought about by the draught administered and the condition of her heart and lungs. The draught contained chloral hydrate 1 drachm, instead of syrup of chloral hydrate 1 drachm. Mr. A. P. Carter, surgeon, practising in Gloucester, said such a dose, in his opinion, would be almost certain to cause death. The inquest was resumed yesterday, and other evidence having been taken, the Jury, after an hour's consultation, returned a verdict "That deceased came to her death owing to the administration to her by mistake at the infirmary of an excessive dose of chloral hydrate," and expressed their opinion that the system disclosed by the inquiry as existing at the infirmary, with reference to the dictating of prescriptions without any signature of a responsible medical officer being appended, was a very dangerous one, and one which ought to be remedied.—*Times.*

LIST OF SUBSCRIPTIONS TO THE BENEVOLENT FUND.

Under Harrogate, p. 686, *insert*—

Reynolds, Freshfield . . . . . . £0 10*s*. 6*d*.

Under Manchester, p. 691, *for*—

Ashford, R. . . . . £0 5*s*. 0*d*.

read—

Ashworth, R. . . . . £0 5*s*. 0*d*.

Correspondence.

The Benevolent Fund.

Sir,—I was pleased to see in last Saturday's Journal the "Local List of Subscribers to the Benevolent Fund," which should stimulate all our local secretaries to a renewed exertion on its behalf,—for even chemists are not exempt from the levelling process now going on, and it is not impossible that many who now do what they can to support the Fund may by adverse circumstances be led to seek its aid. Thence the necessity for a material increase in the number of subscribers. It is not cheering or satisfactory to see so many places of considerable importance raising scarcely the conventional guinea, among all the chemists and their assistants. The latter class seem to be overlooked to a large extent, although many would be pleased to show their sympathy with the aged and helpless of our brethren; whilst many of the former must be forgetful, indifferent, or perhaps have not been solicited. At all events an appeal throughout the country (not as a special effort merely, but) to permanently increase the annual subscriptions would be the means of making some cheerless homes somewhat brighter and the last years of not a few somewhat more comfortable, whilst the personal sacrifice, as an annual subscription, would not be great.

I hope that this suggestion may be of some use in the interest of the "Fund."

Southampton. A Country Pharmacist.

W. G. Davies.—The specific gravity of the U.S.P. "lactic acid" is 1·212, and that of the P.G. 1·21 to 1·22. See before, p. 82.

A. Sibbit.—In the State of New York the practice of pharmacy is regulated by restrictive legislation, and we believe also in both the other States mentioned by you.

F. Walder.—Schellen's 'Spectrum Analysis,' translated by Huggins (Longmans).

Mars.—We presume that it is intended that such a provision shall be made.

F. E.—The correspondence referred to may be found in vol. vi. of the present series, pp. 678, 738, 758.

J. C. Lloyd.—The papers have not, so far as we are aware, been reprinted in a separate form.

A. K. F.—At present an answer to your question would partake of the nature of a prophecy, though we do not doubt that a satisfactory arrangement will be made.

Communications, Letters, etc., have been received from Messrs. Cross, Martin, Wyley, T. and H. Smith, Stanton, Wilkinson, Hart, Newsam, Country Chemist, Nux Vomica, Saline.

NOTE ON LOGWOOD AS A TEST FOR METALS.*

BY ARTHUR WEDDELL.

For some years past I have been accustomed to examine potable waters for metallic impurities by means of the alteration produced in the colouring matter of logwood, and as it furnishes a delicate and convenient means of detecting their presence I have thought it worth bringing before this Society. When logwood is digested with alcohol an extract of a rich yellow colour results, and this colour is not changed on dilution with a pure, freshly distilled water. When added to ordinary samples of water, which contain calcium carbonate in solution, the yellow colour is changed to a beautiful rose red, or if a metal be present to blue.

These changes are accounted for in the following manner:—Hæmatoxylin, the ordinary colouring matter of logwood, is converted by oxygen, especially in the presence of alkalies, into an oxidized product known as hæmatëin, which gives a blue precipitate with salts of iron, lead, copper and many other metals, or if the solution be extremely dilute, a blue coloration only. This reaction is so delicate that 1 part of lead in 100,000 parts of water is easily detected, and with care 1 part in 200,000.

These changes do not occur in acid solutions. The method of using the test is extremely simple and consists in the addition of a few drops of a very dilute tincture of logwood to the sample under examination, care being taken that the quantity added is not too great, as a trace of metal may be thus overlooked, owing to the difficulty of observing the change of colour in presence of a large excess of red colouring matter.

My own practice is to prepare an alcohol extract of logwood (strength 1 in 100) by maceration and to note how much of this is required to produce a distinct rose colour in 100 c.c. of distilled water rendered faintly alkaline with ammonium carbonate, or in 100 c.c. of hard water free from metals.

This quantity of logwood solution is next added to 100 c.c. of the water under examination, and the two tubes compared. If a rose colour is developed, metals are absent, while a blue colour indicates their presence.

More logwood may afterwards be added to each tube and the progressive differences noted, the blue colour increasing in depth, or to a precipitate if much lead be present.

By adding sufficient lead solution of known strength to the pure water, so as to imitate the colour in the second tube, as in Nesslerizing, an approximate idea of the amount of lead may be obtained, when it is known that no other metal is present; but I have not considered the reaction worth experiment in this direction, because the exact comparison is somewhat difficult and can hardly reach scientific accuracy.

The presence of free acids interferes with the reaction, and these, if present, must therefore be carefully neutralized and a slight excess of alkali added. Free carbonic acid gas should be removed by boiling, but I have never met with drinking water that required such treatment.

A variety of applications of this test will suggest themselves. Some years ago I recommended a convenient means of testing glycerine for lead and other metals, by adding the glycerine to water coloured red with logwood. Soda water may be examined by boiling to free from CO_2 and adding the logwood. Lemonade by adding a slight excess of pure alkaline carbonate and boiling. The mineral and vegetable acids may be examined by neutralizing carefully and adding the solution to water coloured red with logwood.

My attention was first attracted to this test by observing that distilled water stored in a metal cistern when used to dilute a logwood tincture turned it to a dirty greenish colour, and when this was mixed with tap water it turned blue. On examining the distilled water by the ordinary method, with SH_2, the presence of lead was detected, it having been dissolved from the solder used in the joints and in fixing the tap. As I have since met with this same condition of storage and impurity I think it would be well for those who store distilled water in such a manner to ascertain the absence of lead before using it.

[*The discussion on this paper is printed at p.* 728.]

* Read at an Evening Meeting of the Pharmaceutical Society, March 5, 1884.

THE CHEMICAL COMPOSITION AND PROPERTIES OF A CRYSTALLINE PRINCIPLE OBTAINED FROM JAMBOSA ROOT.*

BY A. W. GERRARD, F.C.S.,

Teacher of Pharmacy to University College.

The roots from which the principle under notice was extracted were handed to me in the summer of 1883 by Dr. Murrell, who received them from Messrs. Park, Davis and Co., with the following information:—

"The plant yielding these roots is probably the *Myrtus Jambosa*, L. (*Jambosa vulgaris*, DC.), cultivated on St. Maurice. The fruit has the circumference of a medium sized pear, a smell reminding of roses." In the same communication the plant is also mentioned as the "*Myrtus Jambosa Malacensis*, Spr. Is at home in India and Otaheiti. The fruit is known as the rose apple, is frequently eaten, and the decoction of the bark used as an astringent in dysentery, gonorrhœa and leucorrhœa."

Since I received the root it has been figured in the *Therapeutic Gazette*, and examined and reported on by Dr. A. B. Lyons, who throws some doubt on a statement that it is the root of *Eugenia Jambosa*, and gives his opinion that the root and stem in general aspect resemble plants of the order *Piperaceæ*. Dr. Lyons also names his drug "jambu assu," stating that it is indigenous to Brazil; but that name is applied in Chernoviz's 'Medical Formulary of Brazil' to *Spilanthes oleracea*, the plants of which genus are mostly smooth annual branching weeds, and would scarcely produce roots 10 to 15 millimetres in diameter, the size of jambosa roots. It may turn out that the name "jambosa" is a generic one, used in the Brazils for drugs of the same character; hence its application to both the plants mentioned. I have been enabled, through the kindness of Mr. E. M. Holmes, to examine some flowers of *Spilanthes oleracea*; they yielded me an oleoresin with properties similar to one obtained from jambosa, both being powerful sialagogues.

Dr. Lyons's examination of the root demonstrated

* Read at an Evening Meeting of the Pharmaceutical Society, March 5, 1884.

that it contained a neutral crystalline principle, an alkaloid, a peculiar acid, and an oleoresin. An independent examination of my own gave similar results, except that I did not notice the alkaloid. I since find it is present, but the quantity is so minute that its study is not worth following.

The extraction of the crystalline principle, which is found only in the bark of the root, is extremely easy. My process was as follows:—The bark was separated from the root, finely powdered and percolated with ether; the ether on evaporation gave an abundant crop of crystals, which by washing with ether and again crystallizing from ether were obtained perfectly white.

Properties of Crystals.—They are white and tasteless, melting at 77° C., becoming solid at 60° C.; soluble in cold ether, alcohol, and chloroform, and in hot petroleum ether. They are insoluble in cold water, but soluble on boiling, separating in crystals on cooling. With strong sulphuric acid they yield a bright green colour, soon passing to a deep reddish-brown. With strong nitric acid they react violently, giving off nitrous fumes and forming an orange coloured liquid, from which water precipitates a new compound. They gave none of the reactions of a glucoside, neither do they possess the character of weak resin acids.

Analysis.—Before combustion the crystals were submitted to fractional crystallization from various fluids; the various fractions proving of uniform composition the product was assumed to be pure. By exposure to dehydrating agents it scarcely lost weight.

Four combustions for carbon and hydrogen were made, giving as the average 60·585 per cent. C, and 7·584 per cent. H. Nitrogen being present it was twice estimated by the absolute method, and after the various corrections gave 7·2 per cent. N, leaving a difference of 24·631 O. These figures allow the construction of the formula $C_{10}H_{15}NO_3$, the theoretical percentages of which I have placed for comparison with those found—

	Analysis.	Theory.
C	60·585	60·91
H	7·584	7·6
N	7·2	7·1
O	24·631	24·39
	100·000	100·00

The name I propose for this substance is jambosin. Therapeutically it is of very little interest, as I have taken several doses without any apparent effect. The active principle of jambosa is no doubt to be found in the oleoresin, which is a powerful sialagogue, and deserving of further research.

[*The discussion on this paper is printed at p.* 728.]

A NEW REACTION AND TEST FOR ATROPINE AND THE MYDRIATIC ALKALOIDS.*

BY A. W. GERRARD, F.C.S.,

Teacher of Pharmacy to University College.

Whilst studying the behaviour of atropine towards mercuric chloride I was somewhat surprised to find on mixing hot alcoholic solutions that they gave a yellow precipitate, which on boiling became red. On diluting the mixture with water a further amount of yellow precipitate was obtained, which also changed to red on boiling.

The precipitate separated, washed and dried, was found on analysis to be mercuric oxide, with a small trace of mercurous oxide.

The reaction representing the first change can be shown by the following equation:—

$$2C_{17}H_{23}NO_3 + H_2O + HgCl_2 = 2C_{17}H_{23}NO_3HCl + HgO.$$

In addition to the above reaction, I find that a second one takes place simultaneously. This second reaction is between the atropine hydrochlorate and two more molecules of the mercuric salt, yielding the following combination:—

$$\underset{\text{Atropine hydrochlorate.}}{C_{17}H_{23}NO_3HCl} + \underset{\text{Mercuric chloride.}}{2HgCl_2} =$$

$$\underset{\text{Dimercuric chloride atropine hydrochlorate.}}{C_{17}H_{23}NO_3HCl(HgCl_2)_2}$$

On cooling and setting aside a few hours this compound separated in tufts of crystalline plates.

It is seen in the first equation that water is essential to the production of the mercuric oxide, this I have proved by mixing absolute alcoholic solutions, also ethereal solutions of the two salts, but no reaction took place until water was added. As commercial alcohol contains traces of water a slight reaction may follow its use. The above experiment was repeated on hyoscyamine, daturine, duboisine, and homatropine, with the same result, thus affording additional proof of the unity of the mydriatic alkaloids.

The composition of the above double salt was established as follows:—500 milligrammes of the carefully dried salt were dissolved in water, and potassic hydrate added in slight excess; the resulting precipitated mercuric oxide was separated, dried and weighed, then calculated as Hg: it gave 228 milligrammes or 45·6 per cent. The filtered solution and washings from the mercuric oxide were faintly acidified with acetic acid, and the chlorine estimated with argentic nitrate, using potassic chromate as indicator; I thus obtained 99·4 Cl or 19·9 per cent. The difference of the above quantities being assumed as atropine would leave 34·5 per cent. for that body, so that analysis and formula percentages may be thus compared:—

	Percentages. Theory.	Percentages. Found.
Mercury	46·1	45·6
Chlorine	20·4	19·9
Atropine	33·3	34·5

To further prove these results another analysis was made as follows:—500 milligrammes of the salt were dissolved in water, and treated with H_2S in excess, and the precipitated mercuric sulphide washed, dried and weighed gave mercury equalling 45·9 per cent. The filtrate and washings were warmed for some time until quite free from H_2S; it was then made neutral with potassic hydrate and the chlorine estimated as above. I now obtained 20·7 per cent. Cl. This result thus confirms the previous analysis.

In addition to the foregoing, I have prepared hydrochlorate of atropine, and treated it with two molecules of $HgCl_2$, and thus obtained the same double compound.

Expecting to find other alkaloids to react in a similar manner, the same test was applied to as many alkaloids as were at my disposal; in no case did I obtain a red precipitate. The following were examined:—Strychnia, brucia, morphia, codeia,

* Read at an Evening Meeting of the Pharmaceutical Society, March 5, 1884.

veratria, aconitia, conia, gelseminia, caffeia, theia, cinchonia, cinchonidia, quinia and quinidia. With most of these I obtained white precipitates; the codeia and morphia became pale yellow on boiling; in many cases crystals of apparently new combinations separated.

For practically working the test, I recommend the following procedure:—To a small portion of atropine in a test tube, add about 2 c.c. of a 5 per cent. solution of mercuric chloride in 50 per cent. alcohol and warm gently; the precipitate will at once appear, and become brick-red in colour. Like most alkaloidal reactions, I find there are certain limiting conditions necessary for the success of the test. It does not answer in dilute solutions, neither does it turn out well if the atropine be added to the mercury, but working as I have described the reaction is strongly marked.

In forensic analysis the above test will be of value, as hitherto no reliable chemical test for atropine has been known. This communication also shows, that under certain conditions, atropine, contrary to the general statement, behaves towards mercuric chloride not like ammonia, but similar to the hydrates of the alkali metals.

[*The discussion on this paper is printed at p.* 729.]

TIN IN CANNED FOODS.*

BY PROFESSOR ATTFIELD, F.R.S., ETC.

From time to time during the past twelve years paragraphs have appeared in newspapers and other periodicals tending in effect to warn the public at least against the indiscriminate use of canned foods. And whenever there has been any foundation in fact for such cautions, it has commonly rested on the alleged presence and harmfulness of tin in the food. At the worst the amount of tin present has been absurdly small, affording an opportunity for one literary representative of medicine to state that before a man could be seriously affected by the tin, even if it occurred in the form of a compound of the metal, he would have to consume at a meal ten pounds of the food containing the largest amount of tin ever detected.

But the greatest proportions of tin thus referred to are, according to my experiments, far beyond those ever likely to be actually present in the food itself in the form of a compound of tin; present, that is to say, on account of the action of the fluids or juices of the food on the tin of the can. Such action and such consequent solution of the tin, and consequent admixture of a possibly assimilable compound of tin with the food, in my opinion, never occurs to an extent which in relation to health has any significance whatever. The occurrence of tin, not as a compound but as the metal itself, is, if possible, still less important.

During the last fifteen years I have frequently examined canned foods, not only with respect to the food itself as food and to the process of canning, but with regard to the relation of the food to, or the influence if any of the metal of, the can itself. So lately as within the past two or three months I have examined sixteen varieties of canned food for metals, with the following results:—

* Read at an Evening Meeting of the Pharmaceutical Society, March 5, 1884.

Name of article examined.	Decimal parts of a grain of tin (or other foreign metal) present in a quarter of a pound.
Salmon	none
Lobsters	none
Oysters	0·004
Sardines	none
Lobster paste	none
Salmon paste	none
Bloater paste	0·002
Potted beef	none
Potted tongue	none
Potted "strasbourg"	none
Potted ham	0·002
Luncheon tongue	0·003
Apricots	0·007
Pears	0·003
Tomatoes	0·007
Peaches	0·004

These proportions of metal are, I say, undeserving of serious notice. I question whether they represent more than the amounts of tin we periodically wear off tin saucepans in preparing food—a month ago I found a trace of tin in water which had been boiled in a tin kettle—or the silver we wear off our forks and spoons. There can be little doubt that we annually pass through our systems a sensible amount of such metals, metallic compounds, and other substances that do not come under the denomination of food; but there is no evidence that they ever did or are ever likely to do harm or occasion us the slightest inconvenience. Harm is far more likely to come to us from noxious gases in the air we breathe than from foreign substances in the food we eat.

But whence come the much less minute amounts of tin—still harmless be it remembered—which have been stated to be occasionally present in canned foods? They come from the minute particles of metal chipped off from the tin sheets in the operations of cutting, bending or hammering the parts of the can, or possibly melted off in the operations necessary for the soldering together of the joints of the can. Some may, perhaps, be cut off by the knife in opening a can. At all events I not unfrequently find such minute particles of metal on carefully washing the external surfaces of a mass of meat just removed from a can or on otherwise properly treating canned food with the object of detecting such particles. The published processes for the detection of tin in canned food will not reveal more than the amounts stated in the table, or about those amounts, that is to say a few thousandths, or perhaps two or three hundredths of a grain, if this precaution be adopted. If such care be not observed the less minute amounts may be found. I did not detect any metallic particles in the twelve samples of canned food just mentioned, but during the past few years I have occasionally found small pieces of metal, perhaps amounting in some of the cases to a few tenths of a grain per pound. Now and then small shot-like pieces of tin or possibly solder may be met with. But no one has ever found, to my knowledge, such a quantity of actual metallic tin, tinned iron, or solder, as, from the point of view of health, can have any significance whatever.

The largest amount of tin I ever detected in actual solution in food was in some canned soup, containing a good deal of lemon juice. It amounted to only three-hundredths of a grain in half a pint of the soup as sent to table. Now, Christison says that quantities of

18 to 44 grains of the very soluble chloride of tin were required to kill dogs in from one to four days. Orfila says that several persons on one occasion dressed their dinner with chloride of tin, mistaking it for salt. One person would thus take not less than 20 to 30 grains of this soluble compound of tin. Yet only a little gastric and bowel disturbance followed and from this all recovered in a few days. Pereira says that the dose of chloride of tin as an antispasmodic and stimulant is from $\frac{1}{16}$ to $\frac{1}{4}$ a grain repeated two or three times daily. Probably no article of canned food, not even the most acid fruit, if in a condition in which it can be eaten, has ever contained, in an ordinary table portion, as much of a soluble salt of tin as would amount to a harmless or useful medicinal dose.

Metallic particles of tin are without any effect on man. A thousand times the quantity ever found in a can of tinned food would do no harm.

Food as acid as, say, ordinary pickles, would dissolve tin. Some manufacturers once purposed using tin stoppers to their bottles of pickles. But the tin was slowly dissolved by the acid of the vinegar. These pickles, however, had a distinctly nasty "metallic" flavour. The idea was abandoned. Probably any article of food containing enough tin to disagree with the system would be too nasty to eat. Purchasers of food may rest assured that the action taken by this firm would be that usually followed. It is not to the interest of manufacturers or other vendors to offend the senses of purchasers, still less to do them actual harm; even if no higher motive comes into force.

In the early days of canning it is just possible that the use of "spirits of salt" in soldering may have resulted in the presence of a little stannous, plumbous, or other chloride in canned food; but such a fault would soon be detected and corrected, and, as a matter of fact, rosin-soldering is to my knowledge more generally employed —indeed, for anything I know to the contrary, is exclusively employed — in canning food. Any rosin that gained access would be perfectly harmless. It is just possible also that formerly the tin itself may have contained lead, but I have not found any lead in the sheet tin used for canning of late years.

In conclusion: 1. I have never been able to satisfy myself that a can of ordinary tinned food contains even a useful medicinal dose of such a true soluble *compound* of tin as is likely to have any effect on man. 2. As for the metal itself, that is the filings or actual metallic particles or fragments, one ounce is a common dose as a vermifuge; harmless even in that quantity to man, and not always so harmful as could be desired to the parasites for whose disestablishment it is administered. One ounce might be contained in about four hundredweight of canned food. 3. If a possibly harmful quantity of a soluble compound of tin be placed in a portion of canned food the latter will be so nasty and so unlike any ordinary nasty flavour, so "metallic" in fact, that no sane person will eat it. 4. Respecting the globules of solder (lead and tin) that are occasionally met with in canned food, I believe most persons detect them in the mouth and remove them, as they would shots in game. But if swallowed they do no harm. Pereira says that metallic lead is probably inert, and that nearly a quarter of a pound has been administered to a dog without any obvious effects. He goes on to say that as it becomes oxidized it occasionally acquires activity, quoting Paulini's statement that colic was produced in a patient who had swallowed a leaden bullet. To allay alarm in the minds of those who fear they might swallow pellets of solder I may add that Pereira cites Proust for the assurance that an alloy of tin and lead is less easily oxidized than pure lead. 5. Unsoundness in meat does not appear to promote the corrosion or solution of tin. I have kept salmon in cans till it was putrid, testing it occasionally for tin. No trace of tin was detected. Nevertheless, food should not be allowed to remain for a few days or even hours in saucepans, metal baking pans, or opened tins or cans, otherwise it *may* taste metallic. 6. Unsound food, canned or uncanned, may of course injure health, and where canned food really has done harm, the harm has in all probability been due to the food and not to the can. 7. What has been termed idiosyncrasy must also be borne in mind. I know a man to whom oatmeal is a poison. Some people cannot eat lobsters, either fresh or tinned. Serious results have followed the eating of not only oatmeal or shell-fish, but salmon and mutton; *hydrate* (misreported *nitrate*) of tin being gratuitously suggested as being contained in the salmon, in one case. Possibly there were cases of idiosyncrasy in the eater, possibly the food was unsound, possibly other causes altogether led to the results, but certainly, to my mind, the tin had nothing whatever to do with the matter.

In my opinion, given after well weighing all evidence hitherto forthcoming, the public have not the faintest cause for alarm respecting the occurrence of tin, lead, or any other metal in canned foods.

[*The discussion on this paper is printed at p.* 730.]

THE STEAROPTEN OF OIL OF PATCHOULY.*

BY HENRY C. C. MAISCH.

Patchouly camphor, a homologue of borneol, as obtained from the oil was in pieces of various size and form, mostly belonging to the hexagonal class of crystals. The colour ranged from light yellow, probably from adhering or enclosed oil, to colourless.

In order to purify the camphor, it was dissolved in alcohol. This solution did not crystallize although evaporated to a syrupy consistency. The alcohol was completely driven off, and the residue dissolved in ether, from which solution it deposited after several times recrystallizing in colourless truncated hexagonal prismatic crystals.

The fusing points of both the crude and the recrystallized camphor were determined. A small quantity was put on some mercury in a beaker glass in which a thermometer was suspended, the mercury covering the bulb. A slow heat was then applied, the mercury in the thermometer rising slowly. The melting point of the recrystallized camphor was found between 55° and 56° C., coming near that determined by Gal in 1869 (*Compt. Rend.*, lxviii., 406), who gives it as 54°–55° C., while another author, de Montgolfier (*Ber. Deutsch. Chem. Ges.*, 1877, 374), gives it as 59° C. The melting point of the crude camphor, determined upon mercury as stated above, was found between 57°–58° C., or about 2° C. higher than that of the recrystallized. The latter again solidified when cooled to between 48° and 49° C., but the congealing point for the crude camphor is between 54° and 55° C. The boiling point determined by Gal, is given at 296° C., the specific gravity as 1·051 at 4·5° C., and the vapour density as 8·00 at 324° C.

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The Pharmaceutical Journal.

SATURDAY, MARCH 8, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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THE LEGISLATIVE OUTLOOK.

THE progress of events during the last few days has disclosed the present intentions of the Government in respect to two questions upon which many pharmacists in this country are desirous that legislation should take place,—namely, the sale of poisons and the constitution of the Pharmacopœia Committee,—and it seems to us to be very regrettable that those intentions should prove to be of so limited or even negative a character. It is now about sixteen months since the Lords of the Privy Council, being made aware of serious defects in the existing law relating to the sale of poisons, expressed a wish that the Pharmaceutical Socicty should submit to them its views upon the subject in the form of a draft Bill amending the existing law in regard to the sale of poisons. This task was at once undertaken by the Council of the Pharmaceutical Society, and the result was the submission shortly afterwards of a draft Bill, with the provisions of which our readers are acquainted. The parliamentary session of 1883, however, passed away without the Government seeing its way to the introduction of a measure, and the proceedings in Parliament relating to the subject in the present session have hitherto consisted of an almost exact repetition of those of last year,—the introduction of a yet unprinted Bill relating to patent medicines containing poisons by a private member, and an announcement of the intention of the Goverment to deal with the general question. It was only natural, therefore, that the Council of the Pharmaceutical Society, having been induced to formulate its views, should endeavour to obtain some definite information as to the course intended to be taken by the Government, and the consequent correspondence, as laid before it at the meeting on Wednesday last, will be found on another page. It will be seen from this that the Government has decided to confine the Bill that it proposes to introduce to the question of the sale of poisons, and does not intend to include any amendments of the Pharmacy Act in relation to the status or organization of the Pharmaceutical Society.

It would seem, therefore, that little further can be done until the publication of the text of the Government Bill shows the exact official construction placed upon the somewhat vague phrase "amendments on the Pharmacy Acts in relation to the status or the organization of the Pharmaceutical Society." The Council would, however, appear to be quite warranted in expressing its regret at the general tenour of the information, and in stating its inability to see how it is possible to satisfactorily amend the law in regard to the sale of poisons without at the same time dealing with the amendment of the Pharmacy Acts. A superficial knowledge characteristic in amateur legislators, or a wilful blindness that refuses to recognize existing facts, may indeed suggest the entire dissociation of the two subjects; but the basis of the existing law in relation to poisons is too clearly stated to be ignored, and legislation that does not at least attempt to remedy the defects of the Pharmacy Acts and make them effectually operative will leave them less powerful for the public good than before. It is only necessary to refer to the preamble of the Act of 1868, where it is laid down that it is expedient for the safety of the public that persons keeping open shop for the selling of poisons should possess a competent practical knowledge of their business, tested by examination and put in evidence by registration, to show that even the internal arrangements affecting the efficiency of the corporation which performs this duty for the public, and to a greater degree the provisions relating to examination and registration, are worthy of revision when the general subject of poisons is under consideration. The Council, with its intimate knowledge of points in which the Act fails to fulfil the purposes for which it was passed, and the unforeseen subterfuges by which the provisions made in the interest of the public are daily evaded, would have proved sadly lax in the performance of the duty which at the invitation of the Privy Council it had undertaken had it not embodied as far as possible in the draft Bill the whole of the conclusions drawn from its experience. It can be easily understood, however, why the Government, which has had this question somewhat forced upon it by passing events, should in the present state of parliamentary business desire to keep the Bill which it proposes to introduce within the narrowest possible limits. Nevertheless, if it is intended to deal with the question of patent medicines containing poisons, as would seem to be implied in the answer recently given by MR. MUNDELLA to MR. WARTON, it will be difficult to steer clear of the Pharmacy Act altogether. Still, pending the appearance of the Bill, it will be hardly worth while to speculate upon its provisions. When it is published, however far it may come short of what may be considered legitimate expectations, it will be certain to receive the most careful consideration from the Council of the Pharmaceutical Society, and no doubt the suggestion as to laying the result of the Council's deliberations before the Government will be followed. It seems probable, however, that the Council may deem it advisable to embody in another Bill the provisions for which the Government declines to accept the responsibility, and we do not gather from the letter from the Privy Council that any official opposition would be offered to such a course.

On Monday the promised Government Medical Acts Amendment Bill was introduced into the House of Lords and read a first time, and on Thursday its second reading was taken. The Bill appears to be practically in the same form as it was left by the House of Commons at the end of last session, with the exception of an attempt to disarm opposition in one quarter by allowing the Scotch medical corporations to have five representatives on the Medical Council instead of three, as proposed last year. At any rate the clauses relating to the preparation of the British Pharmacopœia remain unaltered. The Bill still provides that the Medical Council shall from time to time cause to be published under its direction a book containing a list of medicines and compounds and the manner of preparing them, to be called the British Pharmacopœia, and that the exclusive right of publishing, printing and selling this work shall vest in the Medical Council. It seems a pity that apparently no heed should have been paid to the prayer of the large number of petitions presented in the closing days of the last session, both from members of the medical profession and pharmacists, asking that provision should be made to include among the members of the Committee charged with the preparation of the national Pharmacopœia a certain number of pharmaceutical chemists. There are some points in the Bill that have excited strong opposition, which may yet imperil its passage; but concerning this request for the proper representation of pharmacists in the Committee entrusted with the duty of preparing their special text-book, we have not yet seen expressed in print a single dissentient opinion. If it had not been that, as before mentioned, the Bill bears the marks of concession in favour of a demand that although strongly supported, was by no means undisputed, it might have been thought that possibly it had not been deemed consistent with the policy ruling the conduct of the Bill to accord even this unanimous request apart from a decision in Parliament. For some inscrutable reason, however, the request not ostensibly disputed has up to the present been ignored, whilst one concerning which there was considerable difference of opinion has been conceded. It seems probable, therefore, that it may become necessary to take active steps to bring the subject under the special attention of Parliament, even before it leaves the House of Lords. In any case, the progress of the Bill will be carefully watched, and we do not doubt that, should it appear necessary in order to secure the object in view, the Council of the Pharmaceutical Society will take the proper steps to bring its legitimate influence to bear, and that the pharmacists throughout the country will, as last year, unite to exercise a constitutional pressure upon their representatives in the House of Commons.

It will be seen from an advertisement on another page that on Wednesday next, at noon, a meeting will be held at 17, Bloomsbury Square, to make arrangements for the usual Annual Dinner of the members of the Pharmaceutical Society and their friends in connection with the Annual Meeting in May. Gentlemen who are willing to become Stewards, but who will be unable to attend the meeting on Wednesday, are recommended to communicate their wish upon the subject at once to Mr. Richard Bremridge.

* * *

The Medical Acts Amendment Bill, which was read a first time in the House of Lords on Monday and a second time on Thursday, is to be considered in Committee on Thursday, the 20th inst.

* * *

On Wednesday last a decision was given in the Court of Appeal of considerable importance in relation to the registration of names as trade marks. The litigation commenced in an attempt made by a firm of oil manufacturers to restrain a competitor from using the term "valvoline," which they had registered as a trade mark used by them before the passing of the Trade Marks Act, 1875. It seems to have been admitted that the word had been used by the plaintiffs as applying to a particular article of their manufacture, and that it had been even used in combination with a device as a distinguishing trade mark. But a previous adverse decision had led to the registration of the term alone. The defendant therefore contended that as the word "valvoline" *simpliciter* had never been used as a trade mark, but only as a descriptive name, the registration of it as a trade mark was bad, and in a cross action he applied that the Registrar of Trade Marks should be ordered to remove it from the Register. This application Mr. Justice Pearson granted, notwithstanding that it was urged that even if the trade mark had been originally bad, it had become good through the lapse of five years since registration, and it was against this decision that appeal was made. The Lord Chancellor, in his judgment, in which Lord Justices Cotton and Fry concurred, said that if the word "valvoline" had been used as a trade mark in this country before the passing of the Act its registration would have been good. A descriptive word might be used as a trade mark, but if the article to which it applied was such that anybody might make and sell it, no right to the word could be got except by user as a trade mark. In this case no such user as a trade mark had been proved, and the original registration under the Act of 1875 having been therefore defective, Mr. Justice Pearson's decision that the name should be removed from the Register of Trade Marks was right.

* * *

Mr. Consul Robertson in a recent trade report, whilst declining to introduce controversial matters, refers to the fact that complaints have reached him as to the manner in which the Japanese Government laboratories are worked to the detriment of importers of drugs, medicines and chemicals. It has been urged upon him that the standard of purity sought to be imposed on these articles upon their entry into Japan is too high when compared with that in force in other countries, and that manufacturers find it difficult to meet the requirements of the Japanese examiners in this respect. We may mention that we recently heard of an instance of this in the stoppage at the custom house of a consignment of sodium benzoate, on the ground that it did not answer to the German Pharmacopœia test for benzoic acid in the reduction of a permanganate solution, which, as is known, is dependent upon the presence of an impurity in the sublimed acid.

* * *

The *Pharmaceutical Record* says that among the tricks of trade that have recently come to light in the United States is the filling of ginseng root with lead. It may be hoped that the "heathen Chinee," who are the chief consumers of this drug in that country, will show a proper appreciation of this application of the resources of civilization.

* * *

The Bill for the reorganization of the inspection of pharmacies in France, to which we referred recently, has been sent to the Committee charged with the Pharmacy Bill, which is considered to be equivalent to shelving it.

* * *

The publication of a new edition of the French Codex would appear to be imminent, as an official decree has appeared making the "new *Codex Medicamentarius, Pharmacopée Française,*" compulsory upon French pharmaciens from the 15th of the present month.

* * *

News has been received that on Friday, the 29th ult., the chemical works in Philadelphia, belonging to Messrs. Powers and Weightman, the large quinine manufacturers, were destroyed by fire. The value of the property destroyed has been estimated to exceed one million dollars, consisting largely of cinchona bark and manufactured products. The firm were the largest holders of quinine in the United States, and one result of the enormous destruction was that the price of bark in the American market immediately went up 50 per cent., and quinine rose from one dollar forty cents to two dollars per ounce.

* *

The Victoria Pharmaceutical Register published in January last, a copy of which has just been received, contains 683 names, showing an increase of 14 as compared with the previous Register.

* * *

The first meeting for the reading of papers of the newly established Glasgow and West of Scotland Section of the Society of Chemical Industry will be held in the Rooms of the Philosophical Society, Bath Street, Glasgow, on Tuesday next, at 8 p.m. The papers to be read are on "The Effect of Temperature in Dyeing," by Professor Mills and Mr. Rennie; "The Production of Ammonia from the Nitrogen of Minerals," by Mr. Beilby; and "The Distribution of the Gases in the Leaden Chamber," by Mr. Mactear. The Chairman of the Section is Mr. E. C. C. Stanford.

* * *

A meeting of the School of Pharmacy Students' Association will be held on Thursday next, March 13, at 8 p.m., when some "Further Notes upon the Synthesis of Uric Acid" will be read by Mr. J. S. Dymond, and a Report upon Pharmacology will be made by Mr. H. G. Greenish.

* * *

The next meeting of the Chemists' Assistants' Association will be held on Wednesday, March 12, at 9 p.m., when a paper on "Photography with the Microscope by aid of the Incandescent Electric Lamp" will be read by Mr. F. W. Branson, F.C.S.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, March 5, 1884.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Messrs. Andrews, Borland, Bottle, Butt, Churchill, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Squire, Symes, Williams, Woolley and Young.

The minutes of the previous meeting were read and confirmed.

DIPLOMAS.

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

Haddock, James.
Randall, William Joseph.
Roberts, Edmund.
Wiggin, John Chinery.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Dolbear, John .... London.
Haddock, James .... Leigh.
Ord, Septimus William .... London.
Randall, William Joseph .... Wareham.
Roberts, Edmund .... Florence.
Wiggin, John Chinery .... Ipswich.

Chemists and Druggists.

The following chemists and druggists, who were in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Humble, John Mitchell .... Birmingham.
Seivwright, George .... Cullen.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society.

Adamson, William Stewart .... Aberdeen.
Bowering, John .... London.
Clarke, Herbert .... Dover.
Davies, Daniel .... Newcastle Emlyn.
Gill, William .... Nottingham.
Jenkins, Evan Edward .... Beeston.
Jevons, Wallis Byron .... Market Rasen.
Kerr, William Henry .... London.
Sinclair, Matilda Anne .... Llandudno.

ASSOCIATES.

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

Alderton, James .... Leamington.
Baker, Sidney George .... High Barnet.
Baker, Walter James .... Dorking.
Bates, John .... Bicester.
Black, James Watson .... Aberdeen.
Borthwick, Robert Waddell .... Bathgate.
Botham, William Bland .... Sheffield.
Burgess, William .... Runcorn.
Clarke, Richard .... Ruthin.
Davis, Frederick .... Oundle.
Farlow, James Southward .... London.

Fellows, Vincent Litchfield......London.
Heaver, Arthur William.........Norwich.
Jackson, George Granger ......Buxton.
Leach, John Pickering ....New Shoreham.
Mack, George Henry ....Holt.
Pomeroy, Francis Thomas ......South Petherton.
Potter, John Henry...............Nottingham.
Rawling, William John ....Devonport.
Richards, Thomas Coombs ......London.
Shallcross, Joseph Richard......Tunstall.
Smith, Samuel Henry ....Leamington.
Southwell, Charles Bullock......Bridgnorth.
Spratling, Walter................. Boston.
Taylor, George ....Edinburgh.
Wells, Arthur John...............Leamington.

APPRENTICES OR STUDENTS.

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

Adams, Walter.......................Harrow.
Aspden, Henry.......................Over Darwen.
Batterbee, Robert Henry ......Lynn.
Birch, John ....Heywood.
Capon, Henry Charles............London.
Collett, William James ....Nantwich.
Davis, Herbert P....................Cardiff.
Farquhar, John McKelvie ......Greenock.
Farnworth, Walter ....Blackburn.
Gibson, George Wood ....Whitby.
Gibson, John W....................Richmond (Yorks).
Gould, Charles William ....London.
Graham, Joseph ....South Shields.
Green, Henry Selby...............Penzance.
Groves, Thomas ....Bridport.
Hallam, Samuel Robinson ......Burton-on-Trent.
Hodges, Arthur Lovell ....Sunderland.
Jones, Martin Llewelyn ....Aberdare.
Maddock, Herbert ....Manchester.
Morgan, William John ....St. Clears.
Morrison, Charles Orr............Sheffield.
Page, Percy Dodson...............Boston.
Parry, John .. ..Llangefni.
Peck, Edward ....Ely.
Peck, Ernest Saville ....Cambridge.
Phillips, George Edward.........Ashbourne.
Rookledge, Frederick ....Easingwold.
Slinn, Harry Edwin ....Burton-on-Trent.
Sloan, William Guley............Barking.
Thompson, George ....Knaresborough.
Webster, Edward..................Hull.
Widdowson, George William...Leicester.
Wilson, Alexander ....Greenock.
Wyllie, Harry Boak...............Kinghorn.

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

Restoration to the Register.

The name of the following person, who had made the required declarations and paid a fine of one guinea, was restored to the Register of Chemists and Druggists:—

Joseph Clempson, 42, South Street, Manchester Square, London, W.

Auditors' Report.

The Auditors' Report for the financial year ending December 31, 1883, was laid on the table.

The Conversazione.

It was resolved that the annual Conversazione be held on Wednesday, May 21, and the President, Vice-President, and Treasurer, with Messrs. Butt, Hills and Squire, were appointed a Committee to make the necessary arrangements.

The Secretary was also directed to apply to the Director of South Kensington Museum for permission to hold the gathering in that building.

Reports of Committees.

FINANCE.

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

FREEHOLD INVESTMENTS.

The Council went into committee to consider this report and on resuming, the motion approving the report of the Committee was carried.

BENEVOLENT FUND.

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

£10 to a former member, aged 77. Applicant had a grant of £10 in March, 1883; has to support a wife, aged 60, in delicate health, and two daughters. Herefordshire.

£10 to the widow of a member from 1856–59, during which time he was in business. Partially supports herself by needlework. Middlesex.

Two other applications had been deferred for further inquiries, and one from an applicant who had had six grants previously was not entertained.

The Vice-President moved the adoption of the report, which was carried unanimously.

The following statement had been submitted to the Committee by the Secretary:—

Benevolent Fund, 1883.

		s. d.		£ s. d.
321	Subscribers @	2 6	. . = . .	40 2 6
1380	"	5 0	. . = . .	345 0 0
74	"	10 0	. . = . .	37 0 0
904	"	10 6	. . = . .	474 12 0
392	"	21 0	. . = . .	411 12 0
41	"	42 0	. . = . .	86 2 0
3	"	63 0	. . = . .	9 9 0
8	"	105 0	. . = . .	42 0 0
2	"	210 0	. . = . .	21 0 0
2	"	£21 0 0	. . = . .	42 0 0
34	"	Odd Amounts.	. = . .	26 19 6
				£1535 17 0

Sources from which the Subscriptions were received.	Total.	Number who do not subscribe.	Number who do subscribe.	Amount.
				£ s. d.
Members - Pharmaceutical Chemists . .	1861	950	911	516 19 6
Members—Chemists and Druggists . .	762	378	384	179 1 0
Associates in Business . .	1178	624	554	190 17 10
Associates not in Business .	827	651	176	50 14 6
Registered Chemists and Druggists not connected with the Society . .	9037	8131	906	385 12 8
Firms				112 2 0
Local Pharmaceutical Associations . .				14 14 0
"Chemists' Ball," "Junior Pharmacy Ball" and "Pharmacy Club" . . .				52 10 0
Other sources .				33 5 6
	13665	10734 who do not subscribe.	2931	1535 17 0

	No. of cases	Amount.	Total of each class. No.	Amount.
Temporary aid granted during 1883:—		£ s. d.		£ s. d.
Members (Pharmaceutical Chemists and Chemists and Druggists), Associates in Business, Associates not in Business, and Registered Chemists and Druggists	26	260 0 0		
Widows of ditto. .	33	330 0 0		
Orphans of ditto. .	3	70 10 0		
			62	660 10 0
Annuities paid during 1883 . . .			42	1283 15 0
			104	1944 5 0

LIBRARY, MUSEUM, LABORATORY, AND HOUSE.

Library.

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

	Attendance.	Total.	Highest.	Lowest.	Average.
January.	Day . . .	469	24	8	17
	Evening . .	155	16	1	7

Circulation of books.	Town.	No. of Entries. Country.	Total.
January	178	164	342

Carriage paid, £2 9*s.* 5½*d.*

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

Pradel (P.), Le Gelsémium sempervirens, 1884.
From Prof. SOUBEIRAN.

Asclepiad (The), no. 1, 1884.
From Dr. B. W. RICHARDSON.

Morel (J.), Essai sur la Classification des Phrénopathies, 1884.

Nieuw Tijdschrift voor de Pharmacie in Nederland, Mei–Dec., 1883.

Pharmaceutisch Weekblad, 1883-4, 36 nos.
From Dr. J. MOREL.

Flora of British India, by Sir J. D. Hooker, etc., part 11, 1883.
From H. M. SEC. OF STATE FOR INDIA.

Midland Medical Miscellany, 1882-3.
From Mr. J. G. F. RICHARDSON.

Kügler (K.), Ueber das Suberin, 1884.
From Prof. FLÜCKIGER.

Geological and Natural History Survey of Canada, Report of progress for 1880-81-82, and Maps.
From the SURVEY.

The Committee recommended the purchase of the undermentioned works:—

New English Dictionary, edited by J. A. H. Murray, President of the Philological Society.

Encyclopædia Americana, 4 vols.

Dymock (W.), Vegetable Materia Medica of Western India.

Whitla (W.), Elements of Pharmacy, Materia Medica and Therapeutics, 2nd ed.

Curator's Report.

The Curator had reported the attendance in the Museum during January to have been:—

	Total.	Highest.	Lowest.	Average.
Morning .	572	44	2	21
Evening .	109	14	1	5

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

Specimens of East Indian Red bark in very fine quills; two fine specimens of a new variety of Zanzibar aloes, recently offered in the London market as "Socotrine" aloes.
From Messrs. A. HILL AND SON.

Specimens of East Indian Calisaya bark in very fine quills. From Messrs CORBYN, STACEY AND CO.

Specimens of the following drugs from India:—Ekangi, Jonka, Sokai, Salpani, Setara, Parileamo.
From the DIRECTOR, ROYAL GARDENS, KEW.

Specimens of the seeds of *Abrus precatorius* in the pods. From Messrs. T. CHRISTY AND CO.

The further specimens of Cinchona bark from Darjeeling had been received. The collection consists of a fine series of herbarium specimens of *Cinchona officinalis, Ledgeriana succirubra*, and ten hybrids; also of young bark of the ten hybrids and powdered bark of the *Ledgeriana officinalis* and *succirubra* for analysis.

The specimens had been mounted and placed in the Museum.

The new show case for new drugs and recent donations to the Museum had been received.

The Professors had attended and reported satisfactorily on their respective classes.

Applications from Dundee University and from Mason's Science College, Birmingham, had been received, asking for copies of the Calendar, which it was recommended should be acceded to, and that in the former case the Journal also should be sent.

Mr. Rastrick, Portsea, and Mr. Robinson, York, had sent collections of autograph prescriptions, for which letters of thanks had been sent.

An estimate for new chairs for the Council room had been submitted, and it was recommended that the chairs be ordered.

Mr. Dunstan, the Assistant Lecturer in Chemistry, had applied for new and more modern diagrams for lecture purposes, and it was recommended that the matter be left in the hands of the President to carry out.

The Ballarat School of Mines and Industries had applied for copies of the Journal, and it was recommended that that institution be placed on the free list.

The PRESIDENT moved the adoption of the report, which, after a few words from Mr. Williams with regard to the diagrams, and an expression of pleasure by Mr. Symes at a statement that the glass cases had now arrived for the exhibition of new drugs and apparatus, was carried unanimously.

LAW AND PARLIAMENTARY.

The Secretary had reported to this Committee the receipt of a reply from the Chemists and Druggists' Trade Association, enclosing a resolution to the effect that the President, Vice-President, Mr. Barclay and the Secretary would, in compliance with the invitation of the Committee, form a deputation to accompany one from the Pharmaceutical Society to wait on the Privy Council.

Communication with the Privy Council.

The following correspondence with the Privy Council Office had been submitted to the Committee:—

"Pharmaceutical Society of Great Britain,
"17, Bloomsbury Square, London, W.C.
"*February* 13, 1884.

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

"Dear Sir,—With reference to the Bill, drafted by the Council of this Society and forwarded to you in February last, to regulate the sale of poisons and amend the Pharmacy Acts, I am instructed to ask the Lord President to receive, on an early day, a deputation representing the Pharmaceutical Society and the Chemists and Druggists' Trade Association, to urge upon his Lordship the importance of introducing it into Parliament during the present session.

"Awaiting the favour of a reply,
"I am, dear Sir,
"Your obedient servant
(Signed) "ELIAS BREMRIDGE,
"*Secretary.*"

"Privy Council Office, Whitehall.
"*February* 15, 1884.

"Sir,—I am directed by the Lord President of the Council to acknowledge the receipt of your letter of the 13th inst., and I am to state, for the information of the Pharmaceutical Society, that Her Majesty's Government have decided to confine the Bill, which they propose to introduce, to the question of the sale of poisons, and not to include in that Bill any amendments of the Pharmacy Act in relation to the status or the organization of the Pharmaceutical Society.

"The Lord President also instructs me to state that if, after the Government Bill has been introduced, the Society desire to submit any observations upon it, his Lordship would be willing to receive a deputation on the subject.

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

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

The Committee had considered that no useful action could be taken until the terms of the Government Bill were made known, and had communicated to that effect with the Trade Association. The Committee recommended the Council to send the following letter to the Privy Council in reply:—

"Pharmaceutical Society of Great Britain,
"17, Bloomsbury Square, London, W.C.
"Charles L. Peel, Esq.,
"Privy Council Office, Whitehall, S.W.

"Sir,—I am directed by the Council of this Society to acknowledge the receipt of your letter of the 15th ulto., and I am to state that the Council regret to be informed that Her Majesty's Government have decided to confine the Bill, which they propose to introduce, to the question of the sale of poisons, and not to include in that Bill any amendments of the Pharmacy Acts in relation to the status or the organization of the Pharmaceutical Society.

"I have the honour to be, Sir,
"Your obedient servant,
(Signed) "ELIAS BREMRIDGE.
"*Secretary.*"

The PRESIDENT moved the adoption of the report and recommendations. The draft letter read would, he thought, sufficiently express the feeling of the Council, and was probably a sufficient notice of the receipt of the communication from the Privy Council. In the opinion of the Committee it was not desirable to move any further until the terms of the Government Bill were known. He had no reason to believe, from what information he had been able to gather, that the Government disapproved of the clauses in the Society's Bill which dealt with the organization of the Society, as it had been called. He believed that the Government did not wish at present to undertake much more than the responsibility of dealing with patent medicines, and had the idea, like most persons unacquainted with the subject, that the sale of poisons could be easily dealt with, in a clause or two, and that a short Bill could be drafted, to which there would be no opposition. Whether that expectation would be realized was another question. At present he thought it would neither be wise nor dignified for the Council to take any further action until the Bi was introduced.

Mr. SCHACHT asked for the letter from the Privy Council in which it was first suggested that the Council should draft a Bill.

The Council then went into committee to consider this subject, and a long discussion ensued.

Mr. SCHACHT said the Council had received a request in sufficiently broad terms to frame an amended Pharmacy Bill as to thoroughly justify it in expressing its regret that no amendment of the Pharmacy Act was intended by the Government, more forcibly than was set forth in the proposed letter.

The PRESIDENT pointed out that the written communications from the Privy Council had always been limited to the sale of poisons.

Mr. WOOLLEY thought there should be something added to the letter giving the Privy Council to understand plainly that in the opinion of that Council the two questions must be dealt with together.

Mr. SCHACHT also pressed the point very strongly that the Council was by the Pharmacy Acts appointed the authority to deal with questions affecting the sale of poisons, and it seemed to him that no Bill ought to be introduced in connection with this subject without the Council being consulted.

Mr. HAMPSON also thought the Council had not been very well treated by the Government, and that it could not be too clear in expressing its opinion that no Bill dealing with the sale of poisons only, and not with the other deficiencies in the Pharmacy Act, would have the support of the Council.

Similar views having been expressed by several other members of Council, it was finally decided to add the following clause to the letter to be sent to the Privy Council:—

"I am further instructed to state for the information of the Lord President that the Council of this Society fail to see how it is possible to satisfactorily amend the law in regard to the sale of poisons without at the same time dealing with the amendment of the Pharmacy Acts."

The Council then resumed, and the report and recommendations were adopted unanimously, with the addition of the above clause to the letter.

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor, stating the progress of cases which had been placed in his hands.

The Committee had also considered several other cases, and in respect to some recommended that proceedings be commenced. In one case of registration the Registrar had reported that on making inquiries, the medical man who had supported the application to be placed on the Register had withdrawn his declaration, and the person in question had withdrawn his claim.

The Registrar was therefore directed to erase the name from the Register.

The report and recommendations were unanimously adopted.

REPORT OF EXAMINATIONS.

February, 1884.

ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.
Major (19th)	7	4	3
Minor (19th)	24	10	14
„ (20th)	29	5	24
„ (21st)	30	12	18
„ (22nd)	27	10	17
	—110	—37	—73
	117	41	76

PRELIMINARY EXAMINATION.

Two certificates received in lieu of Society's examination.

1 College of Preceptors.
1 University of London.

AMENDMENT OF THE BYE-LAWS.

Mr. BOTTLE reminded the Council that the Education Committee had been instructed to carefully examine the bye-laws, with a view to recommending any alterations which might be required in regard to educational matters; and suggested that the same Committee should have power to examine the bye-laws generally, and see if any other alterations were desirable. He thought some of the bye-laws might be modified with advantage.

Mr. WILLIAMS said this was a very wide question, and he did not see why the Committee appointed to deal with the education question only should take upon itself a function which had always been discharged by the Law and Parliamentary Committee.

Mr. BOTTLE said he did not mind which Committee undertook the duty, but if the bye-laws were to be amended at all it was just as well the work should be done thoroughly, and the whole thing brought up to date.

Mr. SCHACHT said there would be one advantage in adopting Mr. Bottle's original suggestion, viz., that the members of the Education Committee had all the details of the bye-laws at their fingers' ends. If thought desirable that Committee could submit its ideas to the Law and Parliamentary Committee, which could bring up a report to the Council upon it.

After some further conversation, Mr. Bottle's suggestion was acceded to, the names of Mr. Robbins and Mr. Williams being added to the Committee.

EVENING MEETING.

Wednesday, March 5, 1884.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The Fifth Evening Meeting of the Session was held on Wednesday last, the chair being taken at half-past eight o'clock.

The minutes of the last meeting were read and confirmed.

As relating to a subject referred to in the minutes, permission was given for the reading of a—

NOTE UPON THE ALKALOIDAL STRENGTH OF THE SAMPLE OF EXTRACT OF NUX VOMICA, EXHIBITED AT THE EVENING MEETING, FEBRUARY 6, BY G. F. SCHACHT.

Some interest having been shown by those present during the dircussion on the paper by Messrs. Dunstan and Short, "On the Preparation of a Standard Extract of Nux Vomica," as to the exact alkaloidal strength of the extract exhibited by myself, a promise was given that the sample should be titrated and the result made known.

In fulfilment of that promise I beg to state that Messrs. Dunstan and Short have been good enough to examine the samples, and that I have also estimated the strength of the extract myself.

Mr. Dunstan reports that he finds it to contain 17·9 per cent. of mixed alkaloids.

My own examination gives me 18 per cent.

These results are practically the same.

Mr. SCHACHT, in continuation, said that the point of interest attached to the determination of the sample referred to in his note was that Messrs. Dunstan and Short, in their paper on extract of nux vomica, read at the last meeting, had given their opinion that an extract of nux vomica should be considered of standard strength when it contained 15 per cent. of the mixed alkaloids. In the discussion that followed the reading of that paper he had ventured to question whether 15 per cent. was quite the wisest percentage that could be selected. In confirmation of his doubt, he might now point out that an examination of the specimen of extract prepared by himself, then referred to, had shown that the percentage was considerably in excess of 15 per cent. The extract was of pill consistence, not syrupy, and prepared in the fashion directed by Messrs. Dunstan and Short. If samples were found on the average to contain more than 15 per cent., it would be a pity to fix 15 per cent. as the standard strength. He thought that most pharmacists would prefer an extract, properly so called, for one diluted with so much spirit and water became a little unmanageable. Such an extract would lose weight by drying spontaneously, and the dispenser would, perhaps, aid the change by gentle heat, and then it would no longer correspond to the standard. He thought that it would have been preferable if the authors of the paper had raised the standard, and that it would be better to arrive at the standard strength by mingling veritable extracts, rather than by adding diluents, such as water and alcohol, which would not give a stable preparation.

Mr. DUNSTAN said that it was not at all surprising that Mr. Schacht's extract contained more than the 15 per cent. which the paper recommended as a standard, since it was not prepared by the process directed in the paper, for as far as he knew there was no estimation made of the alkaloid in the percolate. As to the strength of extract of nux vomica, Mr. Short and he had shown in a previous paper that an average commercial extract contained about 15 per cent., rather less than more. They had examined twelve samples. If Mr. Schacht's extract had been prepared by the process the paper recommended, and which involved an actual estimation of the quantity of alkaloid contained in the strong tincture, it would have been found that the finished extract would contain 15 per cent. As it was prepared by simply exhausting nux vomica with spirit, it was not at all surprising that it contained 18 per cent. Mr. Schacht had said that 15 per cent. extracts were not of good consistence, but that depended entirely upon the nux vomica used. It would be the case if they used a nux vomica containing a low percentage of alkaloid, such as 2·2 or less than 2½ per cent., but one containing more than 2½ per cent. would give an extract which was all that could be desired pharmaceutically. Mr. Schacht used a nux vomica containing a very low percentage of alkaloid, namely, about 2·2. Of course the 15 per cent. extract prepared from that would necessarily be soft. An important objection to taking 18 per cent. as a standard was that it was rather above the strength of the ordinary extract of commerce. An alteration of 3 or 4 per cent. in a substance like extract of nux vomica would be dangerous, and further, when one used a nux vomica containing a high percentage of alkaloid, in order to obtain an 18 per cent. extract, the preparation had to be evaporated till it became too hard for convenient use.

Mr. GILES said that he thought that, in the main, Mr. Dunstan and Mr. Schacht were agreed, namely, that it was important to have a standard preparation of extract of nux vomica. As to whether the standard should be 15 per cent. or 18, it was not very important. Fifteen was a more symmetrical number, and more convenient for calculation. There were two ways of settling the question between 15 and 18 per cent. One might be to toss up for it, and, in the absence of any better mode, that would be conclusive. The other method was to refer it to a competent authority. The grievous thing was, however, that there was no competent pharmaceutical authority. If he lived for a few years longer he hoped to induce the Society to take such action as would constitute it the recognized pharmaceutical authority, and he would take an early opportunity of inviting his fellow members to support him in that movement.

Mr. SCHACHT said that he did not quite follow Mr. Dunstan in the course which led him so distinctly to the conclusion that the smaller percentage was the right one. Mr. Dunstan had rather levelled at him the fact that the specimen of nux vomica from which he (Mr. Schacht) had prepared the extract was not a good one. It had, however, given an extract with a higher percentage of alkaloidal value than the richer specimens. He candidly admitted that he was ignorant of the existence of any relations between the extractives and the alkaloids in samples of nux vomica; but from what he could gather from Mr. Dunstan it seemed that, if he had taken a sample of nux vomica which was supposed to be richer in alkaloidal value, he should have got a worse extract.

Mr. DUNSTAN said that if Mr. Schacht took the same quantity of a richer specimen as he did of his own specimen, and exhausted it in precisely the same way, the resulting extract would probably be richer than the 15 per cent. extract he was speaking of. The only way to ensure an exact result was to estimate the alkaloid.

Mr. SCHACHT said that that was so much the better for his argument, because he should then have had to reduce the extract still more to the condition of a rich syrup. All that he was complaining of was that 15 per cent. was below the strength which an extract should have. He could reduce the extract to 15 per cent. by adding spirit and water, but the extract would not be a good one pharmaceutically, and he should deprecate the addition. He followed Mr. Dunstan's directions with the single exception that he did not stop at the syrupy preparation, but made a real extract, and the result was a much richer percentage. The whole question was whether an extract was to be syrupy or of a pill consistence. From the point of view of a practical dispenser, he maintained that Mr. Dunstan's preparation was not an extract, and that if that preparation was brought to an extract it would contain more than 15 per cent.

The PRESIDENT said that it seemed to him that the author and Mr. Schacht were a little misunderstanding one another. The idea in Mr. Dunstan's mind was, while working scientifically, to come to a conclusion which he (the President) ventured to call a commercial conclusion, and one which should have the least danger to the public. In this particular instance he was disposed to agree with the advisability of keeping a moderately low percentage of alkaloid as a standard. In sanctioning a preparation of the important character of extract of nux vomica, it was necessary to take a strength which would always be obtainable from those specimens of nux vomica seeds which were the weakest in alkaloids, and which might, nevertheless, have the physical characters associated with good nux vomica seeds, so that pharmacists should have an opportunity of reducing to the standard, if need be, rather than increasing. He thought, with regard to all potent preparations, that they should be manufactured rather above the average and reduced to the standard. The practical outcome of all pharmaceutical work led him to this view. Those of the members who were onlookers in this discussion might congratulate themselves upon the fact that both sides appeared to have had the best of it.

A paper was then read entitled—

A NOTE ON LOGWOOD AS A TEST FOR METALS.

BY ARTHUR WEDDELL.

The paper is printed on p. 717, and gave rise to the following discussion:—

The PRESIDENT said that this test would not be considered by professional chemists of the same value as many others that were well known, but there were many cases in which the average pharmacist could use such a test with advantage; and they would, therefore, welcome the description of a colour test of this kind suitable for pharmaceutical purposes. He might remark that Mr. Wynter Blyth, a medical officer of health and public analyst, had published in the first number of the *Asclepiad*, a journal edited by Dr. Richardson, a paper in which cochineal was similarly used to detect lead in water. He mentioned this to show that the use of colour tests was not confined to pharmacists.

Professor ATTFIELD, by way of emphasizing what the President had said, stated that, in his opinion, the logwood test was a good one, but it was only a good negative test. In this sense it covered more ground than either sulphuretted hydrogen or sulphydrate of ammonium taken separately, whilst it covered the ground which both those reagents covered if taken consecutively. Secondly, it was a good negative test for pharmacists, because it could be readily prepared and applied. It was said that a little knowledge was a dangerous thing, but he did not think that saying held good so long as it was known that the knowledge possessed was only a little. Those who applied the logwood test should remember that it afforded only a little knowledge respecting the metals in a water. If they found that a metal was present, then, of course, they must go on to determine what metal it was.

Mr. HILLS said he regretted that the author of the paper was not present to show them the different colours obtained under the varying conditions mentioned. He (Mr. Hills) was unable just at present to confirm the statement in the first paragraph of the paper, that the colour of the logwood tincture was not affected on dilution with pure freshly distilled water; for he found that on adding the tincture to distilled water (which had been re-distilled in glass) a bluish colour was produced similar to that occurring when iron or lead was present. He might add that he had not yet tried the effect with the addition of the ammonium carbonate. Hæmatoxylin appeared to be a body of a very delicate nature, for he found it stated in Watts that "a solution of hæmatoxylin boiled in a platinum dish in an atmosphere free from ammonia acquires merely a brownish or brownish-yellow colour; but, if boiled in a test-tube, it assumes in a few minutes a purple colour, showing that the glass has been decomposed and has given up alkali to the water."

The PRESIDENT said that it was perfectly easy to talk about pure distilled water, but it was a very difficult thing to get it. The possible presence of carbonic acid and ammonia ought to be borne in mind. He was sorry that the author was not present to tell them how he standardized his test.

Thanks were voted to the author for his paper.

A paper was then read entitled—

THE CHEMICAL COMPOSITION AND PROPERTIES OF A CRYSTALLINE PRINCIPLE OBTAINED FROM JAMBOSA ROOT.

BY A. W. GERRARD, F.C.S.

The paper is printed on p. 717, and gave rise to the following discussion:—

The PRESIDENT said that he hoped that Mr. Gerrard would continue his researches and let them know more of the oleoresin.

Mr. HOLMES said that he should think that Dr. Lyons's opinion was correct, that the root was much more nearly allied to the *Piperaceæ* than to the *Myrtaceæ*; the fact of its being a sialagogue also pointed to the same conclusion.

The PRESIDENT said that it seemed hardly fair to the alkaloid for Mr. Gerrard to dismiss it as not worth further investigation, and to fix his whole love upon the oleoresin.

Professor ATTFIELD said that he, as a chemist, felt a little hurt at the dismissal which the alkaloid had received. Its further treatment from the therapeutical point of view was perhaps unnecessary, for Mr. Gerrard had taken several doses and it did not do him any harm. But the alkaloid might turn out to be an extremely interesting one from the chemical point of view. Therefore, if circumstances permitted, perhaps Mr. Gerrard would continue the investigation.

Mr. SCHACHT asked whether Mr. Gerrard had endeavoured to form any compounds such as the substance might be expected to form considering its character.

Professor BENTLEY said that he thought that it would be very important if Mr. Gerrard would investigate the oleoresin. It seemed to be amply deserving investigation. There happened to be in the paper a mention of *Spilanthes oleracea*, which was a very old remedy, and had been known as sialagogue for more than fifty years. It had been largely in use in Brazil for a very considerable period.

Mr. GERRARD, in reply, said, with reference to the alkaloid, that he had worked upon seven pounds of the root, and it yielded him less than a grain of the alkaloid. In order to obtain a sufficient quantity of the alkaloid to enable him to arrive at anything like good results, he should want a very large quantity of the drug. As to Mr. Schacht's question with respect to compounds of this substance, he could state that it did form chlorine and bromine derivatives, but the total quantity of the material which he had at his disposal was not more than 10 or 20 grains, and, hence, he was stopped by the smallness of the quantity. The oleoresin was, no doubt, the active principle, as he had stated, and it was worthy of further research. He had not had much experience with oleoresins. It was not easy to obtain bodies in a definite form from oleoresins.

The PRESIDENT said that he still felt a little grievance on account of Mr. Gerrard having disposed of the alkaloid in a summary way. He had told them that he believed that the oleoresin contained the active principle; but, it was important that the other constituents should be examined, and he (the President) confessed that the paper had not convinced him that the whole activity was in the oleoresin.

A vote of thanks to the author was passed.

The next paper read was on—

A NEW REACTION AND TEST FOR ATROPINE AND THE MYDRIATIC ALKALOIDS.

BY A. W. GERRARD, F.C.S.

The paper is printed on p. 718, and gave rise to the following discussion:—

Professor ATTFIELD said that the meeting ought not to allow that paper to pass without recording its thanks to Mr. Gerrard for the very careful way in which he had worked out the reaction. He had been particularly interested in listening to the paper, though not so much from an analytical point of view, for the reaction did not distinguish between atropine and the other alkaloids, hyoscyamine, daturine, duboisine, and so on. But it was obvious that Mr. Gerrard had obtained a reaction which showed that there were distinct differences of constitution between one group of alkaloids and another. There was a group which gave a particular reaction, and Mr. Gerrard had examined a considerable number of other alkaloids, and found that they did not give it. He (Professor Attfield) had no doubt that when he came to examine more of the alkaloids he would find some which resembled the mydriatic alkaloids and others which would give the reaction in question. This would diminish its value as a test, but he thought that it would greatly increase its value from the point of view of the chemical constitution of alkaloids.

Mr. TANNER asked whether the reaction was shown only by the uncombined alkaloids, or whether the alkaloidal salts also showed it. If so, how did Mr. Gerrard propose to deal with a solution containing alkaloidal salts?

Mr. DUNSTAN inquired whether the equation given in the paper was based upon experimental evidence, or whether it was only an inference. Had the equation been determined quantitatively?

The PRESIDENT said that he had himself made a note with regard to the equation. It was hardly fair to give a reaction of this kind on paper, without giving something more in order to satisfy them that they were not going wrong in quoting the author. With regard to the concluding paragraph of the paper, he did not agree with the author as to the value of a test of this sort. He thought that it was likely to do more mischief than good. In a test relating to alkaloids something more was wanted than an indirect process which was common to a large number of them, according to the author's own showing, and which might be common to a still larger number that he had not yet examined.

Dr. SYMES asked whether the fact that the test acted uniformly with these mydriatic alkaloids did not tend to strengthen the theory that such alkaloids were identical in composition, varying only in constitution. He thought that there was value in the paper to that extent.

Mr. GERRARD said the first question put to him was that of Mr. Tanner, who asked how he should proceed in the case of a substance which contained a salt of the alkaloid. In the case of a *post-mortem* fluid, upon getting out the alkaloidal salt in a state of solution and a state of concentration, he should simply treat it with ammonia, which would throw down the pure alkaloid. Ether would then dissolve out the atropine, and upon evaporation would yield it in a definite form. By resolution in acid and reprecipitation, it might be got in a still purer form. Then it was only necessary to test the residue with the reagent which he had mentioned, namely, mercuric chloride; and in order to make the test as delicate as possible he should suggest that the substance be placed upon a porcelain surface, and a small quantity of the reagent applied to it and heated. The mercuric oxide would then be precipitated. In using ammonia no source of contamination would be introduced, and no body which would give a red precipitate. As the ammonia was entirely dissipated by the evaporation, it might be assumed that the residue was pure atropine. This reaction was intended to apply simply to pure atropine, and not to an atropine salt. Mr. Dunstan had asked whether the equations were merely the results of inference. He might state that he had made analyses of the salts, and taken the molecular weights according to the formulæ which he had given in the paper; and he had treated them in two ways for the mercury. He had precipitated the mercury as mercuric oxide, and estimated it; and he had precipitated it as mercuric sulphide, and estimated it; and the results had been so approximate that he had come to the conclusions stated in the paper. Whether the mercury was attached to the compound in the way in which he had shown in the formulæ. it was impossible for him to say; but this seemed likely. He did not think that it was likely to be mercury of constitution. He did not imagine that the mercury took the place of hydrogen. He thought that the arguments were strongly in favour of the formulæ which he had given. The President had remarked that the reaction might be common to other alkaloids, but he believed that it was generally acknowledged that the mydriatic alkaloids were one and the same, there being only a difference of name. They were isomers, and they behaved generally in a similar way.

Mr. DUNSTAN suggested that, when the paper was published, it should contain the processes upon which Mr. Gerrard based the equations. It was extremely desirable that scientific memoirs should contain experimental results, so that future workers should know precisely how the conclusions were arrived at.*

Dr. SYMES remarked that when it was stated that the mydriatic alkaloids were identical, what was meant was that they were merely chemically identical. He should not like anyone to take a dose of atropine, for instance, as if it was a dose of hyoscyamine.

The PRESIDENT said that he confessed that he sympathized very much with Mr. Dunstan with regard to the reaction. He did not think that Mr. Gerrard was justified in giving that reaction, and he believed that the paper would be very much better without it. The subject of the paper was the question of a test. It was extremely important to determine a test, but it was not essential

* This suggestion has been adopted in some degree by Mr. Gerrard in the paper as printed on p. 718.

that they should attempt to determine what the reaction was in all cases. If an author based on a few experiments a rather important series of what might be called "chemical generalizations," it became a little difficult for succeeding authors to deal with the subject. The last paragraph of the paper, with regard to the value of the test in forensic analysis, was somewhat stronger than Mr. Gerrard could have fairly contemplated. He (the President) should think it very hard to be convicted of poisoning on the evidence afforded by the test. Mr. Gerrard had allowed the scientific use of his imagination to carry him farther than results had warranted. It was a pity to spoil a good thing by too much elaboration.

Thanks were voted for the paper.

The PRESIDENT said that at his request Professor Attfield had consented to bring to a Pharmaceutical meeting a paper he had prepared on a subject of only partial pharmaceutical interest, a paper relating to the questionable occurrence of any important amount of metal in canned or "tinned" foods.

TIN IN CANNED FOODS.

BY PROFESSOR ATTFIELD.

The paper is printed at p. 719, and gave rise to the following discussion:—

The PRESIDENT said that the paper was a very interesting one. Public analysts sometimes alarmed the public by statements based upon the finding of very small quantities of metallic substances in canned meats; and certain members of the public who did not pass preliminary examinations had often a doubt as to what the meaning of 0·0048 of a grain might be. The paper was one which showed the way in which pharmacists might be the bearers of sound technical knowledge to the public at large.

Mr. ATKINS agreed with the President that the paper might be useful on what might be called a semi-pharmaceutical aspect, by assuring the public that there was no ground for alarm. There was a widespread prejudice against tinned foods, and, as the trade in such articles was a growing one, it was desirable that the public should know that no damage would arise from it. The paper brought forward a commercial question of the very first importance.

Dr. SYMES said that Professor Attfield's remarks were also very interesting as confirming some statements made by Mr. Davis, of Liverpool, at a recent meeting of the Chemists' Association. Mr. Davis had arrived at precisely the same conclusion, that no appreciable quantity of tin was found in tinned foods.

Mr. SCHACHT said that he should like to ask whether any of the gentlemen who were accustomed to investigate articles of food for the detection of tin had ever had samples of brown sugar submitted to them for that purpose. A sample of sugar was submitted to him some time ago under the suspicion that a tin compound had been used to produce its beautiful colour; and in a quantity of two pounds he succeeded in getting the faintest conceivable evidence of something which looked very much like tin.

Mr. HOLMES said that a source of danger not mentioned in the paper, in connection with tinned foods, was imperfect soldering, and the consequent passage of air into the can. Under such circumstances microscopic fungi, such as *Penicillium glaucum*, which was known to be poisonous when grown on bread, developed itself. An instance of poisoning by means of this fungus was related in the *Medical Journal* of the previous week. When tinned fruit had been opened and left in the tin for a couple of days, the juice acquired a distinct metallic taste. The same result would be observed in tinned milk which had been opened and left to dry about the tin. He was not surprised that people were afraid of tinned food when they perceived such a taste.

Professor ATTFIELD said, in answer to Dr. Symes, that he had only to remind him that he (Professor Attfield) was not the only one who had drawn attention to this matter, and he hoped he should not be the last, for before such a prejudice as existed in the public mind could be uprooted it would be necessary that many men should make statements of the same kind as those contained in his paper. As to the examination of sugar, some twenty odd years ago, he occasionally found traces of lead, but not of tin. He believed that at that time certain refiners were in the habit of using lead, and it was just possible that a faint trace was left in the sugar. There were complaints on the subject and the evil soon cured itself.

The PRESIDENT said that he believed Dr. Scoffern's process was worked at that time, and afterwards abandoned.

Professor ATTFIELD said that that was the case. With regard to Mr. Holmes's remarks, of course it was well known that if air got into a tin of food it was only a question of time for the food to get damaged and afterwards to become putrid. In the early days of canning manufacturers had difficulties to contend with on that score. He had known them to put the tins of food into a warm room, in order that the putrefaction might take place in their own factories if it was likely to take place at all. As to residues of tinned foods which were left in open vessels, there was no doubt that they might take up portions of tin, iron, or other metal, for if a dirty can was left in contact with the air, both the tin and the iron would become oxidized. If persons were unwise enough to let the food remain long in an opened tin they almost deserved to be punished by the metallic flavour which might possibly be communicated to the residual food.

The PRESIDENT said that it was of the utmost importance when a tin was opened that the whole of the food be at once turned out. He had never yet observed any serious effects when that was done. The palate was in some cases better than any chemical test, and it could detect a difference between fresh lobster and the very best tinned lobster. This difference was often erroneously attributed to metallic contamination. Considering the enormous importance of the articles of food preserved in tins, the paper which had been read might have practical uses in many ways.

Mr. HOLMES called attention to various Museum specimens on the table. There were some samples of the kola nut in a fresh state. It had been said that the red and the white seeds occurred in the same pod, and from the present specimens that seemed to be very likely. He had put on the table some of the bitter kola nuts. In some parts of Africa these were turned to the same uses as the true kola nuts. One curious feature in connection with the bitter kola seed was that although it was a dicotyledonous plant, it did not possess two cotyledons. The specimen of cymene was interesting as having been prepared by a student in the School. The specimen of squill was presented by Mr. Roberts, an old student. It seemed to be of the red variety which was mentioned in the 'Pharmacographia.'

The PRESIDENT announced that the next evening meeting, the last one of the session, would take place on Wednesday, April 2.

Provincial Transactions.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The third ordinary meeting was held at the Owens College (by permission of the Council) on Tuesday evening, February 26, Mr. W. Wilkinson in the chair.

The minutes of the last meeting having been read and confirmed, the Chairman called on Mr. W. Kirkby to read his paper on "Disinfectants."

Disinfectants.

BY WILLIAM KIRKBY.

The author opened his paper by a few remarks on the progress of knowledge in connection with diseases since the enunciation of the "germ theory." The work of several scientists bearing on the subject of disinfectants was then passed in review, the researches of Le Bon being first noticed. Special attention was called to the important conclusion he arrived at, viz., that the disinfectant is not the only thing to be considered in the destroying of micro-organisms, as the efficacy of it depends a great deal on what stage of putrefaction the substance is in. The result of his experiments showing that there is no connection between the power of preventing putrefaction and that of arresting it, and also that the virulent power of a putrefying substance and the toxic nature of the volatile compounds given off by it are not necessarily in any relation to one another was briefly considered, together with a short sketch of his experiments. Passing then to Koch's work, the principal points noticed were that he considers an efficient disinfectant to be one that will destroy organisms in twenty-four hours, and that he found carbolic acid to have little or no effect on the spores of *Bacillus anthracis*, but when putrefaction had set in its action on the organisms was very marked.

Having reference to these experiments, it must be evident that it is too much to expect any substance to act in the same manner and with the same energy on every kind of organism. Koch used only aqueous solutions of carbolic acid in his investigation, as solutions in oil and alcohol were found to be without effect. The same investigator has reported that sulphurous acid gas has no action unless the articles to be disinfected are first moistened, and even then the germs are not all destroyed. He found that, besides chlorine, bromine and iodine, the only reliable disinfectants are corrosive sublimate, osmic acid and potassium permanganate. Wolffhugel and Knorre's corroboration of Koch's results and their reasons for the inefficacy of oily solutions of carbolic acid next claimed attention. Boillat's argument, that although a substance may not destroy organisms, it is quite sufficient for surgical purposes if it arrests the development of the spores, being noticed the author passed on to the researches of Arloing, Cornevin and Thomas. They give as the outcome of their work a list of useful and useless substances in the case of symptomatic *Anthrax*. The most powerful they consider to be carbolic acid, salicylic acid, boric acid, corrosive sublimate and bromine gas. They state that quicklime does not destroy these organisms.

A summary was placed before the meeting of the knowledge which had been acquired by a consideration of the valuable results communicated at various times by these scientists. Carbolic acid may be set down as a good preventive of the development of bacteria; but, except in a few cases, has only feeble action on the living organisms. It was recommended that oily solutions of this disinfectant should be abandoned. Potassium permanganate is more effectual in destroying the living bacteria than in arresting development. Salicylic acid appears to be of considerable service. The other articles mentioned in the paper were just glanced at. The author concluded by saying many articles had been shown to have no just claim to the name of disinfectant; others are only of limited utility, and that no one article, except it be powerful poison, can be used for every kind of putrefaction.

After the reading of the paper, a discussion ensued, in which the Chairman, Messrs. Hermann Woolley, Lane and Elborne took part.

Mr. Kirkby having replied,

The Chairman called upon Mr. Elborne to read his paper on "Exotic Henbane."

Exotic Henbane.

BY WILLIAM ELBORNE,

Assistant Lecturer in Materia Medica and Pharmacy, and Curator of the Materia Medica Museum, Owens College.

About a month ago my attention was drawn to the fraudulent nature of some exotic henbane which was being offered in the market, receiving a sample of the same for examination with the accompanying letter:—

"Bodicote,

"*Jan.* 23, 1884.

"My dear Sir,—There are doubtless many evils in the world which can never be eradicated, but there are yet many of a fearful character which certainly may be annihilated by the advance of science. Is it not astounding that with the great advance in chemistry and pharmacy and the growing caution in the administration of medicine that an article such as I herewith enclose you should find customers in this country to the extent of some tons? It is sold as henbane leaves, on the preparations of which may depend the lives of hundreds of human beings. A foreign house has to-day had the impudence to offer me half a ton at 40*s.* per cwt. I think it right that such facts as these should be made known to such institutions as those of which you are a member, for I cannot either in appearance or flavour of the drug enclosed detect any relation to the plant *Hyoscyamus.*

"I am,

"Yours faithfully,

"To Mr. W. Elborne." "RUFUS USHER.'

The specimen consisted of dry shrivelled up leaves and stalks, with a peculiar odour altogether unlike that of henbane, and upon a careful examination I found it consisted entirely of the leaves of *Datura Stramonium.*

Having discovered the nature of the substitution, it occurred to me to ascertain as far as possible the purity of all the varieties of henbane in commerce, with the view of ascertaining to what extent this substitution was being practised.

I therefore obtained supplies from the leading wholesale houses in London and Manchester, and received quantities of the following (arranged in the order of their value):—

Biennial henbane, second year's growth.*
Biennial henbane, first year's growth.
British annual henbane
German henbane.
Exotic henbane.

Being under the impression some confusion exists or has existed, in relation to the subject of henbane, I might remark before giving the result of my examination that "biennial" and "annual" henbanes are yielded by distinct plants, viz., *Hyoscyamus niger*, var. *biennis*, and *Hyoscyamus niger*, var. *annua*.

The former (the biennial) produces in the first year only a rosette of stalked radical leaves 9–12 inches in length; in the second year throws up a flowering stem 2 or 3 feet in height; and then as the fruit matures the whole plant dies: whereas the annual variety produces its stem, flowers and fruit in the same year and then dies root and stock. It is the second year's dried leaves and flowering tops of the biennial plant which are official in the British Pharmacopœia for the preparation of the tincture, and when obtainable none other should be used.

Having received authentic samples of the latter from Mr. Usher (who probably is the largest grower of henbane in this country), that directed to be used in the Pharmacopœia in the dried state might be described as occurring in nodules (something like Brussels' sprouts) consisting of hairy leaves and purple veined flowers closely matted together, free from stems and stalks. The first year's leaves of the above (erroneously called "annual henbane") may readily be distinguished by their possessing long radical petioles or stalks, and by the total absence of flowers; whereas the

* The only kind recognized in 'Brit. Pharm.'

real British annual henbane in the dried state is found in the form of stalked leaves attached to a stem bearing light yellow flowers less streaked with purple, and the whole plant of a lighter colour and less hairy.

The following is the result of my examination of the numerous samples received. The whole of the English biennial, both second and first years' leaves, were of the best quality, and entirely free from any adulteration or substitution, while the samples received as "German" and "exotic" consisted of the "*annual*" mixed largely with stramonium leaves. The above remarks will tend to show that "exotic henbane" as at present found in commerce is a most worthless article deserving no mention in English pharmacy.

It is, however, satisfactory to learn that the demand for "exotic" is very trifling and that the English biennial maintains its high character as being a pure drug.

After the reading of the paper, a discussion ensued, in which the Chairman, Messrs. Hermann Woolley and Lane took part.

Mr. Elborne having replied,

The Chairman proposed hearty votes of thanks to Messrs. Kirkby and Elborne for their papers, which were seconded and carried with acclamation.

The Chairman then, speaking at some length, took the opportunity of impressing upon the young men present the great advantages which they might derive from cultivating their mental faculties and powers of observation and investigation by writing papers on subjects of interest to pharmacists, and communicating their results to Associations, where much additional knowledge might be learnt from the discussions arising therefrom.

The Chairman having announced the next meeting, the meeting then terminated.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The ordinary monthly meeting was held in the Society's rooms, on Wednesday evening, February 20, Mr. Preston, the President, in the chair..

The Secretary announced the following donation:—The *Pharmaceutical Journal*, from the Pharmaceutical Society of Great Britain.

The President then called upon Mr. H. S. Smith to read his paper on "Volumetric Estimation." Mr. Smith commenced by pointing out the desirability that every chemist and druggist should be able to assure himself, by personal experiment, as to the preparations kept by him being of proper strength, and that for this purpose he should know how to make a volumetric estimation. He recommended masters, therefore, to encourge the study of volumetric analysis by their assistants and apprentices. He then proceeded to describe the principles upon which volumetric analysis is based and showed that it was an application of Dalton's atomic theory. Taking, as an example, lime water, he explained, in detail, the official method of testing it and the facts upon which it is based. Referring, finally, to the subject of indicators, Mr. Smith spoke favourably of the use of phenolphthalein for this purpose.

Mr. Marshall, in proposing a vote of thanks to Mr. Smith for his valuable paper, spoke of the advantages to be derived from a knowledge of such mode of analysis and how essential it was that every chemist and assistant should be thoroughly acquainted with it, both for his own sake and that of the public. He said that during the last few weeks he had examined several samples of lime water, obtained from different shops in the town, and that quite one half of them did not come up to the B.P. standard.

Mr. Fromer seconded the vote of thanks, and, others supporting, it was carried unanimously.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A lecture was given on Wednesday evening, February 27, at the room of the above Association, by Mr. Pickering, the subject being "Electro-plating."

The lecturer commenced by describing the apparatus and chemicals required in this very useful process, giving the rules to be observed during the operation, explaining fully the strength of solutions employed, and impressing upon his hearers the utmost need of perfect cleanliness of the article to be plated. The lecturer then showed to his audience the practical work; first by plating an article with copper, after which he deposited upon it a coat of silver. Besides this, he coated a piece of metal with gold. To all of this, as well as the theoretical part, great attention was paid by the members.

A vote of thanks, proposed by the Chairman, Mr. J. J. Edwards, to the lecturer, concluded the meeting.

Proceedings of Scientific Societies.

ROYAL INSTITUTION.

Theory of Magnetism.

On Friday evening, the 29th ult., Professor Hughes delivered a lecture at the Royal Institution, in which he propounded a theory of magnetism, supporting and illustrating it by a number of observations made by him in recent researches that have not yet been published. He commenced by reminding his audience that Coulomb had conceived the idea that when a molecule of matter containing equal quantities of the two magnetic fluids became magnetized, the fluids were definitively divided, and collected at the opposite sides of the molecule. According to Ampère the magnetic fluids revolve round the exterior of the molecule, thus making each molecule a perfect electro-magnet. Professor Hughes, however, considers that all matter, even the ether by which the molecules are surrounded, is magnetic, and that polarity occurs by rotation. The lecturer did not put forward this latter theory as being original, but merely stated that he had taken it as a basis for his researches. In the theories of Coulomb and Ampère it is necessary to suppose the existence of coercive force, but in his own no such supposition is required; indeed, he is of an opinion that what has been called coercive force represents really only the comparative hardness or softness of the iron or other material. Professor Hughes remarked that he had been indebted to the introduction of the induction balance for many of the results which he had obtained, and explained the principal points of a very sensitive needle which he used for many illustrations of his lecture. In demonstrating the difference between the magnetic properties of steel and soft iron, the lecturer magnetized a bar of each, and showed that whilst the steel bar retained magnetism when struck, the soft-iron bar lost all traces of it when dealt a few sharp blows. Not only is this the case, but if the blows be continued, the soft-iron bar becomes magnetized by the earth's polarity. The same results are obtained by application of heat or electricity, or if the bar be allowed to fall some distance. As this latter experiment would necessitate a drop of several feet, the lecturer replaced the bar by a bottle of loose iron filings, which arranged themselves according to the earth's magnetism when dropped for a few inches. The steel bar, though subjected to the same influences, still retained its original magnetism. This difference Professor Hughes considered due to the loose state in which the molecules are held in soft-iron. In proof of this supposition, he showed that a sharp twist of a soft-iron bar produced the same effect as the blows, but that if it were compressed at both ends, so as to keep it in a rigid state, the same results were obtained as with the steel bar. Another proposition put forward by the lecturer was to the effect that the polarity of the magnet was due to the direction of its stratification, and he showed that when the stratification was reversed the poles were also changed. An account was also given of some experiments upon the atmosphere, which tended to show that in some respects it possesses a magnetic action like that of iron, and this fact Professor Hughes considered to support his theory that there is no magnetic fluid as distinct from the molecule, but that magnetism is an inherent quality in every atom of matter. An interesting experiment was also made, showing that sound is produced by a bar of iron being magnetized, though full explanations could not be given of this and other points owing to the limited time.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, February 28, Mr. H. G. Greenish, Vice-President, in the chair.

Mr. F. McDiarmid read a paper on—

Some Silicon Compounds.

The object of the writer was to trace out the great resemblance which silicon bears to carbon. In the first place it was shown that, like carbon, silicon exists in three allotropic conditions: amorphous, graphitic and crystalline, specimens of two of which were exhibited, and their modes of isolation explained. The chief compound, viz., silica SiO_2 bears a great similarity to CO_2, forming salts with metallic oxides, which are decomposed by acids. The preparation and properties of the following compounds were described, and attention was directed to their analogy to the compounds of carbon:—

Silicon compounds.	Carbon compounds.
SiH_4 silicon hydride, siliciuretted hydrogen or silicomethane.	CH_4 carburetted hydrogen or methane.
$SiCl_4$ silicon tetrachloride.	CCl_4 carbon tetrachloride.
$SiHCl_3$ silicon chloroform, or trichlor-silico-methane.	$CHCl_3$ chloroform or trichloromethane.
$SiHI_3$ silico-iodoform.	CHI_3 iodoform.
SiI_4 silicon tetriodide.	
Si_2I_6 silicon teriodide, from which may be obtained a compound.	
$Si_2O_4H_2$ silico-oxalic acid.	$C_2O_4H_2$ oxalic acid.
SiS_2 silicon disulphide.	CS_2 carbon disulphide.
$(SiOH)_2O$ silico-formanhydride.	$(COH)_2O$ formic anhydride (unknown).

There is a large class of bodies, called silicic ethers, which are produced by the action of alcohols on silicic chloride ($SiCl_4$) and are silicates of alcohol-radicals, *e.g.*:—

$(C_2H_5)_4SiO_4$ ethylic ortho-silicate.	$(C_2H_5)_4CO_4$ ethylic ortho-carbonate.

From these, by various decompositions, may be obtained acids in which the carbon of the carboxyl (COOH) group is replaced by silicon:—

CH_3SiOOH silico-acetic acid.	CH_3COOH acetic acid.
$HSiOOH$ silico-formic acid.	$HCOOH$ formic acid.
C_2H_5SiOOH silico-propionic acid.	C_2H_5COOH propionic acid.

In the same way the carbon in some of the hydrocarbons may be replaced by silicon:—

$Si(CH_3)_4$ silicic methide or silico-pentane.	$C(CH_3)_4$ tetramethyl-methane or pentane.
$Si(C_2H_5)_4$ silicic ethide or silico-nonane.	$C(C_2H_5)_4$ nonane.

The processes for the preparation of most of the above compounds were given, and specimens of the principal compounds shown.

The paper was followed by a discussion, in which the Chairman, Secretary and Mr. Dymond took part.

A Report was then read by the Reporter on Botany, Mr. E. Baily, on "The Continuity of Protoplasm in the Vegetable Cell," in which he brought under the notice of the Association the recent discoveries by Hillhouse and Gardner of filaments of protoplasm connecting the contents of certain cells with each other, which threw much light on the problem of how sensation was conveyed from one part to another in certain plants. He also drew attention to the closer resemblance between plants and animals which was thus indicated, the filaments of protoplasm in plants bearing a resemblance to the nervous system in animals.

The Report gave rise to a discussion, in which the Chairman, Secretary, Messrs. Dymond, Ranken, Short and Thompson joined.

Mr. Thompson then gave the second part of his Report on the "Separation of Chlorides, Bromides and Iodides."

The Report was discussed by the Chairman, Secretary, Messrs. Baily and Eastes.

The meeting then adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the Chemists' Assistants' Association, held on February 27, Mr. Parkinson, President, in the chair, a paper on "The Coal Tar Derivatives used in Pharmacy," was read by Mr. Joseph F. Burnett. The paper opened with a brief description and history of the distillation of coal for gas and tar, and then turned to the constituents and destructive distillation of coal tar, referring particularly to those derivatives which were found in medical and pharmaceutical use. Benzol and its preparations and homologues came first, including nitro-benzol, aniline and the dyes (one of which, rosaniline, was occasionally administered medicinally), toluol, cresol and xylol. Next carbolic acid was noticed, together with those bodies formed from it, such as picric acid, trichlorphenol, the sulphocarbolates, salicylic acid, etc. Salicylic acid was considered with a view to drawing attention to the fact that the artificial was not exactly identical with the natural. Naphthalene and naphthol next claimed attention, and the graphic formula of naphthalene was exhibited with a view to explaining the difference between alpha and beta naphthols, etc. Anthracene and its commercial value were referred to, and a summary of the coal tar distillates in the order of their fractions was given. The paper was brought to a close by an allusion to the bases of coal tar, viz., pyridine and chinoline, etc. The chinoline derivatives, notably kairine, were considered.

About three dozen specimens of the more important products were on the table.

A discussion followed, in which the President, Messrs. Alcock, Cracknell, Flintan and Worley took part.

Parliamentary and Law Proceedings.

"Milk of Sulphur"—Prosecution under the Sale of Food and Drugs Act.

At the Altrincham Petty Sessions on March 3, 1884, Mr. Henry Edward Goodwin, chemist and druggist, of Sale, was charged before Mr. John Allen (Chairman), and Messrs. Edward Collins, H. T. Gaddum, R. P. Gill, and Jesse Haworth, with having sold lac sulphuris as milk of sulphur (*sic*).

The prosecution was conducted by Mr. Harris, magistrates' clerk, on behalf of the authorities, and Mr. Goodwin was defended by Mr. Henry Glaisyer, instructed by the Secretary to the Chemists and Druggists' Trade Association of Great Britain.

Mr. Harris said Mr. Goodwin was charged with having sold, on February 6 last, to the prejudice of one Nathan

Large, the purchaser, a certain drug, to wit "milk of sulphur," which was adulterated with 50 per cent. of sulphate of lime, and was not of the nature, substance and quality demanded by the purchaser, contrary to section 6 of the Food and Drugs Act, 1875.

Mr. Nathan Large deposed that he was an Inspector of Police stationed at Sale. That on February 6 last he went to the defendant's shop and purchased a quarter of a pound of milk of sulphur, for which he paid 5*d*. After he had paid for it, and it had been handed to him, he told the defendant he had purchased it for analysis by the county analyst, and offered to divide the sample into three parts, which offer the defendant declined. He then sealed it up in defendant's presence and numbered the packet 169. After he had told the defendant that he had purchased the article for analysis the defendant said it was not precipitated sulphur, but milk of sulphur containing lime. If the defendant had made that statement before the purchase had been completed he would not have brought it away, because he would have known that he was being supplied with a mixed preparation. He afterwards handed the sample to Superintendent Leighton. Cross-examined: He asked the defendant for milk of sulphur and not for precipitated sulphur. He was served by Mr. Goodwin's assistant, but Mr. Goodwin was himself present at the time the purchase was made. The sample of sulphur purchased was labelled when supplied to him. There was a label put on, but he did not know what became of it. He did not see it afterwards. He did not tear it off or see anyone else tear it off. He did not know at all what became of the label; the packet was labelled when it was handed to him, but he did not see the label afterwards. He did not throw the label on the floor of the shop, or see anyone else throw it there. He asked for milk of sulphur and the drug was supplied to him as milk of sulphur. Before he took the packet away the defendant said it did not contain precipitated sulphur, but milk of sulphur containing lime.

Francis Hinley gave confirmatory evidence.

Inspector Leighton deposed to having received from Large a sample marked 169, which he conveyed on the same day to Mr. Carter Bell, the analyst for the county, whose certificate on the analysis he held in his hand.

Mr. Glaisyer said he had given notice on behalf of the defendant, that he should require the presence of the analyst, and that as Mr. Bell was present it would, he thought, be better that the analyst should put in his own certificate.

Mr. Joseph Carter Bell deposed that he was public analyst for the county of Chester. He received a sample of sulphur from Inspector Leighton on February 6 last, numbered 169. That on analysis he found the said sample to contain 50 per cent. of sulphate of lime. Milk of sulphur should be pure. Cross-examined: Milk of sulphur should be pure, and he should say it should contain no lime. He knew an article called sulphur præcipitatum, B.P. He believed that article was not called milk of sulphur. He believed that preparation was not called milk of sulphur in any pharmacopœia. That preparation did not contain any lime. Neither lac sulphuris nor milk of sulphur was mentioned in any part of the British Pharmacopœia. The term lac sulphuris and milk of sulphur were, however, both mentioned in old pharmacopœias of more than one hundred years ago, and the preparation ordered in those old pharmacopœias did contain sulphate of lime. Consequently there were two preparations known, the one as lac sulphuris, or milk of sulphur, containing lime, and the other as sulphur præcipitatum, or precipitated sulphur, without lime. These were two distinct preparations, the one containing lime was mentioned in a pharmacopœia published so long ago as 1721. There certainly were two articles, and the one made according to the formula given in this 1721 Pharmacopœia and known as milk of sulphur, or lac sulphuris, would necessarily contain sulphate of lime, and the other made according to the recent Pharmacopœia and known as sulphur præcipitatum, or præcipitated sulphur, would not contain lime. He recollected the case of Mr. Marshall, of Runcorn, who was prosecuted in 1876 for selling a similar article to this supplied by the defendant in the case under the consideration of the Bench. The quantity of sulphate of lime contained in the article supplied by Mr. Marshall was about the same or rather greater than that contained in the sample supplied by the defendant, Mr. Goodwin. The Bench at Runcorn convicted Mr. Marshall, he knew, and the case was appealed to the Knutsford Quarter Sessions.

Mr. Glaisyer: At Knutsford, in April, 1877, the case having been very freely gone into, did the Chairman, Mr. Horatio Lloyd, in giving judgment, make use of these words?—"We have been considering this matter since we left the Court, and I am speaking now for all the magistrates who have heard the case. We think although the absence of this substance (milk of sulphur) from the Pharmacopœia would justify the county analyst in taking these proceedings, we cannot for one moment doubt, after the evidence of Mr. Pemberton and others, that in the trade and in the profession there are two distinct things known by the names respectively of milk of sulphur and precipitated sulphur, and that they are supplied to the trade and to the public by those names as two distinct things. We cannot doubt that after the evidence of Mr. Pemberton, who has been prescribing this thing under the very name it was asked for on this occasion, this being a penal action we cannot say otherwise than it has not been made out, and that the appellant committed no offence within the meaning of this Act."

Witness: Yes, but there was no evidence at the hearing of that appeal to support mine; it was a one-sided decision.

Mr. Glaisyer: At all events, one-sided or not, it was the decision of the Court. Now, Mr. Bell, do you recognize the *Lancet* as a medical authority?

Witness: Yes.

Mr. Glaisyer: Then in the *Lancet* of January 6, 1877, appeared this article, "Milk of Sulphur.—When shall we have the last of the wrangles about milk of sulphur? Everyone knows that the article commonly sold as milk of sulphur always contains and must from the way in which it is prepared contain sulphate of lime. It appears to be commonly preferred to the pure precipitated sulphur, and we confess we do not see any reason why it should not be sold if not misrepresented. Milk of sulphur does not mean pure sulphur, but a particular preparation, and we think the Runcorn magistrates were in error in deciding that a purchaser who went to a certain shop for milk of sulphur did not get what he asked for. If he wanted pure sulphur he asked for the wrong article, which was not the fault of the tradesman. The man who wants bread and asks for cake cannot reasonably abuse his baker. Notice of appeal has been given in the Runcorn case, and we trust that a final decision in this not very important question will ere long be obtained." In continuation, he said it had been admitted by the witness that Mr. Marshall, of Runcorn, was convicted by the magistrates there for selling as milk of sulphur an article similar to that supplied by the defendant in this case, and that the conviction was quashed by the decision of the Quarter Sessions Bench at Knutsford. If you think it necessary I am prepared to go further into the matter; but if the case is to go to Knutsford again, I think the responsibility of taking it there should rest with the prosecution, and that the decision of the Bench should be in my favour.

The magistrates conferred.

The Chairman: Is milk of sulphur ever prescribed by medical men at the present time, Mr. Bell?

Mr. Bell: No, sir.

Mr. Glaisyer: I most emphatically contradict that statement; I know of my own knowledge that it is still prescribed by medical men eminent in their profession.

The Chairman: The Bench have decided to take Mr.

Horatio Lloyd's view of the case and dismiss the summons.

Mr. Bell, addressing Mr. Glaisyer: My costs, if you please.

Mr. Glaisyer: No, Mr. Bell, we shall most certainly not pay you any costs. The words of the statute are quite clear upon that point by section 21. "At the hearing of the information in such proceeding the production of the certificate of the analyst shall be sufficient evidence of the facts therein stated, unless the defendant shall require that the analyst shall be called as witness." I, on behalf of the defendant, required that you should be called as a witness for the prosecution, and their case was incomplete without your being so called as their witness.

Mr. Harris: That is so; the other side required us to call the analyst as a witness, and we could not complete the case without doing so.

The Supposed Poisoning Case in Sheffield.

The adjourned inquiry into the circumstances attending the death, at Park, Sheffield, of Fred Castle, six weeks old, was continued, on Monday, at the New Inn, South Street, Park, before Mr. Wightman.

Mr. Preston, President of the Sheffield Pharmaceutical Society, was present to watch the proceedings.

The inquest had been twice adjourned, once to enable a *post-mortem* examination to be made by Mr. A. Hallam, and then, in order that the contents of a bottle might be analysed. This bottle was obtained from the shop of Mr. Wilcock, grocer, South Street, Park. Mr. Wilcock had supplied from it a mixture, some of which had been given to the deceased; and the supposition was that this mixture had caused the child's death.

Mr. A. H. Allen, borough analyst, said he had received a bottle from Police Constable Thornton, and had analysed its contents. He found it contained meconic acid and morphia, which were the two characteristic principles of opium, and which proved its presence. He had also examined the four or five drops of the liquid which remained in the smaller bottle, and found that the smell and colouring were identical with the contents of the larger bottle. In his opinion it was the same mixture, but he could not swear that it was, because of the exceedingly small quantity he had received for analysis.

In answer to the Coroner, Mr. Hallam said that he still adhered to his statement made at the last inquiry, viz., that he could not swear that the child died from any narcotic at all. The actual cause of death was congestion of the brain and lungs, caused by opium.

The Coroner said that as Mr. Hallam could not swear that the child had died directly from opium, the jury could only say that it had died from congestion of the brain and lungs. He thought that the grocer was to blame, inasmuch as, though he sold the mixture, he never took the trouble to ascertain its ingredients.

The Jury returned a verdict in accordance with the medical testimony.

Death from an Overdose of Chlorodyne.

The death is reported at Kendal of Mr. Robert Anderson. It appears that for some time past he has complained of being unable to sleep at nights, for which he has been in the habit of taking small doses of chlorodyne. On Wednesday night he retired to rest at about half-past ten o'clock, and on being called by his landlady about seven o'clock on Thursday morning, he returned no reply. The room was thereupon entered, and deceased was found to be in a deep state of unconsciousness. Dr. Sturridge was at once sent for, who upon his arrival pronounced him to be suffering from the effects of an overdose of opium. Every effort was made to bring him round during the day, Dr. Iliffe being also in attendance, but notwithstanding all they could do, the unfortunate young gentleman died shortly before four o'clock in the afternoon, never having shown any symptom of returning consciousness. Beneath his pillow were two bottles that had contained chlorodyne, both of them being quite empty.

BOOKS RECEIVED.

The Colony of British Honduras, its Resources, and Prospects; with particular Reference to its Indigenous Plants and Economic Productions. By D. Morris, M.A., etc. London: E. Stanford. 1883. From the Publisher.

A Text-Book of Inorganic Chemistry. By Professor Victor von Richter. Translated by Edgar F. Smith, A.M., Ph.D. London: H. Kimpton. 1884. From the Publisher.

On Bedside Urine Testing, including Quantitative Albumen and Sugar. By Geo. Oliver, M.D., Lond. Second Edition. London. H. K. Lewis. 1884. From the Publisher.

The Principles of Theoretical Chemistry, with Special Reference to the Constitution of Chemical Compounds. By Ira Remsen, M.D., Ph.D. Second Edition. London: Baillière, Tindall and Cox. 1884. From the Publishers.

Sell's Dictionary of the World's Press. 1883–4. By Henry Sell. London: H. Sell. 1884. From the Publisher.

Annuaire des Specialités Médicales et Pharmaceutiques. 1884. Paris.

Lékárnicky Kalendár. 1884. Poradal J. B. Goller. Prague.

Correspondence.

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

The Pharmaceutical Society.

Sir,—One sometimes meets with gentlemen who seriously contend that the universal spread of education is very far from being an unmixed blessing. It is about as satisfactory to argue with these individuals as it is to contest the opinions of those who deny the right of the Pharmaceutical Society to the slightest share of our gratitude. For my part I contend that if the Society could show no other *raison d'etre* than the Benevolent Fund, it could very reasonably demand the support of every right minded person. A society which gives away over £2000 a year for the relief, not only of the members actually connected with it, when in distress, but also to the members of the trade outside its pale, surely must merit something more than consignment to eternal perdition. But let us see how this Benevolent Fund has been brought to its present state. Has it been raised by the individual subscribers sitting still and trusting to Providence and the Council to do everything? Is it not rather that every individual subscriber has done something, be it much or little, towards the sum total. Had the whole trade acted in a similar manner, three or four times the amount might have been easily raised. Therefore, when Mr. Wilkinson's noisy friends next shriek out, "What has the Society done?" let him first of all ask them, "What have you done, individually? Have you done your best to achieve the Utopia for which you are seemingly so anxious?" Let Mr. Wilkinson point his friend to the Benevolent Fund as a result of individual effort, and tell him that to accomplish this has needed something more than a mere reliance upon the Council. Unless the trade are resolved to alter the present state of affairs, the Council is as powerless as a piston rod without steam; but if the trade only say that this sort of thing shall stop, then fifty Councils could not say nay. Mr. Wilkinson thinks one of the principal reasons why the Council exists is that it may see that pharmacists are not summoned on juries. Now to carry out his own ideas of representation, as opposed to individual effort, let him make a pilgrimage (in his official capacity as representing this much abused Council) and inspect the jury lists at the proper time to see whether any of us are "on" who are entitled to be "off," for whilst we have a local secretary, why should we trouble to examine them ourselves?

I should decidedly like to see the Council adopt a more vigorous policy with respect to the members who do so much to bring disgrace upon our trade; but so long as we make local secretaries and members of local committees of the men who think that their only aim in life is to rob their poorer brethren by sending out an army of half starved men at a starvation rate of wages, to palm off upon ignorant shopkeepers, teething powders containing antimony, cordials, preservatives, etc., containing laudanum, I am afraid it is too much to expect the Council to move. Let us ostracize these men, though they have the wealth of Crœsus or have half the alphabet after their names; let us show the public that though these men are with us they are not of us. Having done this we can then go to the Council and demand a clause or a bye-law expelling these parasites from the Society and the trade. In conclusion, I would say let individual effort be the guiding star in this important question, it will accomplish much in a comparatively short space of time, whilst years or centuries of exclamations and angry taunts will do nothing or even worse than nothing, and let us all remember that though—

"'Tis not in mortals to command success,

Yet

"We can do more—deserve it."

131, *Embden Street, Manchester.* J. HART.

Sir,—I have read Mr. Wilkinson's letters and it grieves me to see such a wealth of child-like sympathy running to waste when it is so much needed here. We have a large assortment of "poor beggars" languishing in our neighbourhood, and, what may surprise Mr. Wilkinson, we do not love them, and in the hardness of our hearts have a quaint idea of letting them have a healthy time of it, and so induce them to consider the beauties of an emigration scheme. A dozen of them (we have plenty more) keep shops undistinguishable from those of registered men, and a few do a small wholesale as well, supplying Godfrey's cordial and other child destroyers to hucksters and "twopenny-halfpenny shopkeepers." Of this dozen two only, as far as I can learn, ever served an apprenticeship, and as a reward for their superior merit, have post offices attached to their businesses, and up to date are doing very nicely. The rest are a "scratch" pack of fried fish sellers, druggists, porters and mill hands.

Mr. Wilkinson can pour out his pity on this little flock of black sheep, for we have very little of the article in stock here, and I fancy these good people will soon need it.

None of these pharmaceutical poachers come up to Mr. Wilkinson's ideal "poor beggars." The two post masters come nearest, but are not all that he would require in the martyr way, for one openly defies the law on the plea that he was in business before the passing of the Act (he was nearly of the mature age of fifteen at the time), and the other, after fulfilling his apprenticeship, hung about for a bit and then went to one of the London coaches to be crammed, but was referred back to his studies as not having sufficient elementary knowledge, and then, although he knew that several of his *confrères* had been recently warned by the Registrar, he opened a shop. Is it pity these men deserve?

And now for another type. This man, who has bragged in my presence of the large doses of powerful drugs he has given to patients, where doctors hesitated, has recently left his employment to attend to his drug business—it pays so well. I am sorry I cannot say what his late employment was; it was something in the machinery way, I believe, for he was always very grimy with soot and ashes; probably he was a stoker or something of that sort. But it does not matter much, for now he is talking learnedly to ignorant dupes of the virtues of tincty-oppy-hi ("as we chemists call it"), such being his favourite pronunciation of tinct. opii.

Mr. Wilkinson, in his second epistle, seems to think we hould be surprised if we knew the number of letters he had received approving of his sentiments. I for one should not be at all astonished, if I only was certain that all our "poor beggars" could read and write—which is doubtful. Still, I know as a fact that the papa of one of the more juvenile offenders thinks it very clever indeed, and has said so, which is very comforting.

I for my own part dislike the stores about as much as a certain historical character is reported to dislike holy water; but then the *employés* of such institutions are educated people, and such companies furnish foeman worthy of the steel of the Pharmaceutical Society, so that it ought not to be necessary for the Council to waste its strength on individuals when companies are to be fought. But, unfortunately, the House of Lords have tied their hands to a great extent. In each town the chemists ought to help themselves and ventilate a few of the most notorious and easily reached offenders in the police court. The police would finish the work. Such is the opinion of

NUX VOMICA.

Sir,—I do not know that I need say much in reply to Mr. Newsam or your other correspondent, who has not the courage to justify his criticism by appending his name. I think I am perhaps quite as loyal to the Society and as ready to lend a helping hand to further its real interests as anyone else; but I am not one of those who think that loyalty to any institution necessitates the approval of everything the governing body may do or leave undone, or that any member who presumes to disapprove of or criticize its actions is therefore disloyal.

My desire is certainly not to minimize but to increase the influence of the Society, and I do not think that by pointing out some of the causes that retard its progress I have done anything to diminish that influence.

Cheetham Hill, Manchester. W. WILKINSON.

Sir,—*Re* the subject of Mr. Wilkinson's letters, I quite and most emphatically endorse the statements he made in his letter, appearing February 13, and also those contained in that appearing to-day.

Let the Council and the Pharmaceutical Society act in such a way as really to represent the whole trade and then, and not till then, will it be really "efficient."

I have written to you before thus and my opinions are still unchanged, and are those of members and the trade generally, I believe, as Mr. Wilkinson points out in his letter of to-day.

16 *and* 17, *Cliffe High Street, Lewes.* W. T. MARTIN.

Dispenser.—There can be no doubt that the views expressed by you are correct, but it is difficult to persuade the public to act in accordance with them.

C. H. Ering.—Your letter has been handed to the Secretary.

M. P. S.—No doubt decomposition occurred in the almond emulsion. Try bitter almonds.

Inquirer (Barnsley).—We should not expect such a condition. Try the plan of shaking the liquid with some pulped paper and then straining through flannel.

H. T. W.—Consult a medical practitioner.

Saline.—(1) Sodium bicarbonate is permanent in dry air, but gives off carbonic anhydride at a red heat. (2) Tartaric acid melts at 170° C. (3) The use of sugar is optional.

A Country Chemist is recommended to bring any definite information he may possess as to breaches of the Pharmacy Act under the notice of the Registrar.

A. E. J.—The decision in your case seems to be strictly in accordance with the terms of the Act, though we confess we are unable to see in what the article differs from some of the others mentioned.

Cryptogamic.—The artificial acid may be used.

E. J. Evans.—(1) Apply to the Clerk of the Company. (2) A satisfactory knowledge of chemistry.

M. P. S.—Probably *Barbarea vulgaris*, but it is impossible to say with certainty in the absence of flowers and fruit.

G. D. Bowie.—(1) *Polyporus versicolor*. (2) The coloration is due to the mycelium of *Peziza æruginosa*.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Hart, Bennett, Barnett and Co., Unsuccessful Candidate, Jersey.

THE NEW FRENCH PHARMACOPŒIA.

Preliminary Notice.

The new work which from the present date authoritatively displaces the *Codex Medicamentarius* that has been official throughout France during the last eighteen years is the result of the labours of a Commission appointed by President Grévy in February, 1880. The constitution of this Commission is especially referred to on another page, and it need only be stated here that it included among its members men who are eminent in medicine, chemistry, botany, materia medica, and practical pharmacy. The Codex is written throughout in the French language, and in general appearance the new book resembles its predecessor, being printed on the same large octavo page, and following the previous typographical arrangements pretty closely. But a closer examination shows that a considerable alteration has been made in the general arrangement of a great portion of the text, to which more special reference will be made subsequently.

Probably the feature that will first attract the attention of most persons handling the book will be the occurrence of bands of red, white, and blue on the edges, due to the utilization of the republican tricolor as a means of marking off the divisions of the book, after the manner familiar to persons who use the Post Office Directory. These divisions are four in number, the first commencing with some preliminary matter and the last closing with a series of extracts from the laws and regulations concerning the practice of pharmacy in France. Between these lie the four parts of the Pharmacopœia, strictly speaking, devoted to (1) a List of Materia Medica, (2) Chemical Pharmacy, (3) Galenical Pharmacy, and (4) Veterinary Pharmacy.

The Preface is moderately brief, but well-written, and is signed by the President of the Commission. Then, under the title of "*Notions Préliminaires*," follow items of information respecting weights and measures, specific gravity and alcohometric tables, a table of solubilities, and another of equivalents and atomic weights, some of which had a place in the previous Codex. Two or three tables showing the relation of the gram to other French weights that have become obsolete are suppressed; but there remains one table that professes to show the relation of foreign medicinal weights to the gram which certainly shows an excess of conservatism. In it Great Britain and the United States are bracketed together as having the same medicinal ounce and pound, and it is further stated expressly that the pound consists of 5760 grains and is divided into 12 ounces. This was not correct when the previous edition was published in 1866, though perhaps the editors of that period might be excused for not taking cognizance of what had happened outside France within a couple of years; but the perpetuation of the mistake after an interval of twenty years is hardly creditable in an official work. Moreover, the same table attributes to Bavaria, Hanover and Prussia, as medicinal weights, pounds and ounces based upon a grain of a different value in each country, quite oblivious of the fact that since 1870 one Pharmacopœia has been authoritative throughout the whole of the German empire, and that the only measure of weight to be found in it has been the gram. Whilst upon the subject of measures it is worth mentioning, as illustrative of the difficulty with which the most scientifically worked-out systems displace old and familiar ideas, that even in the home of the metric system it is found necessary, on account of certain prescribers, to retain such measures as spoonfuls and glassfuls. All that can be done is to give them appropriate values, which differ, however, in some respects from those given in the Codex of 1866. A teaspoonful (*cuillerée à café*) of water is still defined as weighing 5 grams; but the weight of the dessertspoonful of water is now given as 10 grams; that of the tablespoonful (*cuillerée ordinaire*) as 15 grams, instead of 20 grams; and that of the glassful (*verrée*) as 120 grams, instead of 160 grams. The "handful," however, as a measure of seeds, leaves, etc., and the "pinch," as a measure of flowers, etc., are no longer officially recognized. In order to meet the difficulty attending the measurement of drops a table is given showing the weights of drops of different liquids and the number to a gram. These drops represent those falling from a glass tube terminated by a capillary opening, the exterior diameter of which measures exactly three millimetres. Twenty drops passing through this instrument at a temperature of 15° C. should weigh within two-hundredths of a gram.

The inconveniences attending the use of the degrees of an instrument so arbitrarily graduated as Baumé's areometer for indicating the densities of liquids were fully recognized in the previous edition and provision was made for its substitution. A further step is now taken, and densities in degrees Baumé are no longer given in the body of the work, so that although a table of equivalents is still provided for the sake of convenience, the time is probably brought nearer when the sign "B." will cease to perplex the English readers of French pharmaceutical works. It may be useful to mention that the instrument adopted instead, for liquids heavier than water, is the "densimetre" of Brisson, which is, in fact, an ordinary hydrometer, bearing the figure 1000 at the top of the stem to indicate the level to which it sinks in distilled water at +4° C., the other graduations corresponding to the increasing densities in thousandths. For liquids lighter than water, the centesimal alcohometer of Gay-Lussac is recognized, the zero in the graduation of which corresponds to pure water at 15° C., and the figure 100 to absolute alcohol, so that each degree represents 1 per cent. of absolute alcohol by volume, instructions being given for making the necessary corrections for temperature. A table is also given showing the quantity of absolute alcohol by weight in mixtures corresponding to these degrees, the contraction of acoholic mixtures, the coefficient for the correction of temperature from 0° to 30° C., and the weight of a litre of liquid of particular density in a vacuum and in air. Another table gives the quantities by weight of alcohol of any given degree and distilled water that require to be mixed to obtain a kilogram of alcohol of any of the strengths indicated in the Codex.

Passing now to the First Part of the Pharmacopœia it is found that this consists of a list of the substances derived from animals or plants which are employed in their natural state. In the Codex of 1866 a similar list was followed by one of substances derived from minerals and chemical products, but these articles are now included in the next division. The animal and vegetable materia medica is still very extensive, numbering about four hundred and seventy articles, although considerably over a hundred appear to have been omitted. Little comment respecting the numerous omissions is needed here beyond the remark that most of these articles could be very well spared; this is true especially of those derived from the animal kingdom, as will be admitted when it is mentioned that they include the frog, a species of viper, the oyster, animal kermes, and the wood-louse. The animal kingdom is, however, by no means abandoned, and among its representatives in the Codex are still to be found the concretions known as crab's-eyes, civette and the apple snail. Among the principal novelties in this list are boldo leaves, the flowering tops and seeds of *Cannabis sativa*, dita bark, eucalyptus leaves, potato starch, jaborandi leaves and podophyllum rhizome.

A glance at the Second Part is sufficient to show that here there has been a radical alteration in the arrangement. In the Codex of 1866 the articles not enumerated in one or other of the materia medica lists were grouped in no less than seventy-five chapters, the nature of which will be best indicated by quoting the titles of half a dozen of them: Simple Bodies, Mineral Acids, Sulphides, Salts with Vegetable Bases, Oils and Fats, and Syrups. As these chapters did not follow in alphabetical order according to their subjects, the device seemed an ingenious one for perplexing any person wishing to consult the work in a hurry. In comparison, therefore, the present arrangement seems preferable. It consists in dividing all these articles, together with those that previously constituted the inorganic list in the materia medica, into two large groups, one designated "Chemical Pharmacy," and constituting the Second Part of the book, and the other entitled "Galenical Pharmacy," and forming the Third Part. In these two parts the articles are arranged alphabetically, according to the individual titles in the Second Part and according to the titles of groups of preparations in the Third Part. This arrangement is fairly convenient in respect to the galenicals; but cannot be said to be so in respect to the chemicals, in consequence of the form of nomenclature adopted, in which only the vernacular is used, the acid radical in compounds coming first. Thus the list opens with "Acétate of Ammoniaque Liquide," followed by "Acétate of Chaux," and the other acetates; and after these come the acids. One result of this is to group all the saline compounds according to their acid radical, so that in order to ascertain what are the official saline compounds of a particular inorganic or organic base it will be necessary to consult the index, and even there the information is not always to be found. Another point that is noticeable is the maintenance of the term representing the oxide of the base in the names of the compounds of the alkalies and alkaline earths. It is a fair question, however, whether the Codex Commission might not have improved its work by conforming to the arrangement now general, according to which the materia medica and the preparations are brought into a single alphabetical list, in which the basic side of a compound regulates its position. At present the Commission will seem to many to have abandoned an untenable position, without having had the courage to continue the movement to its logical end.

As it is proposed to refer on future occasions to the articles in these two divisions in some detail, it will suffice to mention here in the briefest manner some of the principal additions that have been observed in the Second Part of the Codex, since these will to some extent indicate many of the probable novelties in the Third Part. Taking first the alkaloids, the Codex now includes apomorphine and its hydrochlorate, caffeine, conine hydrobromate, eserine and its hydrobromate and sulphate, hyoscyamine, narceine, pelletierine tannate, pilocarpine and its hydrochlorate and nitrate, cinchonidine sulphate and the basic and neutral hydrobromates, and quinidine sulphate. Besides these there have been added the ferrocyanhydrate, lactate, salicylate, hydrochlorate, tannate and two hydrobromates of quinine, hydrobromate of morphine and nitrate of aconitine. Other important organic compounds are crystallized digitalin, picrotoxin, picric acid, salicylic acid and sodium salicylate, ammoniated glycyrrhizin, thymol, chloral hydrate, iodoform, amyl nitrite, ethyl bromide and iodide, monobrom camphor and vaseline. There are four new lithium compounds, namely, the benzoate, citrate, carbonate and salicylate. Hydrobromic acid is supplemented by the bromides of barium, iron, sodium; and the iodides of ammonia and sodium are added. Then there are the hypophosphites of sodium and calcium, sodium chlorate and sulphovinate, calcium acetate, benzoate and lactophosphate, and red phosphorus.

NOTE ON A SAMPLE OF SOPHISTICATED SAFFRON.

BY J. HART, PH.C.

A few days ago my attention was drawn to a yellow powder at the bottom of a shop bottle containing saffron (*Crocus sativa*). The abundance of the powder (in proportion to the small quantity of saffron), together with its weight, induced me to make a thorough examination of it, and as I have not met with similar results (possibly owing to the want of indices and of more time to search the literature), the following remarks may be of interest:—

For the purpose of comparison, 10 grains of a very fine sample of saffron, recently purchased, were incinerated in a platinum crucible; the ash obtained weighed ·5 grain, equalling 5 per cent. The process was repeated with an exactly similar result. This corresponds with 'Pharmacographia,' which gives "5 to 6 per cent." as the ash of genuine saffron. Ten grains were then placed under a bell jar and allowed to dry until the weight became constant. The loss was found to be ·25 grain, thus bringing up the ash of a thoroughly dry specimen to 5·12 per cent.

The suspected saffron was very dry; but there was nothing in the colour to indicate the presence of mineral matter. There was no perceptible effervescence on the addition of dilute HCl, either in the powder or the saffron, proving absence of $CaCO_3$. Ten grains of the saffron, freed as much as possible from powder by shaking and rubbing, yielded 2 grains, equalling 20 per cent. of ash, showing 14·88 per cent. of adulteration, even after being freed from all loose powder, when compared with a dry specimen of pure saffron. Ten grains of the loose powder (containing a small quantity of saffron) were then incinerated and yielded 6·5 grains of ash, the bulk of which was insoluble in boiling HNO_3, and gave the characteristic flame of barium. An attempt to ascertain the exact nature of the ash from a further 10 grains of powder was frustrated by an unfortunate accident resulting in the loss of the whole. The remaining saffron and powder were then incinerated and the ash analysed with results as given below. This ash of course contains a proportion of normal ash, but the source of adulteration is proved beyond doubt.

Constituents of ash expressed as parts per 100:—

$BaSO_4$	64·28
$CaSO_4$	14·57
Al_2O_3*	10·71
Salts of K and Na	9·28
	98·84

Remarks.—It is of course impossible to accurately estimate the amount of adulteration, but I think it may be safely set down at from 25 to 30 per cent. I regret that I did not first make a microscopical examination, for although a large quantity of the powder must have fallen off, still sufficient was left on to have been indicated by the microscope. Both these samples were from houses of the highest standing, and in each case the top market price was paid, the adulterated specimen costing 50*s*. a few months ago and the pure 48*s*. per lb. in January last. Another proof is thus afforded, that neither the price paid nor the reputation of the wholesale house is at all times a sufficient guarantee of genuineness.

CONVALLARIA MAJALIS (LILY OF THE VALLEY).†

BY DR. SQUIBB.

Dr. Edward Drummond, of Rome, writes to *The British Medical Journal* (see No. 1194, November 17, 1883, p. 970), that he has lately met with an account of the use of this drug, in cardiac disease, as far back as the commencement of the seventeenth century, in an old Italian book of 'Commentaries on the Materia Medica of Dioscorides,' by Dr. Pietro Andrea Matthioli, published in Venice in 1621, and Dr. Drummond gives the following interesting translation:

"The Germans use lily of the valley to strengthen the heart, the brain, and the spiritual parts, and also give it in palpitation, vertigo, epilepsy and apoplexy; also as a remedy for the bites and stings of poisonous animals; to quicken parturition; and for inflamations of the eyes. For this purpose they are wont to prepare the wine from the flowers at the time of the vintage; and then infuse them in old wine for forty days in the sun, and subsequently distil and re-distil (but not many times), along with lavender-flowers, rosemary and other aromatics. They then preserve it as one of the most precious things to be found amongst medicines, and they call it 'aqua aurea,' and preserve it, in vessels of gold and silver, against sudden attacks. They even believe that, given to persons actually *in articulo mortis* it is able to prolong life for several hours. In this, however, they are not unfrequently deceived, as I have myself witnessed."

In the above translation it must not be taken for granted that the words "distil and re-distil" had their present meaning, for it is highly probable that they had not. Referring to Richardson and other authorities, it will be found that "to separate drop by drop," was formerly taken in a different sense, and had no necessary relation to rising in vapour and being condensed, or even to heat in any form. By the quotations given in Richardson, its present signification from some former more literal one can easily be traced, and in this translation it should probably be read as "percolate and repercolate" after the forty days' maceration.

Hence, it is probable that convallaria has been continuously used in medicine for several hundred years, and that its action on the heart has been long known. Its more modern and rational use in medicine, however, does not date back, so far as the writer knows, farther than a paper on the subject by Prof. Germain Sée in the *Bull. Therap.* for July, 1882. In connection with M. Hardy he investigated its physiological and therapeutic action at length, and very important and definite results were reported. Its effects on the heart and arteries, although similar to those of digitalis, were not identical, and were not produced in the same way, while it was free from some of the inconveniences and disadvantages of digitalis. It was not cumulative and explosive, as digitalis was reported to be. It did not interfere with digestion, but was perfectly well borne, the appetite rather increasing under its use, while the intestinal action was also improved. The diminution of the heart's frequency, under normal conditions, amounts to 10 or 15 beats per minute. Irregularity, especially of nervous origin, is lessened. Sensations of pulsations in distal vessels—*e. g.*, in the head—are removed by it. At the same time the force of the cardiac action is increased. It has a powerful diuretic action, increasing the amount of urine to about three times its previous volume (From *The Lancet*, August 26, 1882, p. 327).

This paper attracted considerable attention, and was followed by others in France, Great Britain and America. All agreed upon the potency of the drug as a cardiac agent. Some regarded it as an equal, and others as an inferior duplicate of digitalis. Some found it diuretic, others not at all so, while in a very considerable number of the trials the results were negative until toxic doses were used. Long ago it had yielded to chemistry two glucoside principles of very different and somewhat antagonistic action, and these, convallarin and convallamarin, were used separately, and the latter was alleged to be the cardiac agent, but with these also, discrepant results were obtained. In a year from the time of Professor Sée's paper it seemed doubtful if the convallaria was not a mere duplicate of digitalis, with the great disadvantage of being by no means so well studied or so well tried, yet stimulated into use by fashion and novelty, and by advertising.

If only a simple duplicate of digitalis, the already overloaded materia medica was much better without it. But if it differed materially in either quality or quantity of action, and was more free from collateral disturbance, the materia medica could not afford to lose the chances offered by it.

At about this period of its career the writer received a note from a very careful and close observer, saying that he considered it a valuable agent, which could not take the place of digitalis in his hands, but which had a place of its own to which digitalis had been applied, but to which it is less applicable, and asking the writer to make a preparation of convallaria for critical trial. This was in the early spring of 1883, and there was no part of the plant to be had in the American market. From the character of the plant, and from various considerations developed by the uses of the extract from its various parts by M. Hardy and others, the writer concluded that the root, if taken at the proper time, would be by far the best portion of the plant for medicinal use, and that a well-made fluid extract of the root would be far the best representative of the drug,—far better than the so-called active principles which, when divorced from each other, were found to yield such discordant results.

A florist was found who had some fine beds under cultivation, and when the roots had fairly sprouted they were taken from the ground, cleaned and dried by a gentle radiant heat. In drying they lost just about 75 p.c. of their weight, this loss not varying more than 1 to 2 p.c. in four separate parcels. The dried root and sprouts were then ground so as to pass through a sieve of twenty meshes, and were made into a fluid extract which represented the dried root minim for grain.

As a rule, cultivated plants are not as active, medicinally, as wild ones, but this was the best that could be done. The menstruum used for exhausting the root at first proved not to be a good one, and yet this fluid extract, in the hands of several good observers, proved moderately

* This contained a very slight trace of Fe.

† Reprinted from *Ephemeris*, January, 1884.

effective, and some discrepancies in the published statements were shown to be probably due to the use of preparations of different makers, or of different materials.

Specimens of this fluid extract were sent to several good observers, and in course of a few months results were obtained which, although not fully sustaining the character of the drug, were yet sufficient to warrant a more extended usage. By this time a parcel of foreign wild flowers and flower stalk had arrived. These were made into fluid extract with a different and better menstruum,—namely, the diluted alcohol of the U.S.P. of 1880. It was, however, pretty plain from the sensible properties that this was not so active nor so good a preparation as that from the root, and therefore that the root collected at sprouting should be preferred. A very few therapeutic trials seemed to confirm this opinion, and by this time some foreign root arrived, was made up and distributed, and the supply of this has now been kept up for several months to all who applied for it, thus gradually extending the number of those who were using this preparation, and adding them to the much larger number of those who were using the preparations of other makers, and who had used these long before this writer took up the subject.

Up to this time several competent and careful observers, —free from the prejudice of novelty, and from the still more dangerous prejudice of basing general conclusions upon too few cases,—have reported their experience in a guarded way. This experience is still discrepant, and therefore difficult to state, so that perhaps all that can be safely said, is that the general kind and direction of the results show that convallaria is worthy of a more extended use before it can be either fully accepted or discarded. It may be pretty definitely said that it is not a simple duplicate of digitalis, nor is it adapted to supersede that important agent in any large number of cases. Yet its use may serve to differentiate or discriminate between cases which have hitherto been classed together and all treated by digitalis, because there was no other agent that was applicable to any of the class.

If the uncertain indications from the use of convallaria thus far be not mistaken, the best that can be hoped from it is that it may materially aid physicians in splitting up the digitalis class into groups, some of which may be better managed by convallaria. It is also among the possibilities, if not among the probabilities, that it may prove either or both a substitute and adjunct to digitalis. There are many conditions in which digitalis fulfils all the indications required of it, but in which it cannot be continued in sufficient doses to maintain the good effects without disturbing the stomach and thus interfering with nutrition. In such, or in some of such cases at least, it may serve as a substitute or alternate. In other conditions which seem to indicate the effects of digitalis, but in which that agent does no good, or cannot be tolerated, convallaria gives a chance of relief where there may have been less chance without it.

Two or three years of careful observation, in good hands, extended over large numbers of cases, without prejudice, and with earnest investigation, will be absolutely necessary to establish the true and lasting character of convallaria, and it is this consideration which induces the writer to add his supply of a well-made fluid extract from good material to those of other makers who long preceded him in supplying it.

The dose of convallaria is, of course, the quantity which will give the special or physiological effect, and this will be different in different cases. But the dose to begin with, and that which will be effective in some cases, is about 24 grains in the twenty-four hours. And as the fluid extract represents the drug minim for grain, the dose of that will be as many minims,—say 6 minims every four hours, or 8 minims three times a day,—the size or the number of the doses to be increased until some effect is obtained.

The fluid extract is miscible with water, and though it does not make a clear solution, the precipitate which settles out is probably but not certainly inert. A good way to administer it is to put a measured quantity in a wine glass and add as many teaspoonfuls of water as may make up the number of doses required when given from the same teaspoon. For example, a fluid drachm is measured into a wine glass, and seven teaspoonfuls of water, or wine, or diluted alcohol are added and the mixture well stirred. Then using the same teaspoon, and stirring well at each dose, if water be the diluent, it is given in teaspoonful doses, which will be nearly eight minims each, farther diluted if desired at the time of taking it.

If the drug is to have a fair chance, there can be very little doubt that a well-made fluid extract of the root collected at the proper season is the best form in which to use it. In all drugs, the active principles of which are neither alkaloids nor acids, but are of that indefinite class called glucosides for want of a better generic name, it is pretty certain that these glucosides do not fully represent the drugs,—nor even well represent them. And when two or more glucosides are obtained from the same drug, the doubt is much strengthened. No one knows,—be he ever so good a chemist,—where the molecules of complex organic substances will split until he tries them, and therefore what he gets is often empirical, and may be the result of his chemical process, so that a different process may give different results. For example, Walz, in 1858, obtained from convallaria two glucosides which he named "convallarin" and "convallamarin." Dilute acids again split both of these into other bodies by subtracting a molecule of sugar, and one of the resulting bodies, *minus* half a molecule more of sugar, leaves the formula of the other original glucoside. Hence the inference that neither convallarin nor convallamarin exist in the plant, but that they are the result of the splitting-up of more complex molecules by chemical means. No one has ever proved that either of them pre-existed in the plant, while the physiological action of the plant is not represented by the action of the two glucosides as given.

THE USE OF LITMUS, METHYL ORANGE, PHENACETOLIN AND PHENOLPHTHALEIN AS INDICATORS.*

BY ROBERT T. THOMSON.

(*Concluded from p.* 705.)

X.—*Effect of the Phosphates of the Alkalies.*

As the normal phosphate of potassium is generally found to the extent of 1 or 2 per cent. (it has even been found as high as 7 per cent.) in commercial carbonate of potash, it is a matter of great importance to know what proportion of the potash, existing as phosphate, is determined by standard acid. I found that the phosphates of potassium, sodium and ammonium acted in the same manner towards the indicators when titrated with standard acid, and will, therefore, only quote the double series of experiments made—the one with normal sodium orthophosphate (Na_3PO_4), and the other with the ordinary disodium hydrogen orthophosphate (Na_2HPO_4). The crystallized form of the former of these salts was prepared by dissolving a weighed quantity of the latter in boiling water, adding the proper proportion of hydrate of sodium, and allowing to crystallize out. After recrystallizing both of these phosphates, a portion of each was ignited to obtain the real amount of dry salt in each, and solutions made of such a strength that 50 c.c. contained in the one case 2·05 gram Na_3PO_4 (equal to 1·162 gram Na_2O), and in the other 1·775 gram Na_2HPO_4 (equal to ·775 gram of Na_2O).

When *litmus* was used in the titration of the normal phosphate, the blue colour remained intact until about 16 c.c. of the normal sulphuric acid were added, when it

* Read before the Chemical Section of the Philosophical Society of Glasgow, January 22, 1883, and reprinted from the 'Proceedings.'

became purple, and, on further addition, slowly passed into red, the change being complete at about 24·9 c.c. This is equal to ·772 gram of soda, which is practically two-thirds of the total soda. The point at which the red colour was fully developed could not be ascertained with any degree of accuracy, even when a solution of reddened litmus was used for comparison, as the change was so very gradual. The mono-acid phosphate consumed 12·4 c.c. of the standard acid, thus agreeing with the result of the normal phosphate.

Methyl orange gives as delicate an end-reaction as with hydrate of sodium. The results were slightly higher and nearer the truth than those obtained with litmus, 25·05 c.c. being required in the one case and 12·6 in the other.

Phenacetolin.—With this indicator the same number of c.c. were necessary as with litmus, and, like the latter, changes gradually in colour, so that the point at which excess of acid is added is somewhat difficult to catch. There is, however, a peculiar phenomenon to be noticed with regard to this indicator. The normal phosphate, like hydrate of sodium, only brings out the scarcely perceptible yellow colour; but, after the addition of about 11 c.c. of the normal acid, the permanent pink colour is formed. In fact, the first-named salt acts towards phenacetolin as if it were a mixture of hydrate and the mono-acid phosphate of sodium. The latter salt produces the pink colour at once.

Phenolphthaleïn again acts in an entirely different way to the other indicators. We have seen before that $NaHCO_3$, NaHS, and Na_2SO_3 are neutral to this indicator, and to these must now be added Na_2HPO_4; while $NaHSO_3$ and NaH_2PO_4 are neutral to litmus, methyl orange, and phenacetolin—$NaHCO_3$ and NaHS being alkaline, and not requiring to be decomposed by boiling before determining the alkali in them by test acid. It will be observed that, in each case, there is exactly an atom of sodium of difference, the phenolphthaleïn being invariably the weaker indicator.

In titrating the normal phosphate, 12·65 c.c. of the test acid were required to discharge the red colour in the cold, and 13·7 c.c. in the boiling solution, the mono-acid phosphate requiring only ·25 in the cold and 1·4 in the hot. In each case, on cooling and titrating back with caustic soda, the same result as was obtained at first in the cold solution was brought out. These results show that when phenolphthaleïn is employed, one-third of the soda in normal phosphate of sodium is estimated by standard sulphuric acid, and only a trifling portion of that existing as the mono-acid phosphate.

Table VII.

Results obtained in the titration of normal sodium phosphate and disodium hydrogen phosphate by normal acid.

Na_3PO_4 used for each test	2·050
$=Na_2O$ „ „	1·162
Na_2HPO_4 „ „	1·775
$=Na_2O$ „ „	·775

Name of Indicator.	Na_3PO_4. C.C. Normal Acid consumed.	Na_3PO_4. Gram of Na_2O found.	Na_2HPO_4. C.C. Normal Acid consumed.	Na_2HPO_4. Grams of Na_2O found.
Litmus . . .	24·9	·772	12·4	·384
Methyl orange .	25·05	·776	12·6	·390
Phenacetolin (first change) .	11·0	·341	...	...
Phenacetolin (second change)	24·9	·772	12·4	·384
Phenolphthaleïn (cold). . . .	12·65	·392	·25	·008
Phenolphthaleïn (boiled) . . .	13·7	·425	1·4	·043

XI.—Effect of Silicate of Sodium.

A preliminary test was made of the value of litmus for the estimation of soda in silicate of sodium, by taking a quantity of hydrate of sodium of known strength, dissolving some silica in it, and then determining the soda. The exact amount of soda used was found, and the estimation made by litmus was taken as the standard of comparison with the results obtained with the other indicators. Five grams of commercial liquid silicate of soda were employed, and 15·05 c.c. of normal acid were consumed with litmus as indicator, the end-reaction taking place with great distinctness.

With *methyl orange* also a very distinct end-reaction was obtained, and 15·1 c.c. were consumed—a result closely corresponding with the former one.

Phenacetolin gave a dark pink colour with the silicate of sodium, but this became yellowish towards the end of the test, and the change was not very distinct. 15 c.c. of the acid were necessary, which does not materially differ from the quantities obtained with litmus and methyl orange.

Phenolphthaleïn.—The red colour produced by the phenolphthaleïn was slowly destroyed on running the acid into the cold silicate solution, 12·7 c.c. only being required. When boiled, the colour returned, but was dispelled when 13·5 c.c. had been added. These results are considerably below the truth.

Table VIII.

Results obtained in the titration of silicate of sodium ($Na_2Si_4O_9$).

Name of Indicator.	C.C. of Normal Acid consumed.	Grams of Na_2O found.
Litmus	15·05	·466
Methyl orange	15·1	·468
Phenacetolin.	15·0	·464
Phenolphthaleïn (cold) .	12·7	·393
Phenolphthaleïn (boiled).	13·5	·418

XII.—Effect of Alumina.

Soluble alumina, like silica, is seldom or never absent from caustic soda or potash. The experiments were made with an excessive quantity of alumina, the proportion used being equal to about 8 per cent. in an average strength of caustic soda. A quantity of pure hydrate of aluminium, equal to ·515 gram Al_2O_3, was prepared from alum by precipitation with ammonia. This precipitate was redissolved, reprecipitated, washed thoroughly, dissolved in 125 c.c. of normal caustic soda and made up to 250 c.c. with water. Fifty c.c. of this was employed for each test and contained ·775 gram of soda, and ·103 gram of alumina.

Litmus.—When litmus is used 25·25 c.c. of the normal acid were consumed, in place of 25 required when no alumina was present, nor did the end-reaction come out very distinctly.

Methyl orange.—After a little more than 25 c.c. of the acid had been consumed, the alumina was all precipitated, and then gradually dissolved, the pink colour at first produced being quickly dispelled as the acid combined with the alumina. A decided and permanent change occurred when 30·7 c.c. had been added. This gives ·951 gram of soda, as against ·775 really present, and if the difference be calculated to alumina it shows ·097 gram of the latter compound instead of ·103. It is thus evident that nearly the whole of the alumina has been estimated along with the soda.

With *phenacetolin* and *phenolphthaleïn*, the real amount of soda used was obtained. The only effect of the precipitated alumina is to obscure the end-reaction slightly.

Table IX.

Results obtained in the titration of aluminate of soda.

Na_2O used for each test . . . ·775 gram.
Al_2O_3 " " . . . ·103 gram.
$=Na_2O$ " " . . . ·186 gram.

Name of Indicator.	C.C. of Normal Acid consumed.	Grams of Na_2O found.
Litmus	25·25	·782
Methyl orange .	30·7	·951
Phenacetolin . .	25·05	·776
Phenolphthaleïn .	25·0	·775

XIII.—Effect of Nitrite of Sodium and Potassium.

A solution of nitrite of potassium was prepared by decomposing with chloride of potassium a known weight of nitrite of silver, which was precipitated from a solution of nitrite of sodium. Twenty c.c. of this nitrite of potassium liquor contained 1·7 gram of KNO_2, and this quantity, diluted to 100 c.c. was employed for each test. The nitrite was found to be quite neutral to litmus, phenacetolin and phenolphthaleïn. With methyl orange, however, the pink colour was not produced even after adding 30 c.c. of normal acid, but seemed to be destroyed at once by the liberated nitrous acid. Another quantity, containing ·085 gram of the nitrite in the 100 c.c., gave a pink colour with ·2 c.c. of acid, but this was slowly dispelled on standing a few minutes, leaving a pale yellow colour. Nitrite of sodium acts in the same way towards the indicators as nitrite of potassium. Nitrites are sometimes found in small proportion in caustic soda and potash.

XIV.—Determination of Soda in Borax.

The solution of borax employed contained 1·683 gram of pyroborate of sodium in 50 c.c., the quantity used for each test.

With *litmus*, the blue colour began to purple when 13 c.c. had been added, but the change was not complete until 16·65 in the one case, and 16·6 c.c. of normal acid in the other, had been consumed. This shows ·516 and ·514 gram of soda, as against ·516 really present. The end-reaction, however, is very indistinct.

Methyl orange is by far the best indicator for the estimation of soda in borax, and is indeed perfect in that respect. The change in colour at the end of the experiment was very sharply defined. The results agreed closely with those of litmus.

Phenacetolin.—Like litmus, the colour of this indicator slowly changes, and a good end-reaction is therefore impossible. The whole of the soda can be estimated by it.

Phenolphthaleïn is utterly useless for the purpose under consideration. The red colour disappears before half of the soda is determined in cold solutions. When boiled, a much higher result is obtained, but still very far below the truth.

Table X.

Determination of soda in borax.

$Na_2B_4O_7$ used for each test . . . . 1·683.
$=Na_2O$ " " . . . . ·516.

Name of Indicator.	C.C. of Normal Acid consumed.	Grams of Na_2O obtained.
Litmus	16·65—16·6	·516—·514
Methyl orange	16·7 —16·65	·518—·516
Phenacetolin.	16·7 —16·6	·518—·514
Phenolphthaleïn (cold) .	7·6 — 7·8	·235—·242
Phenolphthaleïn (boiled).	11·0 —11·3	·341—·350

XV.—Determination of Free Sulphuric, Nitric, and Hydrochloric Acids.

It is quite plain from the results obtained when testing the behaviour of the sulphates, chlorides, and nitrates of the alkalies with the indicators under consideration, that these acids can be determined by a standard caustic alkali, excepting that ammonia cannot be used with phenolphthaleïn. Carbonate of sodium can be used in the cold if methyl orange is employed, and in the case of phenacetolin the caustic potash or soda should contain a little carbonate of potassium or sodium, so that the carbonate or bicarbonate will be formed when the end-reaction is reached, and the dark pink colour will be produced.

XVI.—Determination of Free Oxalic Acid.

A normal solution of pure oxalic acid was prepared, and 20 c.c. of this was employed for each test.

With *litmus* the end-reaction was very well defined, and exactly 20 c.c. of normal hydrate of sodium were consumed, thus giving exactly the amount of oxalic acid.

Methyl orange.—It has been pointed out by Lunge that methyl orange must not be employed when oxalic acid is titrated, and from the following test it is evident that it cannot be relied on. When 12 c.c. of the normal alkali were added the pink colour began to fade away, and was completely destroyed after the addition of 18 c.c.

Phenacetolin.—The addition of 19·8 c.c. produced a very faint pink colour, which was not fully developed till 20 c.c. had been consumed. This indicator cannot, therefore, be recommended as useful for the titration of oxalic acid.

Phenolphthaleïn, on the contrary, works admirably, the end-reaction being as delicate as with the mineral acids. The result agreed with that of litmus.

Table XI.

Determination of oxalic acid.

$H_2C_2O_4$ used for each test . . . ·900 grams.

Name of Indicator.	C.C. of Normal NaHO consumed.	Grams $H_2C_2O_4$ found.
Litmus	20·0	·900
Methyl orange .	18·0	·810
Phenacetolin . .	19·8	·891
Phenolphthaleïn .	20 0	·900

XVII.—Determination of Acetic Acid.

The sample of acetic acid in which the free acid was determined showed a specific gravity of 1·0472 at 15° C., which is equal to, according to Oudemann's table, 35·02 per cent. of $HC_2H_3O_2$. One hundred grams of this acid were made up to 1 litre with water, and 50 c.c. used for each titration, the caustic alkali used being standardized with normal sulphuric acid.

Litmus.—On adding the normal caustic soda, the red colour remained intact, but towards the end of the experiment became purple and almost blue before the end-reaction was accomplished. The last change in colour could only be observed by comparison with a blue litmus solution of the same strength as the liquid operated upon. 29·15 c.c. were consumed both with this experiment and with one tested with litmus paper, 1·749 gram of acetic acid being obtained in each case.

Methyl orange is totally useless as an indicator in the estimation of acetic acid, only 3·5 c.c. of the alkali being consumed.

Phenacetolin.—The addition of 28 c.c. produced a pale rose colour, but the change was very undecided. This indicator is not adapted for this purpose.

Phenolphthaleïn is well fitted for use in the estimation of free acetic acid by caustic soda, as acetate of sodium is perfectly neutral to it, while that salt is alkaline to litmus. Several tests gave 29·2 c.c. of normal alkali consumed—these results being slightly, but quite distinctly higher than those obtained with litmus. The end-reaction is as delicate and sharply defined as in the determination of the mineral acids. If the solution in which the acetic acid is to be determined is dark coloured (as in some vinegars), it may be highly diluted, as dilution has little or no effect on the delicacy of phenolphthaleïn.

Table XII.

Determination of acetic acid.

Name of Indicator.	C.C. of Normal NaHO consumed.	Grams of $HC_2H_3O_2$ found.
Litmus	29·15—29·15	1·749—1·749
Methyl orange .	3·5	·210
Phenacetolin . .	27·8	1·668
Phenolphthaleïn .	29·2—29·2	1·752—1·752

XVIII.—Determination of Tartaric Acid.

1·5 grams of pure and dry tartaric acid were used for each experiment. The solution tested with *litmus* as indicator began to get purple after the addition of 19 c.c. of normal caustic soda, but the change to blue was not complete till 20 c.c. had been consumed, the tartaric acid found being exactly equivalent to the quantity taken. As with oxalic and acetic acids, *methyl orange* gives very low results, 16 c.c. only being required to dispel the pink colour. The tartaric acid found by *phenacetolin* was slightly, but perceptibly, under the truth.

Phenolphthaleïn in this case, as with acetic acid, is the only perfect indicator among these four. Although the results obtained are much the same as those with litmus, the unimpaired delicacy of the end-reaction gives phenolphthaleïn a great advantage over the former indicator.

Table XIII.

Determination of tartaric acid $H_2C_4H_4O_6$ used for each test, 1·5 gram.

Name of Indicator.	C.C. of Normal NaHO consumed.	Grams of $H_2C_4H_4O_6$ found.
Litmus	20—20	1·500—1·500
Methyl orange .	16	1·200
Phenacetolin . .	19·85	1·488
Phenolphthaleïn .	20—20	1·500—1·500

XIX.—Determination of Citric Acid.

The sample used for the following tests was found to be free from impurity; but, as the water of crystallization varies to some extent, it was determined by drying for about twelve hours between 50° and 60° C., and then gradually raising the temperature to 100°. 8·53 per cent. was obtained, which is slightly lower than the theoretical proportion, 8·57 per cent. As 14 grams were made up to 200 c.c., 20 c.c. contained 1·2806 gram of dry citric acid ($H_3C_6H_5O_7$), this being the quantity operated upon. The normal caustic soda was standardized by normal sulphuric acid.

Litmus seems still to be considered the best indicator for the estimation of free citric acid, but it is a very defective one. In the first place, it gives a very indefinite end-reaction, and, in the second, the normal citrate of soda formed during titration is so alkaline as to preclude the use of sulphuric or any other mineral acid in the standardizing of the caustic soda. Pure citric acid must in that case be employed as the standard, and this entails the testing for impurities, and the tedious estimation of water described above. Allen, in his 'Commercial Organic Analysis,' vol. i., p. 263, noticing these points, observes that neither logwood nor cochineal give sharp end-reactions, and recommends the use of carefully prepared litmus paper. In the two tests I made both litmus solution and paper were used, the last change in colour of the former being observed by placing it side by side with a litmus solution of equal strength, to which a little alkali had been added. The results were identical, 19·7 c.c. of the normal alkali being consumed in each case. This shows ·02 gram too little of citric acid, and is to be attributed to the alkalinity of the citrate, as sulphuric acid was made use of in testing the standard caustic soda.

Methyl orange and *phenacetolin* were found to be of no value in the titration of citric acid, 9 c.c. being consumed with the former and 17 with the latter.

Phenolphthaleïn.—This indicator is again distinguished from the others by its great delicacy in the determination of free citric acid, as it is in that of tartartic and acetic acids. Several tests were made, and in every case 20 c.c of the normal acid were consumed, giving results extremely close to the real amount of citric acid present, Phenolphthaleïn has thus two advantages over litmus for the determination of citric, tartaric and acetic acids; first, it gives a sharply defined end-reaction, and, second, sulphuric acid can be employed in standardizing the caustic soda.

Table XIV.

Determination of citric acid, sulphuric acid being used for the standardizing of the normal caustic soda.

$H_3C_6H_5O_7$ used for each test . . . 1·2806 gram.

Name of Indicator.	C.C. of Normal NaHO consumed.	Grams of $H_3C_6H_5O_7$ found.
Litmus	19·7—19·7	1·2608—1·2608
Methyl orange .	9·0	·5760
Phenacetolin . .	17·0	1·1000
Phenolphthaleïn .	20·0—20·0	1·2800—1·2800

Litmus and *phenolphthaleïn* were further tested with a sample of lime juice, in order to make certain that a similar difference in result would be brought out when these indicators were applied to the determination of citric acid in this substance. Of course the other free acids existing in the juice would be included in the result. Ten c.c. of the sample, measured at 15·5° C., were employed.

Litmus paper was used as indicator, as the yellow colouring matter of the lime juice darkens so much as to make litmus solution useless. 13·0 and 13·05 c.c. of normal alkali were consumed, which give 36·5 grains of dry citric acid per ounce, 30 grains per ounce being the Board of Trade standard.

Phenolphthaleïn.—With this indicator the most convenient quantity to use is 10 c.c. of the juice, diluted to 150 or 200 c.c. As the yellow colouring matter becomes darker towards the end of the experiment, the end-reaction is not quite so delicate as in a colourless solution, but can still be recognized without the least difficulty. 13·25 c.c. of the normal alkali were consumed in each case—these results being equal to 37·1 grains of dry citric acid per ounce.

Table XV.

Determination or free acids in lime juice.

10 c.c. of sample used for each test.

Name of Indicator.	C.C. of Normal NaHO consumed.	Grains of $H_3C_6H_5O_7$ per ounce.
Litmus	13·00—13·05	36·40—36·54
Phenolphthaleïn .	13·25—13·25	37·10—37·10

AMERICAN DRUGS.*

BY J. MOELLER,

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(*Continued from page* 704.)

5. HERBA FRANKENIÆ GRANDIFOLIÆ (YERBA REUMA).

The drug consists of all that part of the plant above ground, gathered at the time of blooming. The stem is round, the leaves are disposed in alternate pairs opposite one another. They are spathulate, fleshy, smooth-edged and with but a single nerve. At first they are hairy, as are also the calyces and youngest shoots, but as

* Reprinted from the *Therapeutic Gazette.*

the leaf grows older it becomes smooth, except at the base, where a few remaining straggling hairs give it

Fig. 8.—Branch of *F. grandifolia*: nat. size.

the appearance of being slightly ciliated. Each leaf-sprout ends in a flower (Fig. 8), and the axils of the short, whilst the terminal blossom are generally furnished with two flowers, which are in reality shoots of a higher order, with contracted internodes. The terminal two pairs of leaves form a border around the tubular four-ribbed and four-toothed calyx, from which the four pale-red petals scarcely protrude at all.

The plant when dried has a greyish green colour, similar to the oil-willow (*Elæagnus*), but less silvery. It is odourless and tastes saltish, owing to an external saline incrustation, freed from which the plant proves tasteless.

The family of Frankenia, to which the yerba reuma belongs, is the only representative of the order of Frankeniaceæ, to which the indigenous families of Cystinaceæ, Droseraceæ and Violaceæ belong. *Frankenia grandiflora* (Cham. and Schl.) is indigenous to the sea-coast of lower California where grass grows but in winter. It is found even on the mountain slopes. It is a small, scrubby plant, having a short stem with but few branchlets, and is about 15 cm. in height. It is vulgarly known as "river grass" and was known to the early Spanish settlers as being capable of affecting the mucous membranes, a quality which it owes to the tannin and sodium salts which it contains.

Fig. 9.—Forms of *Jacaranda procera* leaves: nat. size.

Professor Carl Jungk (*Therapeutic Gazette*, 1882, p. 60) found:—

	Per cent.
Tannin forming a bluish precipitate with iron salts, nearly	6·000
Chloride of sodium	28·049
Chloride of magnesium	1·350
Sulphate of lime	1·474
Sulphate of sodium	2·547

It is claimed that the liquid extract, properly diluted, which this plant furnishes, is used with satisfactory results in cases of chronic catarrh of the nose, fluor albus and gonorrhœa, in its latter stages. It has also been given internally for catarrh of the digestive organs, but as yet the results obtained in this direction are not very definite even to the Americans.

6. FOLIA JACARANDÆ PROCERÆ (CAROBA).

The dried, well-preserved leaves are bright-green or brown in colour, varying in form and size (Fig. 9), but in no other particular, and therefore evidently all belonging to the one family. They are inclined to develop unsymmetrically, particu'arly towards the base of the leaf. They are more or less leathery, slightly bent downwards at the edges; the upper surface is smooth, the lower covered with a velvet-like covering, particularly towards the edges and along the nerves. The leaf-stems are very secondary nerves form slight anastomoses towards the rim of the leaf.

Microscopic Characters.—The cuticular covering on the upper surface of the leaf is several times stronger and thicker than that on the lower surface. The palisade layer is single, the mesophyll rather thick. The epidermis (Fig. 10) is, on both sides, composed of large irregular cells with many pores on the lower surface. These leaves are characterized by two kinds of trichomata which occur on both sides.

The first of these are conical thread-like hairs composed of but one cell, broad at the base, tapering gradually to a blunt point, 0·5 mm. and more in length, and thick walled; the others are round, cake-shaped glandular hairs, composed of six to eight cells arranged together in a star-shape (0·05 mm. in diameter) with a yellowish amber-like secretion.

The drug is odourless; when chewed it has a bitter and astringent taste. In 1828, Dr. Schimmelbusch first introduced it into Germany, where, however, it was soon forgotten. Some fifteen years ago it was again heard of there as a blood purifier and diuretic. It was also recommended, to be used both internally and externally, in syphilis. In 1867, Hager (*Pharm. Centralh.*, 1867, No. 3) described a sample sent him from St. Petersburg, consisting of five different and apparently entirely distinct sorts of leaves, whence he concludes that these leaves belong to five different Bignoniæ. I do not think from the specimens before me that this conclusion is warrant-

Fig. 10.—Aspect of under side of leaf.

able, though it may be quite probable that the gatherers may occasionally throw similar leaves of different, but closely allied plants, into the same basket. *Jacaranda procera*, Sprengel (*Bignonia copaia*, Aubl., *Bignonia caroba*, Vellos, *Kordelesteis syphilitica*, Arruel), a Brazilian bignonia, called by the inhabitants caroba, carobinha, caroba mirim, caroba minda, is said to be the parent plant.

Theo. Peckolt has subjected the bark and leaves of the caroba to a very searching analysis, and has found that the former possesses more carobin, the latter more aromatic substances. His analysis resulted as follows:—

	Leaves	Bark
Cellulose and water	853·304	885·090
Crystallized carobin	1·620	3·000
Carobic acid, crystallized	0·516	—
Steocarobic acid, crystallized	1·000	—
Carobon, balsamic resinous acid	26·666	—
Caroba resinous acid, odourless	—	2·000
Resin of caroba, tasteless and odourless	33·334	5·000
Caroba balsam	14 420	—
Bitter substance	2·880	2·830
Extractive substance	10·550	19·530
Extractive substance and organic acids	10·000	—
Caroba tannic acid	4·390	4·800
Glucose	—	1 650
Chlorophyll and wax	9·000	—
Albumen, starch, dextrin, salts	32·120 }	76·100
Calcium malatum	0·200 }	

O. Hesse (*Leibig's Ann. d. Chemie*, 1880, p. 150) has made diligent though futile search for alkaloids in these leaves, coming to the conclusion that their entire efficacy has been considerably exaggerated. It had been supposed that they were descended from a common ancestry with the Pareira bark, an error probably born of the fact that both possess like qualities as a drug.

Peckolt's "carobin" forms felt-like glittering crystal needles, is odourless, and has an alkaline taste, with a slightly bitterish after-taste. Heated upon a platinum foil, it melts into a clear liquid, and burns with a bright flame, leaving no residue. It cannot be sublimated. It is insoluble in ether or alcoholic ether but is very slightly soluble in cold water or cold alcohol; easily soluble, however, in boiling water or hot alcohol, again crystallizing upon cooling. The solution will turn turmeric paper brown. The foregoing table shows that the amount of alkaloid in the bark is nearly double that found in the leaves, whilst the former is wholly destitute of all aromatic substances. Since it is the leaves only that are in use as a drug, we must look upon their aromatic component parts as representing their most prominent curative properties. The name caroba has an unusually manifold signification. With us, as is well known, the fruit of *Ceratonia Siliqua*, L., carobs or carubs, a sort of acorn (*Pistacia terebinthus*), are known to commerce as carobs or carobbs. In Brazil they have also:—

Caroba de flor verde; *Bignonia quinquefolia*, Vell. (*Cybistax antisyphilitica*, Mart.).
Carob-assú: *Jacaranda subrhomba*, DC.
Caroba boanca: *Sparattosperma lithontripticum*, Mart.
Caroba do campo: *Bignonia nodosa*, Mans.
Caroba des paulistas: *Jacaranda oxyphylla*, Cham.
Caroba guyra: *Bignonia purgans*.
Caroba preta, carob-assú.

All the different kinds of carobs are used by the Brazilians as medicaments, and Peckolt (*Zeitschr. d. allg. österr.*, Ap. V., 1881, page 480) thinks they are in every way preferable to sarsaparilla. A certain syphilitic affection of the skin prevalent amongst the negroes, and called Bobas, is often cured by means of a preparation called "Massa de Dr. Alves Carneiro," which is composed as follows:—

℞	Fol. carob. pulv.	90·0
	Sarsaparillæ pulv	30·0
	Fol. sennæ pulv.	30
	Calomelanos	2·0
	Syrup. simpl. q. s. ut. ft. electuar.	

D. S. A teaspoonful morning and evenings with caroba tea.

Peckolt prescribes caroba balsam in doses of 1·0 g. as a tonic, and also as an external application for wounds; carobon in doses of 0·1 g. for affections of the skin, and carobin in doses of 0·5 g. for syphilitic and scrofulous affections.

These mere indications are not sufficiently comprehensive, nor have any pharmacodynamic experiments as yet been published on this subject that can pretend, in any reasonable degree, to satisfy the demands of science and research, which is indeed a rather remarkable circumstance in view of the reputation and popularity of this drug.

(To be continued.)

REFINING OF SHELLAC.*

BY E. L. ANDÉS.

The crude shellac is refined in the following way:—One and a half kilos. of soda are dissolved in 45 litres of water contained in a small boiler or kettle; 5 kilos. of the crude shellac are added in small quantities at a time. This turbid solution has the characteristic odour of shellac and a violet-red colour. The liquid is boiled for a few minutes, and, while hot, a wooden air-tight cover is cemented on the vessel. When the liquid is quite cold, the cover is removed, and the thin cake of fat which is found on the surface is separated. The solution is filtered through linen, the clear filtrate slowly decomposed with dilute sulphuric acid, and the resulting shellac washed with water until no acid reaction remains. The washed resin is now pressed and melted in boiling water, when it can be shaped with the fingers. This shellac is cooled in water containing glycerol, and, when hard, is dried. The refined shellac forms yellowish-white glistening tufts or bars which, when dry, are yellowish-brown; it should entirely dissolve in alcohol.

* From *Arch. Pharm.*, [3], xxi., 291. Reprinted from the *Journal of the Chemical Society*, March, 1884.

THE PRESS ON THE SALE OF POISONS.

From the SATURDAY REVIEW, *March* 8.

Public attention has been attracted so much of late to Ministerial messes, to African massacres, and Fenian explosions, that there seems to have been very little to spare for a crime probably unequalled in England since the days of Palmer at Rugeley. A series of the most atrocious murders has been detected at Liverpool, where for a paltry gain, two women have poisoned their nearest and dearest relatives. They were found out after a long career of probable but unascertained crime. One of them it is reported, confessed as much. There must, we feel sure, be numberless undetected cases as long as the sale of poisons is permitted as at present. The Liverpool poisoners might have gone on with their operations for years to come if it had not been that long impunity produced carelessness and carelessness clumsiness. So far as the law would have interfered they need never have experienced any difficulty in obtaining their supply of drugs. That they have been found out, convicted, and executed is a small matter. They can be hanged but once, and the investigation and trial went into but one case. But the whole affair reminds one of the danger incurred by the public owing to the present laws regulating the sale of poisons. The question of insurance is a serious one, but we need not enter upon it here. The question of the sale of poisons is a much more serious one, and just now the law is practically in abeyance as regards it.

We are therefore glad to hear that Government has taken up the subject. A Bill is before them, and will shortly be brought into the House of Commons. The Act of 1868 is a dead letter, yet it is the only protection we have at present. The older and more respectable chemists, with their full pharmaceutical licences, are being superseded by stores, grocers, and all kinds of unauthorized dealers. The old-fashioned chemist could and did know or guess what was in these compounds; he could and did exercise his judgment in selling them, so that no harm done by them could be brought home to him. But the association which manages a co-operative store, or the uneducated dealer in drugs, or the grocer's assistant who can now sell them, are altogether in the dark, and may provide a sick man with the very drug required to "complete the case." There is much, in fact, to be said against the entire system of stamping the so-called patent medicines. The royal arms on the cover give them a kind of Government sanction, which undoubtedly imposes on the uninformed. That the same paternal and benevolent body which insists on vaccination, pure milk, and sanitary arrangements in general, gives its official stamp to many dangerous narcotics and to virulent poisons supposed to counteract gout, cancer, and other diseases is enough with many people to recommend them as innocuous. Professor Attfield wisely suggests, and not an hour should be lost in adopting the suggestion, that the stamp should be abolished, and that the loss of revenue thus occasioned should be made up in a greatly increased charge for licences to sell patent medicines. As a fact, there is no real patent. If the inventor of a nostrum was obliged to register the drugs he uses and the process, as in ordinary patents, the case would be very different. Some old medicines were thus entered on the patent books years ago. But the modern quack medicine is a secret. We cannot expect every one who sells a bottle with a Government stamp on it to go to the expense of having the stuff analysed. Patent medicines may remain as they are—proprietary; but they should not have the sanction implied—in the minds of the general public, at least—in bearing a Government label. A patent medicine containing poison should be labelled poison, and it should be labelled, not by the retailer, but by the original maker, so that in case of harm ensuing from the use of it the retailer may have his remedy against the maker. There is no inherent difficulty in such an enactment. The retailer of watered milk, if he is fined, can recover against the producer under the Sanitary Acts; and it would be easy to make a similar arrangement in the case of dangerous medicines.

There is another point to which attention should be directed. At present the wholesale houses have no restriction placed on the sale of any poison which they can sell to the retailer or to a medical man. The case of Dr. Lamson will be remembered. He applied to a chemist for aconitine. It was refused; and he then went to a wholesale house in the City and obtained what was sufficient for his purpose. True it was only one grain; but that would be enough to poison half a dozen adults. This was, therefore, strictly speaking, a wholesale transaction, and as such was very severely commented upon by the learned judge who tried the case at the Old Bailey. The greatest difficulty, however, will be found in dealing with what are sometimes described as statutory poisons. These are a very frequent cause of accidents. A metal-worker sends out for a few pence worth of vitriol. It is probably brought him in a cup. It is set on the table among the children. The utmost danger is incurred. The action of vitriol is so pronounced that even a child is not likely to swallow much; but a poisonous dose of carbolic acid may be taken without any immediate inconvenience, and the number of fatal accidents from this cause alone is sadly on the increase. When a chemist sells it, he labels it; but the drysalter has it among his oils and varnishes, and sells it without a word of warning to the buyer as to its dangerous qualities. In cases like these, since we cannot prohibit the sale of drugs necessary in the arts, we should insist on their being at least labelled "Poisonous" as a warning. It is not possible for the law to prevent lawless people from committing crime, but it is very possible to mitigate the chances of accidents. If a man must have arsenic to commit suicide or murder, he will get it, like Mrs. Flanagan, from fly-papers, or perhaps from wall-papers. We can only deter him by the example shown at Liverpool on Monday. But the state of the law is to blame when a child swallows a mouthful of vitriol, or when sugar of lead is put into a pudding. We may go further, and refer to the enormous infant mortality caused by the administration of various kinds of soothing syrups. One well-known medicine of this kind is credited with a round dozen of deaths annually. Scarcely less shocking is the mortality from over-doses of narcotic poisons among adults, and it is reported to be largely on the increase. These are things which should not be allowed to happen, yet they do happen constantly and are reported daily in the papers. It is much to be hoped that the Bill when it comes before the House may be found to contain full provisions on these points, as well as on the licensing question and the other incidental matters of minor importance. The State is directly to blame when a preventable accident occurs, and it is indirectly to blame when the posioner finds the drug he wants ready to his hand.

The Pharmaceutical Journal.

SATURDAY, MARCH 15, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

THE NEW FRENCH CODEX.

AFTER three or four years devoted to the labour of revision, a new edition of the Codex Medicamentarius, or French Pharmacopœia, has just been published and will be binding on the pharmaciens of France on and after to-day. Intercommunication between the countries lying on either side of the English Channel has in recent years undergone such enormous development that this work will possess more of interest even than its predecessor for British pharmacists, many of whom will have to dip into its pages for the information necessary to enable them to dispense prescriptions that will be soon coming into their hands in the ordinary course of business. Even where this is not the case, an intelligent curiosity will be roused as to the nature of the new national pharmaceutical text-book of a neighbouring country, in which the art of pharmacy has been so successfully cultivated, and we hope to be able to meet this by devoting a short series of articles to a summary of the book, the first of which will be found on another page. As compared with Germany or the United States, it cannot be said that France, any more than our own country, is troubled by excess of restlessness or enterprise in those who are the arbiters as to the time when a revision of the Pharmacopœia becomes necessary. It appears that the present is only the fourth edition of the work published under the authority of a law that dates so far back as 1803. The first edition was published in 1818, the second in 1837, and the third,—that which now becomes obsolete,—in 1866, one year before the present edition of the British Pharmacopœia appeared. There is evidence, however, that in France, the fact is at last recognized that such intervals are too long and too irregular; for in the report upon which the decree for the present revision is based, it is expressly stated that the consequences have been "grievous." It is pointed out that a publication of this nature is essentially progressive: "the incessant study of the therapeutic properties of various substances, simple or "compound; the researches of naturalists and the "labours of chemists furnish every day new agents "or allow of the perfecting of preparations already "known; hence the necessity for revising this "work at predetermined periods."

In respect to one subject, the constitution of the body to be entrusted with the revision of a national Pharmacopœia, the appearance of the Codex is most opportune, coming as it does just at the time when the pharmacists of this country are meditating to approach Parliament with a view of obtaining a coordinate position with medical practitioners in the Pharmacopœia Committee. It appears that according to the "loi de germinal an XI.," which strictly speaking should regulate the preparation of the Codex, it is provided that the Commission should be composed of Professors of the Faculty of Medicine and Professors of the School of Pharmacy; but in consequence of a report presented to King LOUIS PHILIPPE on the subject of the appointment of a Codex Commission in 1836, it was decided that "in order to increase the guarantees of knowledge and authority" the professors nominated to serve upon it should be selected from among the members of the Academy of Medicine. This arrangement was continued in the Commission that prepared the Codex of 1866, and the precedent thus established, might have been maintained in its successor. But the Ministers of Public Instruction and Fine Arts and of Agriculture and Commerce, in the report upon which the decree for the preparation of the present edition was based, expressly urged that this constitution of the Commission would be too restrictive and that in conforming to it too rigorously there would be a risk of losing the assistance of *savants* of considerable authority. It was also pointed out that the Commission of 1861 had been completed by the addition of a certain number of members of the Society of Pharmacy, with *voix consultative*, and it was recommended that a similar course should be then taken so that the pharmaciens of France should receive every desirable satisfaction. The Commission as eventually appointed consisted of the Medical Inspector-General (M. GAVARRET), who presided; the Director of the Paris School of Pharmacy (M. CHATIN), who was Vice-President; two officials of the Department of Higher Education; six Professors of the Paris Faculty of Medicine (MM. BAILLON, BOUCHARDAT, HAYEM, REGNAULD, GERMAIN SÉE and VULPIAN); six Professors of the Paris School of Pharmacy (MM. BAUDRIMONT, BOUIS, BOURGOIN, A. MILNE-EDWARDS, PLANCHON and RICHE); and six members of the Paris Society of Pharmacy (MM. BLONDEAU, who acted as Assistant Secretary, DUROZIEZ, JUNGFLEISCH, MARTY, SCHAEUFFELE and VIGIER). It needs but a glance at this list to perceive how fully it is in accord with the position taken up by the pharmacists of this country; for in it not only are the names of pharmacists associated, as such, in honourable fellowship with those of members of the medical profession, but even among the representatives of the medical faculty itself are to be noticed the names of men upon whom pharmacy has as at least an equal claim with medicine. Indeed, those who were privileged to attend the International Pharmaceutical Congress in London in 1881 will remember that M. PETIT, speaking of this Commission, stated that the greater part of the work was being done by the pharmacists belonging to it, the medical men rarely attending the sittings. Moreover, the Society of Pharmacy, among whose ranks so many members of the Commission were found, found itself in a position to render assistance without any loss of dignity. It promptly divided itself into twenty-four sub-committees, each charged to report upon a special subject; the reports were afterwards discussed in general meetings of the Society and the results were communicated to the Commission. In the Preface to the new work the value of these communications is acknowledged in flattering terms. It is worth mentioning also that there is every probability that in future this arrangement for profiting in France by the services of practical pharmacists will have a legal basis, since the Bill now before the French Legislature, as left by the Committee to which it was referred, provides for the presence on the Codex Commission of an equal number of professors in medical schools, professors in pharmaceutical schools and pharmacists engaged in practical pharmacy.

As it is proposed to review this work in a more detailed manner in another place it will not be necessary to enter into a close description of it here. It will suffice to say that considering the pertinacity and ability with which the idea of a Universal Pharmacopœia has been advocated by our *confrères* across the Channel this latest official pharmaceutical text-book of their own appears, upon a somewhat superficial examination, to show very little additional approximation towards the Pharmacopœias of other nations. The Codex remains—the Codex, with most of its known peculiarities and, may we say it, defects. An effort has been made to avoid the chaos involved in the previous edition by the scattering of eight or nine hundred articles through seventy-five chapters. But this is only a relative success and we venture to predict that for a long time to come the index will be the most frequently consulted portion of the work. The old form of nomenclature has been maintained, and this combined with an alphabetical arrangement brings together all the salts containing the same acid radical, a result which is, in our opinion, at least inconvenient in its consequences, since the salts of the same base,—quinine for instance,—are thus distributed at intervals through the whole section. Such points as these seem to be open to general criticism; but when we turn to the materia medica and the preparations we freely admit that the judgment of French experts as to the constitution of the French Codex is indisputable, and we shall be quite prepared to find that the pharmaceutical portion of the work is elaborated with the skill that has made French pharmacy famous.

THE ANNUAL DINNER.

A MEETING for making preliminary arrangements for this annual gathering was held at the Society's house on Wednesday last, and upwards of a hundred gentlemen having expressed their willingness to become Stewards, it was resolved that the Thirteenth Annual Dinner of the Members of the Society and their friends should be held on Tuesday, May 20, at the Holborn Restaurant, and that the price of each ticket should be one guinea. The tickets are to be obtained from the Honorary Secretary only.

The extra expenses of the dinner will be met by the Stewards, as last year, and as it is therefore desirable that that body should be not only representative, but as numerous as possible, it has been decided not to close the list of Stewards for publication until Wednesday, April 2.

A Committee, consisting of the President, the Vice-President, the Treasurer, Professor ATTFIELD, Dr. PAUL, and Messrs. FREDERICK BARRON, ISAIAH BOURDAS, E. NORTHWAY BUTT, THOMAS GREENISH, and WALTER HILLS, was appointed by the meeting and requested to make the necessary detailed arrangements. Mr. RICHARD BREMRIDGE was appointed Honorary Secretary to the Committee, and all communications respecting the dinner should be addressed to him, at 17, Bloomsbury Square.

An Evening Meeting of the North British Branch of the Pharmaceutical Society of Great Britain will be held on Wednesday next, in the Society's Rooms, 119A, George Street, Edinburgh, when a paper will be read on "Tincture of Hyoscyamus," by Mr. W. Gilmour, and two papers on "Spiritus Ætheris Nitrosi:" I. "Composition in Relation to Deterioration," by Mr. P. MacEwan; II. "Characters and Tests," by Mr. D. B. Dott.

* * *

From an official Statement of the Trade of British India that has just been issued it appears that the export trade in drugs of this dependency has doubled during the last five years, amounting in the year ending March 30, 1883, to about £130,000. As might be expected, the increase is due to the development in the trade in cinchona bark, which now represents about two-thirds of the total exports. During the last year the quantity of bark exported reached 641,608 lbs., whilst seven years previously it only amounted to 72,452 lbs. Madras contributed most largely to swell the exports, the cultivation of cinchona in that presidency being more extensively carried on in private estates than in Bengal, where the principal cinchona estates are the property of the Government, which reserves a large proportion of the bark produced for local alkaloid manufacture. Most of the bark hitherto exported has come to London, but the demand from Italy for Indian bark is increasing. The total out-turn of cinchona bark from the Government plantations in India during the year 1882-3 was 527,199 lbs. In Sikkim these plantations cover 2294 acres and contain upwards of five million plants. The Nilgiri plantations cover 847 acres and contain about a million plants. The private plantations in Sikkim are estimated to extend over 331 acres and possess over six hundred thousand plants. In the Nilgiris cinchona is cultivated in combination with coffee on private estates, but no returns exist as to the extent. In Coorg also there are more than a thousand acres under cultivation, containing another million plants.

* * *

The local manufacture of alkaloid, referred to in the previous paragraph, appears to be affecting seriously the import of quinine from Europe into India, as last year it fell to 7585 lbs. from 10,615 lbs. in the previous year. As matters now stand, it is officially stated in this report that imports of quinine on account of the Government have already practically ceased, and an opinion is expressed that in course of time quinine will be no longer imported into India, since that country will be able to supply all her own wants from the plantations of Darjeeling and the Nilgiris.

* * *

We learn from this same report that lac dye, once an important item in Indian trade, is disappearing from the exports, under the influence of the competition of other dyes. Lac is exported chiefly as shell-lac, and to a smaller extent as button-lack. Stick-lack, which is the unmanufactured form of lac, is now hardly exported. Another dyeing material, safflower, the cultivation of which once constituted an industry of some importance in Bengal, has also been almost driven out of the field by the competitors that have been pitted against it by modern science.

* * *

It would appear, however, that the chemical dyes are not everywhere to have all their own way, since the Government of Persia has issued a decree prohibiting the importation of aniline dyes into that country, on the ground that they have been found to exercise an injurious effect upon the textile industries. It is believed that if this prohibition be strictly enforced, Persian carpets will recover their former reputation in the European markets for durability of colour.

* * *

In a report from Mr. Consul Mansfield, of Caracas, on the mining districts of Venezuela, he states that the *Dipterix odorata*, which yields the fragrant seed commonly known as the tonquin bean, abounds in the forests of the Caracas district, where the trees grow to a considerable size. The first crop of "beans" is yielded in the third year of the plant, the fruit bearing some resemblance to a small mango, and containing in its centre the "bean," which emits a powerful odour. A full crop is not yielded until two years later. The tree is said to grow in any climate in Venezuela, but to attain a greater perfection in warm temperate zones, alike removed from parching heat or the sharp mountain breezes. Last year's crop was a large one; Venezuela alone exporting five thousand quintals at an average price of 3½ francs per pound. It is estimated that the bean is used for curing and flavouring eight million quintals annually of tobacco exported from the United States. The vanilla also grows wild in many of the forests of Guayana. It may be remembered that a sample of Guayana vanilla was mentioned as having been shown at the Vienna exhibition last year.

In the course of a lecture on "Science and Singing," delivered by Mr. Lennox Browne, F.R.C.S., at the last meeting of the Society for the Encouragement of the Fine Arts, reference was made to the statements that have been published in respect to a means for improving the voice by the use of a mixture containing peroxide of hydrogen and ammonia, which is said to produce artificially the effects of Italian air. Mr. Browne stated that even if peroxide of hydrogen were capable of producing the alleged wonderful effect upon the voice, he had failed to detect by delicate chemical tests the presence of that compound in a sample of the mixture obtained direct from the inventor, and that although the mixture contained a quantity of free ammonia, and that gas is capable of acting as a temporary stimulant, in his opinion such an effect would be followed by relaxation, which was likely to cause injury to the voice. He also added that this opinion, based upon physiological and therapeutical experience, had been confirmed by actual experiments upon vocalists.

* * *

In the Fourth Annual Report of the State Board of Health, Lunacy and Charity of Massachusetts, the body whose proceedings have recently disturbed the wholesale druggists of Boston, a considerable prominence is given to the subject of the adulteration of food and drugs. In an appendix extending over nearly a hundred pages, Professor Sharples discusses the general subject, and incidentally expresses the opinion that outside the single article of milk injurious adulteration is by no means common, and that fraudulent adulteration is but little more so. It may be mentioned that the Massachusetts Adulteration Act authorizes this Board to spend annually a sum not exceeding three thousand dollars in carrying out its provisions, two-fifths of which is to be spent in the enforcement of the law against the adulteration of milk.

* * *

Some time ago we mentioned that, in compliance with a request from the Planters' Association, the Government of Ceylon had given permission that prescriptions might be made up for Europeans at the hospitals and dispensaries connected with the Medical Aid Ordinance, on the payment of a fee covering the cost. Some little friction, however, appears to attend the carrying out of this permission, since the dispensers at these Government establishments refuse to recognize as a prescription any document not bearing the signature of a medical practitioner, whilst the planters contend that the permission should be construed to include private recipes.

* * *

It may interest some of our readers in the North to learn that a "Revised Edition" of the List of Prices recommended by the Committee of the Midland Counties Chemists and Druggists' Association has just been issued. We presume that copies may be obtained from Mr. C. Thompson, the Honorary Secretary of the Association, Birmingham.

* * *

At the next meeting of the Chemical Society, on Thursday, the 20th inst., there will be a ballot for the election of Fellows. The papers announced are, "Note on the Preparation of Marsh Gas," by Messrs. Gladstone and Tribe; and "On the Action of Dibrom-α-Napthol upon Amines," by Mr. R. Meldola.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

On Wednesday, the 5th inst., the monthly meeting of the Council was held at three o'clock.

Present—The President, Mr. James E. Brunker, M.A., in the chair; Mr. H. N. Draper, F.C.S. (Vice-President); Drs. Collins and Montgomery; Messrs. John Evans, Grindley, Hayes, Hodgson, Simpson, Professor Tichborne and Mr. Wells.

The minutes of the last meeting were read and confirmed.

A letter was read from Mr. William J. Smyth, of 14, Newington Street, Belfast, asking whether he would be admitted to examination.

The President said Mr. Smyth applied to be admitted at the last examination, but the Certificate Committee did not feel at liberty to pass his certificate, because he had served in an establishment analogous to that of Mr. Hardy. The decision, however, which had since been arrived at in the case of Mr. Hardy covered that of Mr. W. C. Dobbin, who had signed Mr. Smyth's certificate; so that the reply to be given to Mr. Smyth was that he would be allowed to come in at the next examination.

On the motion of Mr. Hayes, seconded by Mr. John Evans, it was resolved that Mr. Smyth be informed that he may present himself at the next examination.

A letter was read from Dr. R. Crossitt, of Cookstown, county of Tyrone, asking whether the matriculation examination of the Queen's College, Belfast, which a Mr. Craig had passed, would be accepted in lieu of the Preliminary examination of the Pharmaceutical Society.

The President: The Registrar having made inquiries has found that this examination is accepted by the General Medical Council, therefore we must accept it under our bye-law.

The Registrar was directed to write to Dr. Crossitt accordingly.

A letter was received from Mr. James N. Hardy, defending the course of action which he had taken relative to opening a compounding department in the house of Beater and Co.

On the motion of Dr. Montgomery, seconded by Mr. Simpson, the letter was directed to be marked "read."

Dr. Montgomery moved, pursuant to notice, that the duties of the Visitors at the examinations should be defined. His object was to elicit the opinions of the members of the Council as to whether the Visitors should not take a more active part than they had hitherto done at the examinations. Should they act as the assessors who assisted in other examining bodies and give their opinions on any complications that arose? In the Apothecaries' Hall examination the assessor was present at the entire of it, and when it was over he took part with the examiners in deciding what the marks were to be. He did not mean to offer any positive proposal now.

The President: Would not the best course be to refer the subject to the Committee of Examinations for them to report on it? I think the introduction of something in the shape of an assessor would be very useful.

Mr. Grindley: Does the President of the English Society take part in the examinations?

The President: The President and another member of the Council of the English Society are always present at the examinations as well as the Inspector of the Board of Trade, who is assessor. The Lord Lieutenant has power to appoint a similar officer in this country but he has never done so. It might be well for the Committee to consider whether an application should not be made to the Lord Lieutenant on the subject.

The Vice-President said there were other matters also in respect of which he was sorry that their practice had not been assimilated to that of the English Society.

Mr. Grindley: Does the President of the English Society interfere in the examinations there?

The President: I cannot say that he interferes in the examinations, but he is always present at them.

Dr. Montgomery moved that the Visitors of the Examinations be requested to report on the question of the visitation of the examinations, and to suggest what the functions of the Visitors should be.

Mr. Evans seconded the motion, which was agreed to.

The Registrar read a report from the Pharmacy Act Amendment Committee, containing a *résumé* of the proposed amendments and the reasons for them.

Mr. Grindley said there was a rule that reports of Committees should be on the table for a month before they were discussed. This report involved vital changes, and it should not be sent forward to the Chief Secretary as representing the opinions of the entire Society without full consideration.

The President said he thought the Council would be quite in order in considering this report now. There was really nothing in these recommendations that had not received the sanction of the Council already. The report was simply a document for the information of the Chief Secretary, based on the opinions already expressed by the Council.

Professor Tichborne said they would be quite in order in considering the report now. What Mr. Grindley wanted was to have the recommendations carefully considered, and the best way of securing that would be to order the report to be printed and distributed amongst the members, and then it could be considered at the next meeting.

Mr. Hayes: Has not this matter been thoroughly threshed out already? I do not see why we should postpone it now.

The President said it was in the power of the Council to postpone the discussion of the report, but it was very important that the recommendations should be in the hands of the Chief Secretary as soon as possible. They would have to go into the hands of the Government draftsman; and it would perhaps be August before a Bill would be in shape. The English Bill was at present in the hands of the Government, and might be read any day. The Chief Secretary had said that if it were not opposed it might be taken up at once. It was very desirable that Parliament should deal with the two Bills at the same time.

Mr. Grindley said a matter which dealt with the rights and privileges of the members and licentiates of the Society ought not to be rushed forward.

The President: It has been under consideration for the last four years.

Mr. Grindley moved that the report be printed and circulated amongst the members of the Council, and that the consideration of it be taken up at the next stated meeting of the Council.

Mr. Wells seconded the motion, which was agreed to.

A report of the Committee on the supply of the Journal to the members of the Society was read.

On the motion of Mr. Hodgson, seconded by Dr. Collins, it was resolved to request the Pharmaceutical Society of Great Britain to supply the Journal to the present members of the Society for an annual payment of £20.

A report was read from the Law Committee in reference to a letter which had been referred to them from Mr. Robert J. Downes, suggesting alterations in the byelaws of the Society. The report stated that some of the suggestions were unsuitable, and that the rest had been already dealt with.

On the motion of Mr. Hodgson, seconded by Mr. Grindley, the report was adopted.

Mr. Cornelius Mannin, 2, Great Brunswick Street, Dublin, was elected a member of the Society.

Some accounts were ordered to be paid, after which the Council adjourned.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The ninth general meeting of the thirty-fifth session was held at the Royal Institution, February 14, 1884. Mr. Edward Davies, President, in the chair.

The minutes of the previous meeting were read and confirmed and the following donations to the Library and Museum were announced:—'The Transactions of the Literary and Philosophical Society of Liverpool,' for years 1880 to 1883, from the Society.

Mr. Lorne J. M. Campbell was then unanimously elected as member.

Dr. Symes stated that Drs. Cook and Watkins, of Bay View Asylum, Baltimore, had reported in the *Medical News* that, while treating a number of malarial cases and testing the urine of the patients daily, they had been surprised to find that, on the addition of picric acid, in each case a flocculent precipitate was formed, which could readily be mistaken for albumen. The patients were taking either quinine or cinchonidine, and it was found on experiment, that sufficient of the alkaloid passed through the system unchanged to bring about the result. Dr. Symes said picric acid was a very popular test with medical men in this country, notwithstanding that greater precautions were necessary in using it, than the old test, nitric acid. For example, it had been shown by Dr. Batten (*Lancet*, Nov. 11, 1882) that any excess of albuminous urine redissolved the precipitates and also that potash salts present would cause a precipitate. His chief object in bringing the matter forward was to show that most of the difficulties connected with the use of picric acid as a test for albumen in urine could be surmounted by observing two points, viz.:—always to use an excess of the reagent, and always to apply heat. He had pointed out, on a previous occasion, the necessity for the urine being decidedly acid. Dr. Symes's remarks were accompanied by experiments demonstrating these facts.

Mr. A. C. Abraham said that the writer to whom Dr. Symes had referred had evidently paid very little attention to the details of this test as devised by the originator, Dr. Johnson, who most emphatically insisted upon the necessity of boiling after the addition of the picric acid solutions. In his (Mr. Abraham's) experience, the addition of citric acid was in some cases also necessary, when the urine was not decidedly acid, although Dr. Johnson did not recommend this, unless the sample was neutral or lkaline.

The discussion on this subject was continued by Mr. Davies and Mr. Ward, and Dr. Symes was thanked for drawing attention to it.

Mr. Richard Parkinson mentioned that on taking into use a fourteen pounds parcel of powdered African ginger, which had been some time in stock, he noticed that the paper was much stained with some substance of the nature of a resin and desired to know the cause.

Mr. Conroy, in reply, stated that African ginger contained a much greater proportion of oleoresin than the Cochin or Jamaica varieties and this had possibly caused the appearance on the wrapper alluded to, though it was more probably due to the addition of oil during grinding. African ginger was the kind usually selected for manufacture of gingerine.

The President then called on Mr. M. Conroy, F.C.S., to read some "Notes on some New American Drugs and their Nature and Properties."

The specimens shown and described were twelve in number as follows:—

Stillingia.—Root of *Stillingia sylvatica* (queen's root, queen's delight, yaw root): nat. ord. *Euphorbiaceæ.* This root possesses a peculiar, unpleasant odour, and a bitter, acrid, pungent taste. In large doses it is emetic and cathartic, in small doses alterative. It is coming into demand in this country, and is said to be a very valuable agent in the treatment of syphilitic affections. The preparation most in demandis the fluid extract.

Leptandra.—Rhizome and rootlets of *Leptandra Virginica* (Culver's root, black root, physic root): nat. ord. *Scrophulariaceæ.* The odour is feeble and not disagreeable; the taste bitter, somewhat nauseous and acrid. The freshly gathered root is said to act violently as a cathartic. In the dried state it is much milder. Used in the United States as a laxative and tonic in bilious complaints. The eclectic practitioners consider it an excellent cholagogue, and use both the impure resin, which they call "leptandrin," and the root itself as a substitute for mercurials.

Castanea.—The leaves of *Castanea vesca* (chestnut): nat. ord. *Cupuliferæ.* Used in the treatment of whooping cough, but their therapeutic value seems to be much disputed. The leaves possess a slight odour and a somewhat astringent taste.

Gossypii Radicis Cortex.—The bark of the root of *Gossypium herbaceum*, and other species of *Gossypium* (cotton plant root): nat. ord. *Malvaceæ.* Dr. Bouchelle, of Mississippi, considers it to be an excellent emmenagogue, and not inferior to ergot in promoting uterine contraction. Dr. T. J. Shaw, Tennessee, thinks it superior in the treatment of amenorrhœa to any other emmenagogue, and equal to ergot as a parturient, while attended with less danger.

Viburnum. — The bark of *Viburnum prunifolium* (black haw): nat. ord. *Caprifoliaceæ.* Taste, slightly astringent and bitter; odourless. Said to be valuable in diarrhœa and dysentery. Recommended also in nervous disorders of pregnancy, and as peculiarly efficacious in preventing miscarriage.

Euonymus.—The bark of *Euonymus atropurpureus* (Wahoo, arrow wood, etc.): nat. ord. *Celastraceæ.* Said to be useful in intermittents, dyspepsia, torpid liver, constipation and dropsy; but on the whole the character of its action is said to be uncertain.

Grindelia.—The leaves and flowering tops of *Grindelia robusta* (hardy *Grindelia*, rosin weed): nat. ord. *Compositæ.* *Grindelia* has a balsamic odour, and a pungently aromatic and bitter taste. In America it is much used in the treatment of asthma, whooping cough and bronchitis, and in the former disease it has acquired great repute.

Chimaphila.—The leaves of *Chimaphila umbellata* (pipsissewa, prince's pine, wintergreen): nat. ord. *Ericaceæ.* The taste of the leaves is pleasantly bitter, astringent and sweetish. They are diuretic, tonic and astringent, and were employed by the American Indians in various complaints, especially scrofula, rheumatism and nephritic affections. It is now used in the treatment of dropsy.

Cimicifuga.—The rhizome and rootlets of *Cimicifuga racemosa* (black snake root, black cohosh): nat. ord. *Ranunculaceæ.* Said to be very useful in rheumatism, also in lumbago, sciatica, etc. Better known in England as *Actæa racemosa.*

Cypripedium.—The rhizome and rootlets of *Cypripedium parviflorum* (ladies' slipper, moccasin root); nat. ord. *Orchidaceæ.* The odour is heavy and unpleasant, and the taste sweetish, pungent and bitter. Used as a gentle nervous stimulant or antispasmodic. It has been used for the same purposes as valerian, but is said to be less powerful. Said to be useful in epilepsy.

Rhamnus Purshiana (*Cascara sagrada*), nat. ord. *Rhamnaceæ.*—The demand for this bark and its preparations has lately been considerable in this country. It is said to possess tonic laxative properties. Cathartic in large doses; stomachic and tonic in small.

Xanthoxylum.—The barks of *Xanthoxylum fraxineum* and *Xanthoxylum Carolinianum* are official in the U. S. Pharmacopœia under this title. Nearly inodorous, bitter, and very pungent.

Xanthoxylum is stimulant, producing when swallowed a sense of heat in the stomach with more or less arterial excitement. It is said to resemble mezereon and guaiacum in its remedial action. As a remedy in chronic rheumatism it enjoys considerable reputation in America. The bark used as a masticatory is a popular remedy for toothache.

Mr. Conroy described the nature and properties of each specimen and its medical and therapeutical uses, and in conclusion said that the specimens were collected by Messrs. Evans, Sons and Co., who requested him to offer them to the Association as a gift to its museum.

Mr. R. Parkinson said he had much pleasure in moving a vote of thanks to Mr. Conroy for his interesting paper, and also to Messrs. Evans for the gift of the specimens.

Mr. A. C. Abraham seconded the motion, and made some remarks on one or two of the specimens.

The discussion was continued by Dr. Symes, Messrs. J. S. Ward, A. H. Samuel and Davies, and the motion on being put was carried unanimously. Mr. Conroy having briefly replied, the meeting terminated.

ABERDEEN CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

At the weekly meeting of this Association, held on Friday, the 7th inst., in the Café, Aberdeen, the President, in the name of the Association, presented Mr. G. D. Bowie, Secretary of the Association, who is leaving to fill a situation in Stonehaven, with an address expressing appreciation of the services rendered to the Association in his capacity of Secretary, and also of his general character and ability.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The ninth meeting of the present session was held in the Pharmaceutical Society's rooms, 119A, George Street, on Thursday evening, February 28, at 9.15, Mr. C. F. Henry in the chair.

The minutes of the former meeting were read and confirmed, after which Mr. Peter Boa read a paper on "The Cultivation of Taste in the Practice of Pharmacy." In introducing the subject the essayist showed that the pharmacist is generally looked upon by the public as a man of taste. This he held to be due primarily to the fact that pharmacies as a rule are neatly furnished and have a air of refinement. But, although the environments of the pharmacist may show good taste, it is quite possible that this may be due to the skill of the cabinet maker, by whose judgment he has been guided. The true indication of good taste on the part of the pharmacist is found in the manner in which he finishes his work; he may be scientifically accurate in his manipulations, but if he send out slovenly done-up parcels, written directions, etc., he puts before his customer causes for reflection and mistrust. In fact, a patient cannot judge of the contents of a bottle; but if it be delivered to him in a condition which shows that care and good taste have been exercised in finishing it off, he judges that equal care has been exercised in the professional part of the transaction. The essayist, therefore, held that in pharmacy, cultivation of taste should begin with pupilage, and if the pupil be trained to perform well those parts of his work upon which the public sums its judgment, he is brought into a groove which leads him to exercise accuracy and good taste in the purely pharmaceutical part. The essayist then expressed his thoughts on the selection and use of corks, labels, paper, twine, sealing wax and address stamps, and placed on the table several examples of gross violation of good taste on the part of pharmacists, in that department.

The essay was well received by a large audience, and on the motion of the President, seconded by Mr. MacEwan, a hearty vote of thanks was awarded to Mr. Boa.

A long and animated discussion followed, in which Messrs. Crowden, Duncan, Hill, Robertson, Simpson, Turnbull, and others took part, Owing to the lateness of the hour, the other business was delayed until the next meeting, which was held on Wednesday, March 5.

At this meeting, Mr. Boa presided, and after the minutes of the former meeting had been read and confirmed, Mr. J. B. Dunlop read a paper on "Pharmacopœial Natural History," in the course of which he gave a very interesting account of the various animal substances of materia medica, a special feature of the paper being a series of artistic drawings executed by Mr. Jardine, an apprentice member of the Association. The paper was further illustrated by typical specimens of the drugs treated of. A vote of thanks was awarded to Mr. Dunlop, and a discussion followed in which several members took part.

Mr. A. H. Simpson then introduced a proposed resolution that the papers read before the Association should be printed at the end of each session, and moved that the Committee of the Association should be instructed to consider the matter in its details, and report. The motion was seconded by Mr. Hill and agreed to.

After several queries had been replied to, notice of others was given for next meeting, which will be held on March 26, when Mr. W. S. Turnbull will read a paper on "Elementary Botany," intended for the guidance of those preparing for examinations.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on March 6. Dr. W. H. Perkin, F.R.S., President, in the chair.

It was announced that a ballot for the election of Fellows would take place at the next meeting of the Society (March 20).

The following certificates were read for the first time:—Messrs. G. C. Bose, J. P. Battershall, W. D. Crumbie, W. J. Grey, H. G. Greenish, J. H. Wainwright.

Dr. Miller then read a paper, entitled—

Studies on Sulphonic Acids. No. I. *On the Hydrolysis of Sulphonic Acids, and on the Recovery of Benzenes from their Sulphonic Acids.* By H. E. Armstrong and A. K. Miller. The authors were led investigate the behaviour of sulphonic acids on distillation with sulphuric acid, in the course of a study of the hydrocarbons resulting from the action of dehydrating agents upon camphor, their primary object being the separation of the 1:2:3:5 tetramethylbenzene. It appeared, from various considerations, probable that this body would form a highly unstable sulphonic acid. It was found on passing steam into the sulphuric acid solution of the mixtures of hydrocarbons from camphor that all the benzenes could in this way be recovered. The method consists in passing steam through the solution of sulphonic acid or sulphonate in sulphuric acid, the acid solution being heated and mainmained at the temperature at which hydrolysis takes place with fair rapidity. A weight of acid was usually employed equal to that of the sulphonate taken. Apparently no decomposition of any of the benzenes takes place, and the yield of hydrocarbon may be said to be theoretical. The authors give the following list of sulphonic acids used, and the temperature of initial hydrolysis:—Benzensulphonic acid, 175°; toluenparasulphonic acid, 150°; metaxylensulphonic acid, 120°; orthoxylensulphonic acid, 120°; paraxylensulphonic acid, 120°; pseudocumene sulphonic acid, 115°; mesitylensulphonic acid, 100°; cymensulphonic, 130°; 1:2:3:5 tetramethylbenzensulphonic acid, 120°; metamethylisopropylbenzensulphonic acid, 120°; 1:2:4 dimethylethylbenzensulphonicacid, 120°. From their results the authors believe that it will be possible to separate many hydrocarbons by this "fractional hydrolysis" from mixtures of their sulphonic acids. The authors give some results in which the rate of hydrolysis at different temperatures has been studied. They are about to investigate the influence of pressure on the rate of hydrolysis.

Dr. Tilden asked if there appeared to be any relation between the composition of the sulphonic acids and the temperatures at which they were decomposed,

Dr. Armstrong said that sufficient data had not yet been obtained, but apparently the simpler the constitution the less readily did decomposition take place. He also mentioned that in many cases fractional distillation completely failed as a method for purifying hydrocarbons, principally because bodies belonging to different series, but having the same boiling point, were often present in the same mixture. By the above method this difficulty might be overcome. The excess of hot strong sulphuric acid was also advantageous in carbonizing some hydrocarbons present as impurities.

The Secretary then read a paper—

On a Relation between the Critical Temperatures of Bodies and their Thermal Expansions as Liquids. By T. E. Thorpe and A. W. Rücker.—From Van der Waals' investigations it appears that the want of similarity between the formulæ which express the expansions of liquids is due to the fact that their initial point is, in general, the arbitrarily-selected temperature of melting ice; uniformity of mathematical expression can only be attained, if, in each case, the temperature is expressed, not in ordinary thermometric degrees, but as a fraction of the absolute boiling point of the substance. It is thus possible to obtain the law of the thermal expansion of any one liquid from that of any other, if their critical temperatures be known. Mendelejeff, in a paper recently read before the Chemical Society, gave an extremely simple and accurate empirical formula for the expansion of liquids. One of the conclusions at which Van der Waals arrives is that the product of the coefficient of expansion under constant pressure into the absolute critical temperature is, at corresponding temperatures, the same for all bodies. By combining these two formulæ the authors arrive at a formula, which may be expressed in words as follows:—The density of a liquid is proportional to the number obtained by subtracting its absolute temperature from its absolute critical temperature, multiplied by a constant which is the same for all substances. The values of this constant in the case of the substances for which the necessary experimental data exist are almost identical, and approach very closely; therefore the above expression can be further simplified thus: The density of a liquid is very nearly proportional to the number obtained by subtracting its absolute temperature from twice its absolute critical temperature. If further investigation proves that the range of variations in the above constant is small, the expression already given affords a ready and valuable means of calculating the critical temperatures of bodies from observations on their expansions as liquids.

Dr. Hugo Müller then took the chair, while Dr. Perkin read a communication entitled—

Remarks on the Densities of Members of Homologous Series.—An investigation, in which the author has been for some time engaged, necessitated the determination of the densities of an extended series of carefully prepared products, especially the acids and ethers of the fatty series. On examining these results they exhibited a relationship to each other; the results were therefore plotted in curves, in which the numbers of carbon atoms were used as abscissæ, and a scale of numbers, embracing those of the densities, as ordinates. The curves so obtained are regular, and the dots representing the experimental numbers are either on or close to the curves, and it is obvious, from an inspection of the curves, that the densities of the homologous acids and ethers follow a regular law.

Dr. Tilden remarked that there were singular irregularities as regards the physical properties, for instance melting points, in some of the homologous series.

Dr. Armstrong suggested that in the case of formic and acetic acids this might be explained by supposing that the influence of the hydrocarbon portion of the acid was small compared to that of the oxatylic portion; and again we had no evidence to prove that the formula of acetic acid was not more complicated than $\left\{\begin{matrix} CH_3 \\ COOH. \end{matrix}\right.$ If a formula could be calculated for Dr. Perkin's curves it might be most valuable in discriminating isomeric acids.

Dr. Perkin said that as regards magnetic rotation formic and acetic acids, seemed to be outside the fatty acid series, which seemed to commence with propionic acid.

Mr. Farrington then read a—

Note on some Experiments made at the Munster Agricultural School to determine the value of Ensilage as a Milk and Butter-producing Food.—Two cows were fed for a week upon ensilage and five lbs. of meal, and for a second week upon a mixed food of carrots, beet, hay and oats. The total quantity of milk obtained with the ensilage was 433½ lbs., giving 1 lb. of butter from 33 of milk; with the ordinary food 414½ lbs. of milk yielding 1 lb. of butter to 34·5 from milk were obtained. The butter from the ensilage was inferior in quality. The author states that 84 lbs. of ensilage replaced 25 lbs. of hay, and that the expense of making hay and its equivalent of ensilage was equal, but that the use of ensilage effected a saving for each cow daily of two stone of roots and ¼ bushel of grains. The total solids and cream in the milk were estimated. In answer to some questions of Mr. Warington the author stated that he was unable to give the basis upon which the equivalent quantities of hay and ensilage were calculated, and did not know whether the grass was compounded of the same materials (grass, vetches, etc.) as the ensilage.

The Secretary then read a—

Note on the Behaviour (I.) *of the Nitrogen of Coal during Destructive Distillation; and* (II.) *a Comparison of the Amounts of Nitrogen left in Cokes of various Origin.* By Watson Smith. — Professor Foster, in a recent paper (*Chem. Soc. Jour. Trans.*, 1883, 110), states "I have not made any experiments on the amount of nitrogen in tar, nor am I in possession of any information on the subject. I have assumed that the quantity is relatively small." The author of the present paper has investigated the subject, having observed in 1868 that ammonia was frequently formed during the distillation of coal tar. He has obtained the following numbers: nitrogen in the tar 1·667 per cent.; in crude benzene from the tar 2·327; in "light oil" 2·186; in creasote oil 2·005; in "red oil" 2·194; in the pitch 1·595. The author has also estimated the amounts of nitrogen in three cokes, *a.* ordinary gas coke, *b.* Beehive metallurgical coke, *c.* a hard compact metallurgical coke from Simon Carve's oven. *a.* contained 1·375 per cent; *b.* 0·511; *c.* 0·384 per cent. of nftrogen.

Mr. E. W. Voelcker said, in some experiments which he had recently made, he had found that it was impossible to get rid of the whole of the nitrogen by carbonizing such bodies as peat, charcoal, etc., even when very high temperatures were used. These results seemed to have an important bearing on the analysis of nitrogenous bodies by the soda lime method; when manures from such substances as blood, fish guano, etc. were analysed, if any lumps formed the whole of the nitrogen could not be obtained.

Mr. Groves said that no statement was made as to where the coke came from, whether from the middle or sides of the oven. The middle portion of the coke being subjected to a much lower temperatures than the coke at the sides might be expected to contain more nitrogen.

On a Hitherto Unnoticed Constituent of Tobacco. By

T. J. Savery.—Whilst examining some tobacco for sugar, a substance was noticed in the aqueous solution which reduced Fehling's solution. This body was almost completely removed by clarification with subacetate of lead and the resulting liquid was free from sugar. The author succeeded in isolating this reducing substance by precipitation with subacetate of lead, decomposition with sulphuretted hydrogen, etc. The substance gave a green coloration with ferric chloride, changing to red on the addition of potash; with ferrous sulphate alone no change was produced, but when this reagent was added with ammonia, a dark brown colour appeared. A purer product from unmanufactured tobacco gave the same reactions and developed a red colour with strong sulphuric acid, changing to a claret on the addition of a trace of nitric acid. A green colour was produced with either potash or ammonia. The substance precipitated hydrochlorides of quinine and cinchonine. The author concludes that the body is closely allied to caffetannic acid and names it tabacotannic acid. No analyses are given.

The Society then adjourned to March 20, when a ballot for the election of Fellows will be held, and a "Note on the Preparation of Marsh Gas," by Dr. Gladstone and Mr. Tribe will be read.

Parliamentary and Law Proceedings.

The Dispening of Large Doses of Ergot.

An adjourned inquest, touching the death of a woman named Sarah Ballinger, was held on Monday last at Cheltenham, before Mr. Coren. The woman was living apart from her husband, and the proceedings at the inquest with respect to the dispensing of certain prescriptions may present points of interest to our readers.

Mr. Boughton, the medical practitioner who attended the deceased, being recalled, stated that he thought the deceased was suffering from a kind of fibroid tumour, which had been growing, he thought, for about three months. Such a tumour would not always leave traces when it came away. The reason he saw deceased three or four times a day during the last fortnight was because she was so much worse. She was very intermittent in her illness, and during the last week he thought the case was a very serious one. He thought about a week before her death that she would not recover. The applications he used were carbolic acid and Condy's fluid, and Dr. Kirkland used the latter. A fibroid tumour could be removed without an operation.

Mr. Hands, chemist, here, at the request of the Coroner, produced some prescriptions, and Mr. Boughton admitted the initials to them. The Coroner showed the witness one document, and asked if it was in his handwriting. Without examining it, Mr. Boughton said it was.

Mr. Boughton was then questioned as to the nature of the prescriptions.

The Coroner then pointed to a prescription, and asked the witness whether it could not be used for an unlawful purpose.

Witness: It could not, and certainly not in the dose there. It it a small dose.

Mr. Coren then asked the witness if he knew the Mrs. Roberts to whom the prescription was given?

Witness: No, I am sure I do not.

The Coroner: Do you know anyone named Roberts living at Bristol Road, Gloucester?

Witness: No.

The Coroner: You keep no books, and, therefore, cannot tell anything about it?

Witness: No, sir, I cannot. The doses were moderate.

Having cautioned the witness, Mr. Coren asked: Was that prescription not given for an unlawful purpose?

Witness: No, sir, decidedly not.

The Coroner: Would it have that effect?

Witness: No, sir, I do not think it would in that dose.

The Coroner: I think it is due to the chemist to say that he did not dispense that prescription, but gave something of a different character.

Mr. Heath: May I ask who that was?

The Coroner: Mr. Hunt, of Gloucester. I think it is only right I should state this, and I have a copy of the prescription made up by Mr. Hunt in lieu of that given by Mr. Boughton. Here are the two documents, and I merely make the explanation.

The witness's examination was then resumed. In reply to questions he said his practice was mostly amongst women and children. The prescription to Mrs. Roberts was given for a purely lawful purpose, and was not in excess of the dose permitted by the Pharmacopœia.

By Mr. Heath: It was quite possible that he should have given the prescription read to a Mrs. Roberts, whom he might have known nothing about. He had no remembrance of the woman calling herself Roberts for whom he wrote that prescription, and as a matter of practice he often gave prescriptions to persons whom he did not know before. He had had special practice in these cases, and might therefore give stronger prescriptions in this particular class of disease than other men might do; and this Mrs. Roberts might have been suffering from a tumour such as the deceased was suffering from. When deceased first came to him he was in some little doubt as to the exact nature of the complaint from which she was suffering. It took him a fortnight to discover what the exact tumour was, though he had the opinion all along that a formation would have to be removed. If the deceased had been pregnant when he first examined her, there would not have been the symptoms of which he had previously spoken. Dr. Kirkland was called in at the request of the relatives, who gave him the money to pay the fee. When the first prescription was made up he told the woman of the house to ask the dispenser to moderate the ingredients. He was attending another patient at the time at 2, Granville Street, and they both had a dose of the same medicine. In all the prescriptions he had followed the Pharmacopœia in such cases.

Mr. Clark: These prescriptions you gave seem to have been made up by no less than three separate chemists—Mr. Hands, Mr. Board, and Mr. Spiers—within a month.—Yes, they were.

Did you direct them to be taken to those various places?—I did.

For what reason?—I had no particular reason at all.

Is it usual for a medical man to write out his prescription, and in the space of one month to send to three different chemists?—Yes, if he likes.

In your particular line?—Yes.

In reply to a Juryman, witness said the dose given to Mrs. Ballinger was one-third less than that given in Mrs. Roberts's prescription.

Mr. William Hands, chemist, High Street, produced prescriptions dated the 31st of January and the 22nd of February. The first prescription was brought when he was out, but he dispensed it, altering it a little. He thought the dose of ergota too large, and he put half an ounce instead of two ounces as mentioned in the certificate.

The Coroner: Then in point of fact you put a fourth of the dose.

Witness replied that was so. He thought that Mr. Boughton had made a mistake, and he explained it to him afterwards. That was the only alteration he made. One was a simple tonic mixture, and was dispensed according to the prescription. He should like to remark that he had received dangerous prescriptions from other medical men in the town. For instance, he was once ordered to put 16 grains of strychnine in sixteen pills, and he had to consult the doctor before he did it.

The Coroner said there was no doubt medical men were liable to mistakes, as in the recent death at the Infirmary at Gloucester, where the patient died from an overdose.

The Coroner then asked the witness to examine the other prescriptions put in which were dispensed by other chemists. After examining them he said that he should not have dispensed one of them (the prescription given to Mrs. Roberts) without first asking Mr. Boughton.

The Coroner: Would you give me your opinion of that prescription?

Mr. Hands: I would rather not. There are medical men here, who would speak better than I can.

The Coroner: Of course I should not like to press you.

Mr. Hands: I do not know the nature of the case prescribed for.

The Coroner: I can ask you this, Would you dispense it?

Mr. Hands: No, sir. Not without consulting the medical man who wrote it.

A juryman (Mr. Gallop) asked the witness if the reason why he did not dispense the dose as originally prescribed was because it was a dangerous one.

Mr. Hands replied that he would rather not answer. It was a question for the medical men.

Another juryman (Mr. Smith): May we take it that as the witness refused to dispense in that quantity he considered it dangerous?

Mr. Hands: Well, it is not a usual dose.

Mr. Thomas Francis Board, chemist, High Street, identified two bottles containing medicines found in the bed room in which the deceased died as having been dispensed at his shop. He said he held no prescriptions from Mr. Boughton, but he remembered giving the larger bottle of mixture, and the small bottle of mixture produced, to Mr. Boughton. He made up the contents of the large bottle from verbal directions given to him by Mr. Boughton. It contained 40 grains of quinine, with a little acid to dissolve it. This made a powerful tonic, but there was nothing dangerous in it. The small bottle was also made up at the request of Mr. Boughton, and someone called afterwards for it. It contained a drachm of a preparation of opium, and was a usual dose.

Francis John Spiers, in reply to the Coroner, said he was not a chemist or a dispenser. He kept a chemist's shop in the High Street, which belonged to his father, who was a qualified dispenser. He had not passed any examination as dispenser, but he was reading for it. He served an apprenticeship with Mr. Gibbon, and was dispenser at the Dispensary. His father was responsible for the shop. He dispensed two of the prescriptions. (These were stated by the Coroner to be of an ordinary character.)

Mr. Edward Pearce Spiers, chemist, High Street, said that he dispensed prescription No. 1, but not as written. He was desired by the person who came for it to modify the dose. The prescription was for two ounces of liquid extract of ergota, and though he gave half the quantity, that which he gave was of the same strength as required by the prescription.

Dr. Kirkland, recalled, stated that he saw the deceased on the Sunday morning before her death. She was semiconscious. He asked the deceased if she had had a premature birth recently, and she said "No; four or five months ago." He believed the deceased was suffering from blood poisoning of an acute character. If the deceased had had what she said she had three or four months previously he should, under certain circumstances, have anticipated that the same symptoms would have been observed. That, in fact, was his diagnosis of the case, formed from the history given of it by Mr. Boughton. The latter said that he thought he had removed a tumour from the deceased, who was feverish afterwards, and he could not quite understand it. The fact that a tumour had been removed would not necessarily be observable in a *post-mortem* examination. A tumour would be treated by drugs, and ergota would probably be used. He attended the deceased on behalf of Mr. Arkell, a relative of the deceased. Having looked at the prescriptions, witness said that prescription No. 1 was a pharmaceutical dose, and so was No. 4, and there was nothing special about the other prescriptions given in the case. Ergota would be quite properly given for a fibroid tumour. Three of the ingredients in No. 6 (Mrs. Roberts's) were rather large doses, larger than he should give.

The witness was examined at great length on the medical aspect of the case. He stated in reply to the Coroner that the same means and the same medicines used in this case, to remove a supposed tumour, might have been effectual for another purpose. From the symptoms he thought himself that a premature birth had taken place, and it might have been recently, or three months ago.

At this stage the inquiry was adjourned.—*From the Cheltenham Examiner.*

Poisoning by "Naphthine."

The *Northern Whig* of Wednesday reports an inquest held in Belfast touching the death of Mrs. Mary Ann Thomson, the wife of Deputy Surgeon-General Thomson. According to the evidence Mrs. Thomson had conceived an unwarranted jealousy respecting her husband, which caused her to behave strangely, and on the previous Friday he came to the conclusion that she had taken poison. Medical assistance was obtained, but considerable difficulty was experienced in procuring a stomach pump that was in order. An emetic of mustard and water was in the meantime administered, but all the efforts to save the lady's life were futile, and Mrs. Thomson died about eleven o'clock. The *Northern Whig* goes on to say that it was ascertained at the inquest that deceased had partaken of chloral, and it further appeared that in the early part of last week she drove in a cab to the establishment of Messrs. Grattan and Co., Corn Market, and there purchased a quantity of naphthine (*sic*), the value which, together with a small hypodermic instrument for the purpose of injection, was £2. She produced a copy of a medical work, and said she wanted two bottles of the naphthine for a friend in India, and that it would require to be carefully packed in a box so that it might be conveyed to its destination in safety. It seems that the assistant in the shop, after some consultation with the manager, supplied the lady with the naphthine, without obtaining from her any signature, and that she thereupon drove off. On the night after Mrs. Thomson died, her husband and Dr. Arnold, on searching the bedroom, discovered in her wardrobe one of the two bottles in which she had received the naphthine, and subsequently found the box in which the bottles had been packed.

A good deal of discussion took place at the inquest as to the propriety of supplying such a large quantity of poisonous liquid to a stranger, and the Coroner considered it advisable to send for Mr. Yoxall, the manager of Messrs. Grattan's establishment in Corn Market. This gentleman, on his arrival, pointed out that the Act of Parliament did not require the seller to obtain signatures for this particular fluid.

The Coroner objected in very strong terms to such a large quantity of it being given to any person who was unknown to them, and said that, although the establishment of Messrs. Grattan, as they all admitted, was one of the finest and best conducted of the kind in the three kingdoms, yet they must be careful not to allow a repetition of such an occurrence.

After considerable discussion regarding the various features of the case, the Jury returned a verdict to the effect that Mrs. Thomson had committed suicide by partaking of poisonous fluids whilst in a state of unsound mind.

Fatal Dispensing Mistake.—Committal of an Assistant for Manslaughter.

An inquest was opened on Tuesday, the 4th inst., at Bristol, before Mr. H. S. Wasbrough, city coroner, into the circumstances attending the death of Eliza Vowles, a married woman, thirty-three years of age, whose death was alleged to have been caused by an ipecacuanha powder being made up for her by a chemist's assistant, instead of jalap powder. Several witnesses were examined, and the inquest was adjourned till Thursday, for a *post-mortem* examination to be made.

At the adjourned inquest on Thursday,

Mr. L. M. Griffiths said he had made a *post-mortem* examination of the body. He examined all the cavities of the body. There was considerable evidence in the chest of disease, some of which was of long standing. There was also evidence of serious disease of the bronchial tubes. There was considerable adhesions of the membrane covering the lungs, and of the lungs themselves. There was evidence in the upper part of the lungs of consumptive disease, but it was not active. The other organs were much congested, but otherwise healthy. He considered the congestion to be due to the opium. There was scarcely anything in the stomach. He attributed death to an overdose of opium, which acted with unusual force upon the deceased, who was a person in exceedingly weak health. Deceased was naturally a weak person and had been brought lower by the disease in the chest. The immediate cause of death was opium poisoning.

Mr. Keevill, chemist, said his assistant was a very careful man, and he had had considerable experience. At the time when Mr. Vowles came for the powders he (Mr. Keevill) was out of the shop; but he had since gone into the matter, and found that his assistant was going to make some compound ipecacuanha pills that same evening. When Mr. Vowles came for the powders he referred to the books, and found the prescription. Directly underneath Mrs. Vowles's prescription was one for ipecacuanha powders; it was of the same amount, and the price was also the same, and that was how his assistant came to make the mistake. Mr. Keevill produced the book in which the prescriptions were entered.

The Coroner, in summing up the case, said the question the jury would have to decide lay in a small compass. The chief point was whether due care was used by the assistant in dispensing the medicine. If they thought sufficient care was not used, then the assistant was guilty of culpable negligence. The deceased had suffered from consumption, for which jalap powders were prescribed. These did her good, and on Monday the husband went to the chemist for some of them, and instead of giving him compound jalap powders the assistant gave him compound ipecacuanha powders, which contained opium. One of these powders, when administered to the deceased, brought on drowsiness, and eventually the woman died from the effects of taking it. The deceased, having been suffering from consumption, was naturally weak; but it made no difference, however weak she might have been. If, through the carelessness of anyone, her life was shortened, then it was criminal negligence. He advised them to dismiss the case of consumption, for if the woman could not have lived long, yet through the carelessness of someone she died, then it amounted to the same thing; the law was quite clear upon that point. He quoted a case to explain the point, in which a woman sent to a chemist for a pennyworth of paregoric for a sick child. The message was properly delivered, but by the side of the bottle containing the paregoric was one containing laudanum. The apprentice, in mistake, took down the bottle of laudanum and gave it for the paregoric. It was taken home and some given to the child, who died from the effects of it. The apprentice in this case was committed for manslaughter. He thought that case and the present one were very similar. If they thought that when the jalap powders were sent for and ipecacuaha powders sent back, the assistant exercised due and ordinary care, he would be free from blame; if not, he was guilty of criminal negligence. It was most important to the public that all prescriptions should be dispensed accurately, because their lives were in the hands of dispensers.

After a short consultation the jury returned a verdict of "Gross negligence on the part of the assistant."

The Coroner: You know that amounts to manslaughter?

The Forman: Yes.

The assistant, who is a German, named Thomas Klomowski, was therefore committed for trial on a charge of manslaughter.

The case also came before the magistrates at the Police Court on a charge of manslaughter against Thomas Klomowski. After hearing the evidence, the chairman of the magistrates said they had carefully considered this case, and there was no doubt the defendant made a mistake in taking the prescription, which was not the one he should have taken. Death was accelerated by the medicine, but the bench could not see that there was any gross carelessness in the case. If this had been done with an utter absence of care they would consider it culpable, but care was taken, and this was an error. They did not think it was a case of manslaughter. The charge would be dismissed.

Obituary.

Notice has been received of the death of the following:—

On the 29th of January, Mr. Thomas Mills Nall, Pharmaceutical Chemist, Stanley Street, Leek, Staffordshire, Aged 63 years.

On the 8th of February, Mr. James Moore Crosby, Chemist and Druggist, Newborough Street, Scarborough. Aged 56 years.

On the 13th of February, Mr. Edwin Green, Chemist and Druggist, High Street, Market Harborough. Aged 35 years.

On the 18th of February, Mr. Henry Woolhouse Shaw, Pharmaceutical Chemist, Market Place, Doncaster. Aged 42 years. Mr. Shaw had been a Member of the Pharmaceutical Society since 1871.

On the 18th of February, Mr. Humphrey Wolferstan, Chemist and Druggist, Kirk White Street, Nottingham. Aged 68 years.

On the 22nd of February, Mr. William Francis Williams, Pharmaceutical Chemist, Beaufort Square, Chepstow. Aged 35 years.

Correspondence.

F. Walder.—Use carbolic acid in crystals, and a little stiff glycerine of tragacanth.

Jersey.—(1) Dissolve separately the ferri cit. c. quin. and potass. iodid.; with one of them put a half a drachm of mucilage for each ounce of the completed mixture, and mix. (2) Make the pills up with ol. theob. and ung. resinæ, say 18 grains of the former and 6 grains of the latter. If the operation be conducted quickly the pills will keep any time.

"*Spes*."—(1) Assistants who, being of full age at the time of the passing of the Pharmacy Act, furnished the Registrar before the 31st of December, 1868, with certificates that they had been engaged for a period of not less than three years in the dispensing and compounding of prescriptions as assistants to chemists and druggists. (2) Apply to the Secretary.

Communications, Letters, etc., have been received from Messrs. Beckett, Williams, Bennett, Granville, Inquirens, Associate.

THE MATERIA MEDICA OF THE NEW PHARMACOPÉE FRANÇAISE.

The list of articles of materia medica forms the first portion of the work (pp. 29–83) and is arranged alphabetically as in the last edition, the vernacular names being placed first and followed by the scientific names. As previously mentioned the chemical substances which formed a separate portion of the materia medica in the last edition are now arranged in the second part of the work, which is entitled 'Pharmacie Chimique,' so that in the new edition the materia medica includes only substances obtained from the animal and vegetable kingdoms. The list of these is still a large one, comprising four hundred and ten articles, of which one hundred and sixty-nine, indicated with an asterisk, are expected to be kept in stock in every pharmacy. In the last edition there were five hundred and thirty-five articles belonging to the vegetable and animal kingdoms, of which two hundred and six were marked with an asterisk.

In the preliminary chapter, in which directions are given concerning the collection and preparation of roots, leaves, flowers, etc., there is hardly any alteration. The term dicarpous (*dicarpiennes*) is introduced as synonymous with the term biennial. The very impractical direction to gather roots of perennial plants in the second or third year is still retained. Obviously it is next to impossible to ascertain whether such plants as tormentil, gentian, male fern, bistort, etc., are more than three years old, while the assertion that if older they are too woody and subject to diseases which alter their properties, is a somewhat sweeping one.

In this chapter also a note is added to the effect that the term root is often confounded with that of rhizome, and accordingly in several instances the term "rhizome" has been substituted in places where "racine" occurred in the last edition. The terms *rhizome*, *souche* (root-stock) and *racine* are, however, used with such a want of uniformity that it is difficult to understand what definition is applied by the authors to the respective terms.

The list of articles being such a large one, it will be more conveniently considered under the sections adopted in the work itself.

A.

The following are omitted:—Musk seed (abelmosch), the fruits of *Anacardium occidentale* (acajou) and *Semecarpus Anacardium* (anacarde oriental), *Alchemilla vulgaris*, *Anemone pratensis*, the bark of *Bowdichea virgilioides* (alcornoque), areca nuts, and the roots of *Aristochia Clematitis*, *A. longa*, *A. rotunda* and *A. cymbifolia.*

There is only one addition under "A," the entire plant of Arenaria rubra (*Spergularia rubra*), Pers. This is an introduction from Algeria, where it is used in cystitis, vesical catarrh, hæmaturia, jaundice, etc. The results obtained by Dr. Bourreau, in Paris, indicate that it possesses powerful diuretic properties, and is useful also in dysuria, gravel, nephritic colic, etc. M. F. Vigier, who analysed the plant, believed its properties to be due to the large amount of alkaline matter it contains, and to a resinous aromatic substance. Judging from the general properties of the family to which it belongs one would have expected it to contain a principle allied to saponine, but none was detected by M. Vigier. He found, however, that when distilled with water it gave an ammoniacal distillate (*Journ. de Pharm.*, [4], xxx., p. 371).

Alterations have been made under the following:—

Ache de Marais. *Apium graveolens*, L.—The authors appear to have been in doubt as to what to call the root of celery, the official portion being now described as "portion souterraine," instead of "racine," as in the last edition.

Aconit Napel.—The note directing that preparations of the leaf instead of those of the root should be always dispensed when the latter were not indicated in the prescription is now omitted, although both leaf and root are still official. No directions are given for distinguishing this root from the Japanese drug, nor for ascertaining its quality.

Agaric de Chene is now placed under the more familiar name of Amadou.

Alkékenge is now styled Alkékenge Coqueret.

Aloes.—Cape aloes is still the official species and the only one to be used unless directions to the contrary are given. *Aloe africana*, Mill., and *A. perfoliata*, L., are now mentioned as species yielding it, in addition to those mentioned in the last edition. Socotrine aloes is omitted, the following remark being made concerning it:—"Socotrine aloes, formerly the most esteemed of the African aloes, only comes into commerce casually." This is perfectly true; the aloes which arrives in this country and passes under the name of Socotrine aloes, is always of the hepatic character, or, if approaching Socotrine in colour and translucency, gives a crimson reaction with nitric acid, like that given by Barbadoes aloes (*A. vulgaris*, Lam.).

Amandes.—The botanical source is now given as *Prunus* (*Amygdalus*) *communis*, L., which is incorrect according to the generally accepted laws of botanical nomenclature, *Prunus communis* not being Linnæus' name for the plant.

Ambre Gris.—This intestinal concretion is now attributed to different species of Cetaceans, and not to *Physeter macrocephalus* alone.

Ammi officinal.—This is given under a cross reference as *Ajowan*, and the botanical source is now given as *Ammi copticum*, L. (*Ptychotis coptica*, DC., and *P. Ajowan*, DC.).

Aneth.—*Anethum graveolens*, L., is now referred to the genus *Peucedanum*, but without giving the authority for the new name.

Angélique officinale is referred to *Angelica Archangelica*, L.

Angusture vraie is now attributed to *Galipea Cusparia*, A. Sh. (*G. febrifuga*, H. Bn., and *Cusparia febrifuga*, H. B. K., being given as synonyms). Nitric acid is said to produce only a little coloured yellowish (*jaunâtre*) spot, on the internal surface of the bark, but in the samples tried by the writer of these notes it gave a dark reddish-brown colour.

Aristolochie serpentaire.—The term applied to the official part is changed from *rhizome* to *souche*.

Armoise (*Artemisia vulgaris*).—The word "*rhizome*" is substituted for "*racine*," and the same charge is made under "Arnica."

Arrowroot de la Jamaique.—Measurements of the granules are given.

Asa fœtida.—The botanical source of this drug is given as *Ferula Asafœtida*, L., and *Ferula Narthex*, Boiss, and probably also *F. alliacea*, Boiss. The description of the drug is omitted. *Ferula alliacea*, Boiss., yields, according to Dymock (*P. J.*, [3], v., p. 945), the asafœtida known in Bombay as Abusharee Hing, a dark coloured drug which contains about an equal quantity of slices of the root, and which never appears in commerce in Europe. The reason for inserting it here as a source of commercial asafœtida is not obvious.

Asarum (*A. Europœum*, L.), and Asclepiade or Dompte-venin (*Vincetoxicum officinale*), Asperge (*Asparagus officinalis*, L.).—The word "souche" is, in each of these, substituted for racine, while in Aunée, now Grande Aunée, rhizome is the term used to describe what is commonly called the root.

Aya-pana. The synonym *Eupatorium triplinerve* is now used instead of *E. Aya-pana*, Vent. Ventenat is given as the authority for the former name, which by Pritzel ('Nomenclator Botanicus') is attributed to Vahl.

The articles Wormwood, Sea wormwood, Amadou, Alkekengi, Cape aloes, Almonds, Wheat starch, Star anise, Anise, Serpentary, Armoise (*Artemisia vulgaris*), the leaves, rhizome and capitula of Arnica, Arrowroot, Asafœtida, Asparagus rhizome, Elecampane, and Axunge, are the articles marked with an asterisk under "A."

B.

The following are now omitted:—Barbatimao Bark, Mecca balsam, Belladonna seeds, Ben "nuts" (*Moringa disperma*, Guib.), Baume de Liquidambar (*Liquidambar styraciflua*), the grain and gluten of *Triticum sativum* (Blé), Bois d'Aloes, Bois de Brasil Bois nephretique, Bois de rose de Canaries (Lignum rhodium), Buranhem bark (*Chrysophyllum leucophlœum*, Casaretti).

Balsamite odorante: A new synonym, Baumecoq, has been added, and the Latin synonym, *Pyrethrum Tanacetum*, DC., omitted.

Baume du Peru noir.—The synonyms *Myroxylon Pereiræ*, Kl. (*Toluifera Balsamum*, var. *Pereiræ*, H. Bn.) are now adopted, and tests are added. The balsam is stated to be incompletely soluble in diluted alcohol, benzine and ether, giving a clear mixture with acetic acid, acetone, absolute alcohol, and chloroform.

Baume de Tolu.—The botanical name now adopted for the tree is *Myroxylon Toluifera*, H. B. K. (*Toluifera balsamum*, L.). The balsam is described as having an odour recalling that of benzoin and vanilla, and as being completely soluble in cold acetic acid, acetone, alcohol, and chloroform, insoluble in benzine and sulphide of carbon.

Belladonne.—The seed is now official, in addition to the root and leaves. The observation that the root should be recently dried and deprived of the base of the stem is now left out.

Benzoin de Siam.—Is described as containing numerous and large tears and having a very pronounced odour of vanilla. Siam benzoin in lumps has disappeared from commerce of late years, and Siam benzoin consists entirely of loosely agglomerated tears rather than contains them.

Benzoin de Sumatra.—This is described as having an odour of styrax, and the kind known in commerce as Penang benzoin is therefore probably intended to be used. Inferior specimens without tears and full of impurities are to be rejected.

Benoite (*Geum urbanum*).—The "racine" is now become "souche." In the root of this plant the rootlets are all round the root, as in valerian, which is called a "racine."

Bétoine. The synonym *Stachys Betonica*, H. Bn., is now added. The authority for the name is, however, Bentham, not Baillon.

Bistorte.—The word "rhizome" is substituted for "racine."

Bluet ou Barbeau (*Centaurea cyanus*, L.).—The capitulum, instead of the flower only, is now made official.

Boldo.—This by a printer's error is ascribed to *Pneumus boldus*, Mol. (*Boldoa fragrans*, A. Gray).

Brinvillière.—A cross reference under this name, so suggestive of poison, is given to *Spigelia anthelmia*, L.

Buchu or Bucco.—The leaves of *B. crenulata*, Hook., and *B. serratifolia*, W., are now official, in addition to those of *B. betulina*, Bartl.

It may be noticed in passing that Buglosse is not identical with the plant known by that name in England, but includes *Anchusa officinalis*, L., and *A. italica*, L.

Boldo and Belladonna seed are the only two new articles under the heading "B."

The articles marked with an asterisk are Bardane (Burdock root); Balsam of Tolu; African Bdellium; Belladonna root, leaf and seed; Siam Benzoin; Bitter orange, leaf and rind; Bistort root; Spermaceti; Bouillon blanc or Molène (*Verbascum Thapsus*, L.), and Bourrache (*Borago officinalis*).

(*To be continued.*)

SCANDINAVIAN PHARMACY.

ADAPTED BY JOSEPH INCE.

Monsieur Henry Labonne, a Paris pharmacien, has addressed a series of letters to the *Union Pharmaceutique*, and the *Bulletin Commercial*, on the pharmacy of Sweden and Norway, describing his personal experience in those Northern regions. Probably a sketch of some of the more salient incidents of his narrative will interest the English reader.

The route lay through Denmark, Sweden and Norway; across Lapland and as far as North Cape, the furthest extremity of Europe.

The external aspect of a pharmacy is first described, taking as an example the chief laboratories and business premises of Drontheim. This is not the capital but only an important town of Norway.

The house of the Apotekare, like the rest, is made entirely of wood; very large, very clean, and painted white. In front is a large garden; and in this every or almost every indigenous pharmacopœial flower is represented. Add to this, a sundial, a barometer and thermometer visible from a long distance; shells and minerals to form borders; and you see that it is in truth the garden of a *savant*.

It is significant that we reach the Pharmacy by the Apotek gata, that is Pharmacy Street. In all provincial towns in France there is a Church Street, and even a Vicarage Street; but here there is one in honour of Pharmacy. This small fact shows that in these parts the pharmacist is *somebody*, or at least that a Laboratory goes for *something*. The interior presents no peculiarity: a set of bottles on shelves, and scales upon a counter have much the same aspect everywhere.

The master is always well dressed, generally in a frock coat and with a white cravat. He wears this costume not only in town but out in the country; a fact demonstrated in a very small village, to give but one example, between Ostersund and Stockholm.

This village contained altogether from about fifteen to twenty houses, built on a rock; wooden thatched houses only. One amongst them looked like a chateau compared with the rest; on approaching we read with surprise, Apotek.

The pharmacien was in his garden with madame and the household; their dress, almost parisian, and in keeping with the appointments of the house, was in strong contrast with that of the people of the place, who wore the motley costume of Sweden, reminding one of Italy, both by its brilliant colours and the absence of shoes.

Just now thatched roofs were mentioned. These are clods of earth, or more often turf placed on a frame of wood; but their appearance differs altogether from that of French cottages. The roof of the latter is frequently covered with mosses, but moss alone is allowed to grow. In Norway, on the contrary, the wind transports on to these clods of very fertile turf every imaginable grain; and as the inhabitants religiously respect these seeds, the result is that, seen from a distance, these houses of the hamlet seem to have a garden on the top by way of covering; all the more so as this is the country blest by flowers, the native land of the great Linnæus.

There is a reason for the homely construction of these houses; the granite is very hard to work, while fir wood on the contrary costs scarcely anything, and wood houses are warmer than those built of stone. That seems paradoxical, but you have only to enter and see how carefully the smallest cracks are closed by wool, and to reflect that wood is a very bad conductor and consequently that the heat of their comfortable stoves is retained, and you will acknowledge that the construction is quite right.

Unfortunately there is a reverse side to the medal. The first thing you read in any guide respecting any town is that it has been several times destroyed by fire, for which reason there are no ancient monuments in these Northern towns. That also explains why each street and square at Drontheim looks like a field; the fear of fire inspires a dread of overcrowding buildings.

Now let us see something about organization, course of study and practical pharmacy in Scandinavia.

Under the first provisions of legislation no one could establish a pharmacy (apotek) without having obtained the permission of the king. This privilege was only accorded to a new pharmacien in respect of a definite pharmacy in a specified part of the country. But soon the same thing happened as in the case of the tobacconists of France. Those who had obtained the right sold their privileges and many grave inconveniences were the result.

At first the proprietor, taking advantage of competition, only allowed the working of his business to the highest bidder. The latter having bought so dearly soon became hampered by debts and was a struggling man. The matter was complicated by the insecurity arising from the doubtful legal character of his transactions; they were not permitted by the law, but only tolerated by use and custom. To remedy this state of things, legislation distinguished between two sorts of pharmacies (1834).

1. Those just mentioned, designed under the name of privileged royal pharmacies, on condition that the owner should only sell his right by sanction of the king.

2. Personally privileged establishments; the privilege forbidden to be sold. If the pharmacy became vacant, the king, on demand, could award it to another pharmacien in possession of a diploma.

In spite of that, many legal projects had for their object the total abolition of the sale of privileges. Lastly, by an edict of 1873 all traffic of the kind will cease in 1920.

At the present moment (1883) there are only twenty-five pharmacies at disposal; one hundred and sixty-four are *personal*, with forty branch shops called *filial apotek*. The same term occurs in Germany: the French word "succursale" is never used.*

To ensure the cessation of these twenty-five marketable pharmacies a regulation has been adopted.

The interested party up to 1920 receives his privilege at a valuation; the pharmacy thus becomes *personal* on condition always of the repayment to the State every six months of a certain sum calculated with regard to ultimate redemption. In a few years there will be but one class—namely Personal Pharmacies—in Scandinavia. In Sweden where there are four millions and a half inhabitants, their number will amount to about two hundred and thirty. It is true that many of these inhabitants, as the Lapps and the Finns, are not great consumers of pharmaceutical products.

But if pharmaciens are thus protected, they are under certain obligations.

All must be members of the Pharmaceutical Society founded in 1821. Moreover, they are divided into districts, one pharmacien in each district being appointed chief.

The Pharmaceutical Society supports an institute or school where studies for the acquirement of the legal grade are conducted. This pharmaceutical institute is at Stockholm and was founded in 1845.

Independently of the Pharmaceutical Society, it is under the superintendence of the medical department or Collège de Santé of Sweden. The direction of the institute is composed of professors and of two delegates chosen by the Society. Every year a professor must report to the College on the working of the school. If the Society has exhausted its funds, the Diet, or National Assembly, will come to its aid. There are four chief professors, two laboratory assistants, one tutor, making seven in all.

It now remains to describe the regulations under which the diploma of Pharmacien may be gained.

The candidate for a diploma in Swedish-Norway must begin by an apprenticeship of from three to six years in a business house. Then he passes the examination of pharmaceutical student before several pharmaciens and one medical man. Without this examination he is not admitted to the courses at the School of Pharmacy, where alone he can pass his final pharmaceutical examination.

These are not the only formalities to be observed in order to become a student in pharmacy at the school or institute. A year must elapse between his first examination and registration; and he must be provided with certificates from the pharmacien with whom he has served his time. These certificates must declare that he has worked in the laboratory

* Note by Translator. The word "affiliated" is employed by English universities to indicate a dependent college.

for at least one year. Lastly, before admission he must pass in Latin, materia medica, natural history, chemistry and mathematics.

Let us suppose that our young student has successfully complied with the regulations and that he has now entered at the School of Pharmacy; let us see what remains so that he should gain his diploma. His studies are about to finish and but three months remain before he undergoes the last ordeal. On these three months depends his success, for now he must give proof of his practical instruction.

From a literal translation of the Swedish it appears—

1. He must show skill in dispensing a prescription. He must prepare emulsions, ointments, etc., before the teacher of pharmacy.

2. In presence of a professor of chemistry and pharmacy he must make two mineral assays, chemically prove the purity of some substances used in medicine, and detect a poison in a mixture.

3. [An examination which has no analogue in France.] The candidate must answer trade questions put to him by a pharmacien of the town, on suitable methods for preserving remedies, and on a knowledge of prescriptions and pharmaceutical regulations.

4. The professor of natural history and pharmacognosy must ask questions on zoology; particularly on the application of this branch of study to the practice of our art; on posology or the study of doses; and lastly on an acquaintance with the most important antidotes.

5. The candidate must produce his analyses and reports in writing, and reply to two examiners (one chemical, the other pharmaceutical) chosen by all the professors united.

If all goes well the student has only to show his certificates of reception at these multiplied and severe examinations to be rewarded with his diploma; provided always that the fee to the Pharmaceutical Society has been paid.

(*To be continued.*)

HAMAMELIS VIRGINICA.*

The so-called witch hazel derives its name from the similarity of its leaves to those of the English hazel (*Corylus Avellana*, L.). The latter has been used from time immemorial as the attribute or divining rod of witches, and in the earlier days of the American Colonies the American "witch hazel" was made to do duty in place of the English.

The witch hazel (*Hamamelis virginica*, L.), which is also called, in some sections, "winter bloom," "snapping hazel nut," "spotted alder," etc., occurs in nearly all parts of the United States, chiefly in damp woods and thickets, along the moist banks of rivers east of the Mississippi, from the Mexican Gulf to Canada, but according to Pursh, also on hills and in stony places. Usually it is a bush or tall shrub, but sometimes attains a height of 20 feet. Like many other Eastern American trees and bushes, it blossoms late in autumn, from September to November, when the leaves are falling, and contributes its share to the many-coloured hues of the forest in the fall of the year. Bigelow† says of it:—"Among the crimson and yellow hues of the falling leaves there is no more remarkable object than the witch hazel, in the moment of parting with its foliage, putting forth a profusion of gaudy, yellow blossoms, and giving to November the counterfeited appearance of spring."

Its Latin name, *Hamamelis*, is borrowed from the Greek, and was applied by the ancient Greeks to a kind of quince, medlar or pear, but the identity of this cannot now be recognized. It was interpreted by the ancients as meaning "resembling an apple tree," being evidently applied by them to a tree bearing a fruit resembling apples. It is, therefore, rather singular that Linné should have selected this term to denote our witch hazel, which certainly does not fit the above comparison.

G. B. Emerson* says of it:—"The union, on the same individual, of blossoms, faded leaves, and ripe fruits, not very common in any climate, led Linnæus to give to an American plant a Greek name significant of the facts of its producing flowers together with the fruit." Of course, this interpretation is not correct, no such meaning being contained in the term. But the curious appearance of old leaves, flowers, and fruit, on one and the same shrub, is by some supposed to have originated the name "witch hazel."

That the popular notion of the mysterious power of witch hazel, resembling that originally ascribed to the European hazel, was quite prevalent in this country even before the Revolution is testified to by Carver,† who says:—"It is said to be possessed of the power of attracting gold and silver, and that twigs of it are made use of to discover where the veins of these metals lie hid; but I am apprehensive that this is only a fallacious story, and not to be depended on; however, that supposition has given it the name of witch hazel."

A paper in Hutton's 'Mathematics,' and another, by Alfred Burnson, of Prairie du Chien,‡ give some wonderful stories about the power of witch hazel in discovering water. And Porcher§ relates that persons in the upper districts of South Carolina pretend to use the rod with success.

The shrub usually consists of several crooked branching trunks arising from the same root, some 4 to 6 inches in diameter, 5 to 12 (sometimes 20) feet in height, and covered with a smooth, brown bark, the older bark becoming brownish-grey and fissured, and the inner portion being whitish and smooth.

The fruit is a light brown, nut-like, roundish oval capsule or pod, two-celled, which incloses the seeds, but soon bursts elastically into two pieces. It ripens in the summer of the succeeding year.

The two seeds are shining black, with a white hilum, are white, oleaginous and starchy within, and are eatable like hazel nuts. The seed of trees grown abroad germinates but rarely; the plant is there usually propagated by cuttings which strike root very slowly.

There is only one other distinct species of *Hamamelis*, namely, *Hamamelis japonica*, and this differs only by slight characters, namely, by its having more leaf nerves, broader and revolute, brown calyx lobes, and a shorter fruiting calyx.

Medical Uses.

Both the bark and the leaves are used medicinally. The United States Pharmacopœia (1880) recognizes only the leaves, though it would appear that the bark is much more extensively used. Both have a certain degree of fragrance, particularly when fresh, and, when chewed, are at first somewhat bitter, quite astringent, and leave a pungent, sweetish and persistent after-taste. Water as well as alcohol extracts their virtues. They appear to contain, according to Dr. A. Lea, besides the usual plant constituents, a peculiar bitter principle; this autho[r]

* The plant is figured in *Curtis' Botanical Magazine*, No. 463, tab. 6684. Reprinted from the *American Druggist*, January, 1884.

† 'Florula Bostoniensis.' 8vo. Boston, 1814, p. 40.

* 'Report on the Trees and Shrubs . . . . of Massachusetts,' p. 472.

† 'Travels through the Interior Parts of North America in the years 1766, 1767 and 1768,' by J. Carver. 8vo. London, 1781, p. 509.

‡ 'Patent Office Report on Agriculture,' 1851, p. 16.

§ 'Resources of the Southern Fields and Flowers.' 8vo. Charleston, 1869, p. 62.

also first drew attention to the large amount of tannin they contain.*

Witch hazel is reputed to be tonic, astringent and sedative. A decoction of the bark (1 oz. to 1 pint) has been found useful in hemorrhages, as well as in diarrhœa, dysentery and excessive mucous discharges. Its supposed beneficial effect in incipient phthisis, where it has been thought to unite anodyne influences with its others, is probably unsupported by facts.

The bark is reported to have long been known to the Indians—which is not at all surprising—as an excellent remedy in swellings and tumours of a painful character, as well as in external inflammations, applied in form of a poultice.

When the negro slaves endeavoured to procure abortion by means of cotton root, miscarriage is said to have been prevented by hamamelis. This is vouched for by Dr. W. W. Durham,† who says:—"At one period of my practice, the negroes used the cotton-root so frequently to produce abortion, that my supply of black haw [*Viburnum prunifolium*, recommended in 1847 by Dr. Phares, of Newtonia, Miss., as an antitocic], became exhausted, and, having heard of the power of the hazel to effect the purpose for which I used the haw, I resorted to it (the hazel) with perfect success. Having only used it for the purpose of preventing abortion from the effects of the cotton-root, I cannot speak of it in other cases."

The decoction may also be used advantageously as a wash or injection for sore mouth, painful tumours, and is probably useful in any cases where a local astringent is indicated, as in leucorrhœa, gleet, conjunctivitis, etc. Professor Stillé states that he has known the decoction or infusion to be used, as a lotion, with apparent benefit, in crusta lactea.

An ointment made with lard and a decoction of white-oak bark, apple-tree bark and witch hazel bark, has been found a valuable application to piles. The same is very generally reported of the so-called white extract of witch hazel, which is said to be made by distilling the fresh bark with a very dilute (6 per cent.) alcohol. This preparation is a popular external remedy in sprains and bruises, and is besides vaunted as a cure for almost every disease flesh is heir to.

Dr. King states that he has used a decoction of equal parts of witch hazel bark, golden seal root (*Hydrastis canadensis*) and lobelia leaves—a strong decoction being made from the first two, then the lobelia leaves added—as a lotion in ophthalmia, with such success, that he succeeded in curing even the most obstinate and long-standing cases; and he adds that other practitioners to whom he communicated this fact have confirmed it.

The decoction was also highly recommended by Dr. James Fountain,‡ of Peekskill, N.Y., and Dr. N. S. Davis,§ in hemorrhage of the lungs and stomach.

Besides the colourless, or distilled "extract," there are several other popular or proprietary preparations, mostly made, probably, by dissolving the soluble parts of the residue left on distilling the bark or leaves.

THE CARDAMOM HILLS OF TRAVANCORE.||

A correspondent of the *Madras Mail* gives the following account of the cultivation of cardamoms in Travancore:—

I spent several days at Odumenshola, and in various visits to the neighbouring Tavalum and gardens, as well as on road-making rounds, I had many opportunities of watching the work of collection and curing the cardamoms. Our ride to a large Tavalum was very interesting as we passed through miles of cardamom forest through which bridle paths had been cut. The Tavalum we visited was some distance beyond the forest, and was a busy scene, as a large amount of cardamoms were being dried on the natural barbacues of rock, and women and children were busy stripping the capsules off the scapes that had just been brought in. From here we rode over a pretty undulating grass country to Callapara where A. had a large permanent camp for warehousing the cardamoms from the neighbouring forests.

From what I could learn there are two varieties of cardamom in the Travancore forests. One crop comes to maturity about October, and the other in January. The varieties appeared to be caused by difference of rainfall and soil; the former growing in a misty wet climate, and poorer soil than the other, which grows in a comparatively dry climate, and fine rich soil. My small experience was confined to the latter variety. Land having been selected, the superintendent has to be applied to for leave to open the garden. Nothing is charged in the way of assessment till the garden comes into bearing, when a rate of 10 per cent. on the crop is charged for land tax. Only certain forests will grow cardamoms, and the presence of a few wild plants is a safe indication of the suitability of the soil. They will not grow in bamboo or reed jungle, nor will they thrive under munga-murrum, mella-murrum, or dammer trees. The best aspect is a northern one and a steep incline is better avoided. The finest gardens, I noticed, were on easy undulating land, and in such situations I was informed they lasted for years. The opening and preliminary work is very simple. Operations begin in April by the cutting down of all undergrowth to 6 or 8 inches in diameter; and here and there large trees of rapid growth are cut down. No burning is done as in coffee clearings, and the felled branches and undergrowth are allowed to rot. In the following October the young cardamoms begin to sprout. Where they are too crowded, it is necessary to thin them out and transplant them into the open spaces, and where the plants have sparely sprouted, it is also usual to sow the ground with seed. The seed should be sown before the monsoon. The growers prefer stocking their gardens with spontaneously grown plants, which they say last longer and come late, bearing earlier than those grown from seed. For two years nothing further is done. In the third the clearing should be weeded, and the small sprinkling of crop gathered. In the fourth year a thorough weeding ought to be done, and the decayed stocks and leaves heaped up between the clump of cardamoms. The garden is now in full bearing, and will require regular attention. The weeding should be done in November, and the crop comes immediately to maturity with the letting in of light and air. Cardamoms require light showery weather in March and April, when the flowering scapes are ready to blossom. In rich soil the scapes will run out to 3 and 4 feet in length, but shorter growths give better results in the way of crop. The failure of showery weather immediately after the blossom will ruin the prospects of the crop, and though the scapes will sometimes throw out a second blossom, the result is generally a poor one. The fluctuations of crop are therefore great, and as hail storms often occur about the blossoming time, the risk and uncertainty of crop is much increased. Cardamoms begin to ripen in November, but it is often late in January before the growers will pick the crop, and a great deal is destroyed by snakes, rats and vermin of every description. Judging from what I saw in the garden, of capsule shells, probably one-third is lost in this way. Chetties from the neighbouring villages in the Madura district are the principal growers, and they usually begin the cardamom harvest when about half the remaining capsules on the scapes are ripe.

The scapes with the cardamoms on are removed to the small collecting stations, and cured by a process of drying in the sun and exposure to the dew. The morning after

* Tilden's *Journ. of Mat. Med.*, Feb. 1868. See also H. K. Bowman in *Amer. Journ. Pharm.*, 1869, 164.

† *Atlanta Med. and Surg. Journ.*, 1867, and *Richmond Journal*, January, 1868.

‡ *New York Journ. Med.*, x., 208.

§ 'Trans. Amer. Med. Assoc.,' i., 350.

|| Reprinted from the *Tropical Agriculturist*, February 1, 1884.

the collection the capsules are carefully removed from the scapes, and dried on the rocks. The fleshy shell soon loses its green or brown colour under the three or four days' drying, and is then fit to be removed to the weighing stations. Cardamoms lose two-thirds, three-quarters, or even four-fifths of their measure by drying; the exposure to dew is supposed to give a bleached look to the sample. Some cardamoms I noticed had a green tinge which no amount of drying could remove, and was supposed to be caused by the nature of the soil they came from. Could the crop be gathered in, as it ripened, there is no doubt a much better sample could be secured, but I was informed that it would not pay the growers to do this, as the Travancore Government made no distinction in the price for bad or good qualities, and the result was the loss of much of the ripe fruit and the character of the rest being damaged by indiscriminate packing of mature and unripe capsules together. A second curing and winnowing is given at the weighing stations, and there is a further drying and winnowing on the coast when the cardamoms are ready for the buyer. On the coast the best descriptions will realize as much as 4 rupees per lb. (Dutch) but the grower only receives a third of this, and when all deductions from this third are made for watchmen, land tax and other petty charges, the amount really paid is nearer one-fourth than one-third. From notes taken of the cost of cultivation, I was doubtful whether the growers could make anything by the transaction, but the fact of their continuing to cultivate is proof that they do make something. A. considered it paid the growers if they secured two good crops to three bad ones; but he admitted that it was very difficult in bad seasons to get the owners to take in their crops, and he had often to do so at the Government's expense. At one time the produce had been as high as 3000 cwt., but had subsequently dwindled down at a tenth of that quantity. Since A.'s incumbency more land has been opened up and abandoned gardens brought into cultivation, and he had lately a crop of 1500 cwt. A more liberal policy on the part of the Travancore authorities would soon double the cultivation. Nearly all the cardamom growers are British subjects, owing no doubt to the fact that the forests, as far as the Pereyaur, had once been under British jurisdiction. About the second decade of this century, this tract was transferred to the Travancore Government, and the cultivators who were British subjects continued their occupation under the new rule. Roughly estimated, about 20,000 acres were under cultivation, and from what I could learn there was forest land enough available for extending the cultivation five-fold. The yield an acre in even favourable time does not exceed 20 to 25 lb. of cardamoms.

In addition to cardamoms the Travancore Government collect ivory, wax, gallnuts and other hill products, and obtain some revenue from teak and blackwood, and also from cattle grazing fees. Altogether the average nett revenue comes to about 2 lakhs of rupees. No land is granted for otherwise than cardamon cultivation—a wise policy on the part of the Travancore Government, as without losing their forests they obtain a safe though fluctuating revenue. Still there is a good deal of land suitable for grain cultivation which is not allowed to be cultivated though ready with a light tickling of the surface to yield fine crops. The wandering hill tribes in return for Sircar service are alone allowed to grow any grain, and they are restricted to old nursery clearings.

Though the cardamom hills are unoccupied at present by any resident population, there was a time when they must have been inhabited, as ruins of forts, rude carvings, and inscriptions plentifully testify, but there are no traditions of the old inhabitants, and the present hill tribes, according to their own account, are but comparatively recent settlers. The present hill men are of either Tamil or Malayalam origin, and seem to have settled on the hills in the last three hundred years. They are fine men in physique, though living in feverish places, and according to census returns are on the increase. The railway has made the country accessible, as twenty-four hours from the Railway Station of Ammanackenoor would land the sportsmen at some of the finest shikar ground in Southern India.

EMULSION OF COD LIVER OIL.*

BY C. F. SCHLEUSSNER.

The number of formulas already in print is legion, yet the one I have had in use for a long time is one that gives such entire satisfaction to patient, prescriber, and myself, that I think it worthy of more extended knowledge. The formula is not original with myself, but is already in possession of many others of the fraternity, and has in the hands of almost all of them proved a success.

Some, however, have *failed* in the manipulation, and this I think must be due either to unsatisfactory materials or fault in the labour bestowed upon the shaking process. The formula is as follows:—

Powdered gum arabic . . .	180 grains.
Powdered tragacanth . . .	180 grains.
Powdered arrowroot . . .	180 grains.
Cod liver oil	24 fluid ounces.
Syrup	4 fluid ounces.
Water	20 fluid ounces.

The manipulation should follow *exactly* the following directions:—The powders are rubbed in a porcelain mortar of 8 ounces capacity with a small quantity of cod liver oil to a thin smooth paste, more oil being gradually added until 4 or 6 ounces have been added, when it is to be poured into a 5-pint bottle, *which must be clean and perfectly dry*; more oil is then put into the mortar to rinse it, and poured from it into the bottle, adding the balance of the oil. The bottle is then to be vigorously shaken to distribute the powder thoroughly through oil, then add *twelve* fluid ounces of water *all at once*, and shake the bottle *thoroughly, vigorously, and continuously for ten minutes*, when the remaining quantity of water and syrup may be added *all at once*, and the shaking again continued for about two or three minutes.

The yield is three pints of finished emulsion.

Nothing has been said in the above about flavouring, or the addition of other articles so often used in emulsions, such as the hypophosphites, etc.

The emulsion may be made as a stock emulsion by omitting from the above quantities *four ounces* of the water from the last quantity. When desired for any special prescription, it will only be necessary to dissolve the salts ordered or needed in enough water to make six fluid drachms, and pouring some emulsion in a pint bottle, add the solution to it, shake well for a few seconds, then add enough of the stock emulsion to make a pint. Flavouring, dilute sulphuric acid, or any other materials may be added by a similar method in place of a portion of the water omitted.

I have used this method for many months with *entire success* and satisfaction; it keeps well, does not form a crust to the same extent that do many other emulsions, and is more fluid than many that are offered. It has also the advantage of less expense in mucilaginous material.

This formula was temporarily adopted by the New York Committee on unofficial formulas, and was made in their presence to entire satisfaction; yet on being repeated by some members of the committee in their own stores they failed to reproduce as satisfactory an emulsion as that shown the committee and made by them. I can only add that it has never failed in my hands, and that in other instances it has succeeded perfectly on the first trial with others. I only repeat, that if the directions given are *strictly followed* it will never fail. The chief points are best quality of powdered gums and oil, a *clean dry* bottle of *twice* the capacity of total ingredients, vigorous and continuous shaking for ten minutes, the addition of the water *all at once* at the times indicated.

* From the *Pharmaceutical Record*.

The Pharmaceutical Journal.

SATURDAY, MARCH 22, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

MR. WARTON'S BILL TO RESTRICT THE SALE OF PATENT MEDICINES.

PROPHECY, even when only implied, has once more proved to be a risky occupation, for close upon the heels of a very recent somewhat pragmatical assurance that the scheme of Mr. WARTON for dealing with the sale of patent medicines containing poisons "has never had any concrete existence, nor is it likely to have such," the printed Bill has made its appearance. As a copy has been received only just before the time for sending this Journal to press we shall content ourselves now with briefly summarizing what would be the effect of the provisions contained in the seven clauses, the text of which will be found on another page, since in the prospect of a Government measure on the same subject this Bill has not the importance it might otherwise have had.

The legislation proposed would be based upon the presumption that until otherwise proved and authoritatively declared every patent medicine should be deemed a poison within the meaning of the Pharmacy Act, 1868; and, therefore, as the words in the sixteenth section of the Pharmacy Act exempting the making or dealing in patent medicines from the operation of the previous fifteen sections would be repealed, all such articles would come within the general scope of the regulations affecting the sale of scheduled poisons. In order, apparently, to afford an opportunity for the removal of preparations free from poison from this category, it is provided that any person interested in a particular patent medicine, or a vendor or purchaser, may require the same to be analysed by the Pharmaceutical Society of Great Britain, and that if it be found free from any scheduled poison the Society may pass a resolution containing a declaration to that effect, which, upon approval of the Privy Council, would be published in the *London Gazette.* After the expiration of one month from the date of such a notification the proprietor or vendor of this particular preparation would be entitled to affix to the containing vessel or wrapper a label bearing the words, "free from poison." If, on the contrary, the preparation should be found to contain a scheduled poison, a resolution of the Society to that effect, after approval by the Privy Council, would be advertised in the *London Gazette*, and a month hence the preparation would be deemed to be a poison within the meaning of the Pharmacy Act, which indeed, by the provision before mentioned, it would already have been before any analysis. Possibly, however, this provision contemplates the desirability that might sometimes arise for the re-examination of a preparation that has been declared free from poison. It will be observed that no provision is made for the expenses that would be incurred in carrying out this work on behalf of the public.

GLEANINGS IN THE SOUTH-WESTERN PROVINCES OF CHINA.

THE interior of the enormous Chinese empire is still to the Western world so nearly a *terra incognita* as to render all fresh trustworthy information respecting it extremely acceptable. Such a contribution has just appeared in the form of a parliamentary paper containing an account of a four months' journey made in the early part of last year by Mr. HOSIE, a consular agent, through a considerable portion of the important provinces of Se-chuen, Yun-nan and Kuei-chow in the south-west of China. It is principally in these provinces that, in defiance of Imperial edicts, the cultivation of the poppy has been introduced and persevered in, until now it seems to be a tolerated industry, and home-grown opium has become in China a powerful competitor with the Indian drug. Scattered here and there among the observations made on this journey are several that appear to possess sufficient interest for the readers of this Journal to make them worth culling and binding together in a note. The starting-place was Chung-king, the great trade emporium of the province of Se-chuen, and the first objective point was Cheng-tu, its capital, lying about two hundred miles to the north-west. Along the road between these two towns the poppy was a frequent crop, more land being devoted to it in some districts than to anything else; indeed it is there cultivated to such an extent as to affect the price of corn and all other commodities. Nearing the capital the safflower was met with, but here, as in India, its cultivation is decreasing under the joint competition of opium and foreign dyes. Orange groves were also passed, and it was noticed that everywhere the skin of the orange was carefully collected and preserved, the epidermis and the white inner layer, when separated, both finding a place in Chinese medicine. Along this route and everywhere throughout the province there was an abundance of the Chinese "wood oil tree" (*Elæococca vernicia,*) a Euphorbiaceous plant, from the seeds of which an oil is expressed that is used by painters; the tree was also met with in. the provinces of Yun-nan and Kuei chow. Besides coal, a common fuel in this district is charcoal made from ferns, which are placed in a pit and allowed to smoulder, water being constantly sprinkled on the heap to prevent a blaze. A detour was made to visit the famous salt and fire wells at Tzu-liu-ching, where side by side with the sources of the brine are found the means for its evaporation. The fire wells would appear to be associated with petroleum deposits, and give forth an inflammable vapour which is conveyed through bamboo tubes lined with lime to the furnaces where it is burnt under the evaporating pans. The brine varies in quantity and quality; sometimes it is black and sometimes yellow, the latter yielding about half as much salt as the former. The black brine is obtained from a depth of at least two thousand feet and the yellow from seven or eight hundred feet. When the supply is good upwards of three hundred "buckets" of black brine and six or eight hundred of yellow may be obtained in a day. The "buckets" would appear to be large and the brine strong, since it is stated that a bucketful of black brine yields upon evaporation about twenty-four pounds of salt, worth from 6*d.* to 9*d.* The low price of the salt, however, does not save it from adulteration, since we are told that in the manufacture of granular salt bean flour is added to improve its colour.

After reaching the capital of Se-chuen the travellers turned south-west, passing through a fertile plain and reaching Ya-chou, which is considered to be the centre of a medicine-producing country. Here "huang-lien," or gentian, sells for more than its weight in silver, and "hou-po," the bark of the *Magnolia hypoleuca*, is valued at 15 to 30 taels (£4 8*s.* to £8 16*s.*) per catty (1⅓ lb.), the product from the wild tree being most esteemed. It is curious, if not significant, that here and subsequently, next to tea, medicines and coffin boards formed the principal articles of trade. Brick tea is manufactured in Ya-chou, and is said to differ from the article made under the same name at Hankow in consisting of the entire leaf and twig loosely pressed together, whilst the Hankow brick-tea is tea-dust firmly compressed into actual brick shape. Still travelling south and bending towards the west of Yun-nan, the valley of Chien-chang, the great white wax insect egg-producing district, was reached. Wax is not produced here however, since, according to Mr. Hosie, the insects are not reared on the wax-tree, but on a tree called the "tung-chien," and are exported to the districts where the wax-tree is cultivated. If this observation be correct it will help to clear up some obscurity with reference to the origin of the Chinese white wax. The perseverance of the late Daniel Hanbury established it beyond reasonable doubt that one tree, at least, upon which the Chinese wax insect feeds is a species of ash (*Fraxinus chinensis*, Roxb.); but he mentioned in his first communication that the wax had also been attributed to a plant bearing the name "tung-tsing," variously spelt "tong-çin," "toung-thsing," etc., which has been referred to various species of *Ligustrum*. Mr. Hosie speaks very distinctly on the subject. He says:—"It has "been hitherto a matter of surprise that the valley "of Chien-chang should produce the insects and "not the wax, and Chia-ting the wax and not the "insects. The reason is perfectly simple however. "In the prefecture of Chia-ting the wax tree is ex-"tensively grown; in the valley of Chien-chang it "is not. On a small twig of the 'tung-ching' tree, "which a dealer in wax insects has just given me, I "find half a dozen round excrescences about the size "of a pea, and innumerable smaller excrescences, like "minute shellfish, clinging to the bark. On opening "one of the brown glazed pea-shaped excrescences, "thousands of minute whity-brown creatures, whose "movements are all but imperceptible to the naked "eye, are seen. In less than a month hence these ex-"crescences will be collected, transported and sus-"pended on the branches of the wax tree. At first "they spread themselves on the upper side of the "leaves during the night, but hide during the day "from the sun under the leaves. After a time they "spread over the branches and secrete the wax. A "little wax is on the twig of the tung-tching tree "which I hold in my hand."

Among the articles of medicine observed in Se-chuen province, Mr. Hosie mentions "China root," by which, however, he does not mean the rhizome of *Smilax China*, usually designated under that name, but the curious fungoid growth of a species of *Pachyma*,—resembling the "tuckahoo" or "Indian bread" of North America,—which is found on the roots of old fir-trees. Another medicinal substance, "tu-la," was met with after crossing the Yun-nan frontier, which is described as a "brown root-like substance, found underground in the hills." It has a bitter taste, resembling that of quinine, and is said to be efficacious as an antidote to opium and in the treatment of fever. This is not the only case in which a regret arises as to the limits of the traveller's scientific knowledge. In one place he vouches for having inspected a specimen of coarse dusting cloth, "manufactured from the fibrous roots of a coarse grass," the peculiarity of which is that "when it is "dirty it is put in the fire, the dirt is consumed and "the cloth is taken out clean and uninjured and "ready for use." In Yun-nan poppy cultivation and opium collection were noticed almost everywhere, the purple and white-flowered varieties being grown in this province. This province also contributes armadillo skins for use as medicine in the more northerly parts of China. In the southern part of the province of Kuei-chou the proportion of land under poppy cultivation appeared to be still larger than in Se-chuen or Yun-nan, the poppy grown here being a white-flowered variety edged with pink, whilst further north the red and purple-flowered varieties become more common. Before concluding this notice mention may be made of a practice not devoid of a touch of humour. On several occasions Mr. Hosie's attention was attracted to travellers wearing official hats, which he was told indicated that they were candidates making their way northwards to attend the competitive examinations in Pekin. The statement appeared, however, inconsistent with the large quantity of luggage they carried, until the mystery was cleared up by the information that as examination candidates from the provinces travel with a pass exempting their luggage from all taxes *en route* to Pekin, such persons usually carry with them a good supply of opium and Ta-li marble, so that in the event of their being "plucked," they have some consolation in being able to return home with pockets better lined than when they set out, as the result of a little bit of smuggling.

The Medical Acts Amendment Bill passed through Committee in the House of Lords on Thursday.

* * *

On Tuesday, in the House of Commons, in reply to a question, Mr. Hibbert said that it was the intention of the Government to bring forward a measure dealing with the storage of petroleum, after Easter, and that probably it would be thought necessary to introduce the Bill into the House of Lords.

* * *

On Tuesday another decision upon the law relating to the registration of trade marks was contributed by Mr. Justice Chitty. The case was an application to register as a trade mark for extract of meat a device consisting of a portrait of the late Baron Liebig and the words "Brand Baron Liebig," which was opposed by the Liebig's Extract of Meat Company. Mr. Justice Chitty held that it had already been decided that the term "Liebig's Extract of Meat" is common property, and that therefore the applicant was not entitled to register that part of the proposed trade mark which consisted of the words "Brand Baron Liebig." With respect to the portrait, he said it was a common custom to publish portraits of inventors and this portrait was not sufficiently distinctive for registration. Moreover, to suffer the registration to proceed would, in his opinion, be to sanction the registration of a mark calculated to mislead the public into the belief that Liebig's extract of meat was the property of the applicant. On these grounds the application was refused.

* * *

The Bill providing for the preparation of a new and legally authoritative United States Pharmacopœia by a committee consisting largely of State hospital officials, which has been introduced into the House of Representatives, is giving rise to a considerable amount of comment, which is not, as a rule, by any means favourable. The *Pharmaceutical Record* says that the whole movement has too much the colour of rivalry between New York and Philadelphia, apparently associating this rivalry especially with the change of publishers. "Some of the gentlemen of the latter city have never been able to disguise their dissatisfaction at the departure of the Pharmacopœia from them, and we do not believe a word of complaint against the scientific part of the present revision of the Pharmacopœia would have been sounded, had the business management been to the liking of the complainants."

It is announced that Sir Lyon Playfair, K.C.B., has consented to allow himself to be nominated at the Montreal meeting of the British Association as President for the meeting to be held in Aberdeen next year.

* * *

In the annual report of the Planters' Association of Ceylon it is stated that owing to the low prices now realized for cinchona bark, together with the liability of the cinchona tree to be short-lived in Ceylon, except in the most favourable localities, a general check has been given to its cultivation in the island. Cinchona is now giving place to tea, and it is thought that the exports, which are estimated to have last year reached six millions of pounds, will soon show a serious decline. The *Times of Ceylon*, too, commenting upon the same subject, says, "the flood is over and now we must expect the inevitable ebb."

* * *

The *Quinologist*, one of the numerous American technical journals, has been discontinued, to allow the editor (Dr. R. V. Mattison) to engage more actively in a business career which "the demands of an active constituency of customers and the exigencies of the situation in regard to the manufacture and sale of the alkaloids of the cinchona bark have rendered of the highest importance."

* * *

The *St. Louis Druggist* reports a case as having recently occurred in Watertown, N.Y., in which a physician, wishing to administer a dose of extract of valerian to a lady patient, went into a pharmacy and helped himself, with the result of administering extract of veratrum instead and nearly killing his patient.

* * *

A meeting of the School of Pharmacy Students' Association will be held on Thursday, March 27, at 8 p.m., when a paper will be read by Mr. E. J. Eastes on "Unofficial Indigenous Materia Medica," and a Report upon Organic Chemistry will be made by the Secretary (Mr. Dunstan) on "Some Crystals found in a bottle of Aldehyde."

* * *

At the next meeting of the Chemists' Assistants' Association, to be held on Wednesday, the 26th inst., a paper on "Emulsions," will be read by Mr. Joseph Ince.

* * *

The next meeting of the Manchester Pharmaceutical Association will be held in the Medical Theatre, Owens College, on Tuesday evening, March 25, at 7.30 p.m., when the following papers will be read: "A Note on Kamala," by Mr. W. Kirkby, and "Notes on New Remedies," by Mr. F. C. J. Bird.

* * *

A forthcoming "Physic" course of "Gresham Lectures" is to be devoted to the Food Section of the International Health Exhibition of 1884, and will be given by Dr. E. Symes Thompson. The lectures will be delivered on Tuesday, the 25th inst., and three following days at 6 p.m. It may be convenient to mention that these endowed lectures are delivered in Gresham College, Basinghall Street, and are free to the public.

Provincial Transactions.

YORK CHEMISTS' ASSOCIATION.

On the 11th inst. Mr. H. E. Spencer, L.R.C.P., etc., delivered a very interesting lecture to the members of this Association, in the rooms of the York Young Men's Christian Association, upon the subject of "Disinfectants." Mr. J. Clark presided, and there was a fairly good attendance.

The lecturer remarked that the subject he had chosen was of a very practical character, and of great importance to both medical men and pharmacists. The questions for him to answer were, first, what disinfectants were expected to do; and, secondly, how they were expected to do it. After explaining the difference between a deodorizer and a disinfectant, he said he was inclined to adopt the germ theory of the present day. If it were taken for granted that that theory were true then their business would be to ascertain what would kill the bacteria—or the worst kind of germ—and they then would have obtained a true disinfectant. There was a large number of disinfectants which, for the sake of convenience, he classified as oxidizing agents, which destroyed infective matter by means of oxygen—nature's great purifier. There were also the desulphurating agents, the antiseptics, antizymotics, or to use another word the bactericides, and lastly the absorbents. Referring to the management of a sick room, he said the chief requirements were fresh air, light and cleanliness, and the use of disinfectants did harm if they caused persons to neglect the proper ventilation and cleansing of the sick room. Supposing that a person was suffering from typhoid fever, he showed how necessary it was that everything taken from the room should be thoroughly disinfected. Unless that were done the infection might be conveyed by means of the drain down to the nearest water-course, and thus communicated to persons who lived several miles off and drank the water. According to the germ theory, he said that it was easy enough to undertand how, if an outbreak of typhoid fever took place at Boroughbridge, it could be communicated to the inhabitants of York in the water they drank, even after the water had passed through the water company's filter beds. In cases of scarlet fever, it was believed that the infection was in the dust or scales which came off the patient's skin when he was recovering, and it was, therefore, a very good plan to rub the patient's skin with a disinfectant.

Votes of thanks to the lecturer and the chairman concluded the proceedings.

Proceedings of Scientific Societies.

ROYAL INSTITUTION.

Mesmerism.

At the Friday Evening Meeting held at the Royal Institution on the 14th inst., Mr. J. N. Langley delivered a lecture on "Mesmerism." In opening the subject, the lecturer remarked that for centuries certain passes and movements had been known to exercise a mysterious influence over people. A great advance, however, was made by Mesmer, who wrote a treatise upon "The Theory of the Magnetic Fluid of the Body," whilst in Vienna in 1775, and soon afterwards obtained some notoriety in Paris. Some of Mesmer's researches were placed upon a scientific basis by the late Mr. Braid, of Manchester, who applied the term "Hypnotism" to the results which he obtained, thus making a distinction between the proved and unproved experiments of "Mesmerism." Before proceeding to the main part of his lecture, Mr. Langley gave a brief explanation of the physiological action produced when a stimulus is applied to the skin. He then went on to say that when rays of light from an object fall upon the retina, a nervous action is set up and passed on to the brain, giving an idea of the object from which the rays of light are reflected, and that this nervous action may be carried on to other parts and so cause reflex action, to maintain which does not necessarily require consciousness. The lecturer then drew attention to the fact that if any animal, for example a frog, be turned upon its back, and its early struggles gently and gradually repressed, it will be found after a few minutes to remain in a perfectly quiescent state, though recovering itself at a sudden flash of light, or a sharp noise, as well as upon the application of any cold substance. If allowed to remain in an undisturbed state, however, the frog falls into a deep torpor, in which it remains for a considerable length of time, the senses gradually becoming more incapable of noticing any stimulus as the length of time increases. Whilst in this stupor the limbs of the frog can be placed in any position, and will remain in that position for an indefinite period. If a slight pinch be administered, a corresponding movement of the muscle of the part is observed, and if a more vigorous pinch be given, muscular movement is noticed in all parts of the frog. If, however, two pinches in different parts be administered at the same time, no muscular action is generally apparent. Further, if the body of the frog be stroked, the frog emits one croak for each stroke it receives, but if a pinch be administered at the same time as the stroke, a croak is very seldom obtained. Mr. Langley then followed up his remarks by experimenting upon a frog, an alligator, and a pigeon, all of which he successfully mesmerized, casually mentioning that it is much harder and requires a longer period to obtain birds in the quiescent state. The lecturer then raised a question whether the animal, finding its first struggles for freedom futile, makes a resolve to lie quietly on its back and feign death, and as time goes on becomes more resolved to be unconscious to external influences, or whether the torpor arises from a paralysis of the will. Mr. Langley favoured the latter view, stating that he considered the mesmeric condition to be due to the non-activity of certain nerve centres in the brain. At the close of the lecture an excellent description was given of the method adopted to mesmerize a human being. A bright object is held in the left hand of the operator, about eight to ten inches from the eyes of the subject, who is directed to rivet his attention upon the object, and if at any time his gaze is diverted, the experiment has to be recommenced. At first the pupils of the eye will contract, but afterwards gradually dilate, and when in that state, if the operator carry his right hand from the object towards the eyes, the eyelids will generally close with a vibratory motion. In a few seconds the subject can be compelled to perform any action, if the proper stimulus be applied. After quoting some instances of unconscious mesmerism, Mr. Langley remarked that if a person be told that he will be mesmerized at a certain time, that person, if he thought of the assertion at the appointed time, might mesmerize himself as a consequence.

The following is the text of the important lecture on a Mechanical Theory of Magnetism delivered by Professor Hughes, on the 29th ult.:—

Theory of Magnetism.

BY PROFESSOR D. E. HUGHES, F.R.S., M.R.I.

The theory of magnetism, which I propose demonstrating this evening, may be termed the mechanical theory of magnetism, and, like the now well-established mechanical theory of heat, replaces the assumed magnetic fluids and elementary electric currents by a simple, symmetrical, mechanical motion of the molecules of matter and ether.

That magnetism is of a molecular nature has long been accepted, for it is evident that, no matter how much we divide a magnet, we still have its two poles in each separate portion, consequently we can easily imagine this division carried so far that we should at last arrive at the molecule itself possessing its two distinctive poles, consequently all theories of magnetism attempt some explanation of the cause of this molecular polarity, and the reason for apparent neutrality in a mass of iron.

Coulomb and Poisson assume that each molecule is a sphere containing two distinct magnetic fluids, which in the state of neutrality are mixed together, but when polarized are separated from each other at opposite sides; and, in order to explain why these fluids are kept apart as in a permanent magnet, they had to assume, again, that each molecule contained a peculiar coercive force, whose functions were to prevent any change or mixing of these fluids when separated.

There is not one experimental evidence to prove the truth of this assumption; and as regards coercive force, we have direct experimental proof opposing this view, as we know that molecular rigidity or hardness, as in tempered steel, and molecular freedom or softness, as in soft iron, fulfil all the conditions of this assumed coercive force.

Ampère's theory, based upon the analogy of electric currents, supposes elementary currents flowing around each molecule, and that in the neutral state these molecules are arranged hap-hazard in all directions, but that magnetization consists in arranging them symmetrically.

The objections to Ampère's theory are numerous. 1st. We have no knowledge or experimental proof of any elementary electric currents continually flowing without any expenditure of energy. 2nd. If we admit the assumption of electric currents around each molecule, the molecule itself would then be electro-magnetic, and the question still remains, What is polarity? Have the supposed electric currents separated the two assumed magnetic fluids contained in the molecule, as in Poisson's theory? or are the electric currents themselves magnetic, independent of the iron molecule?

In order to produce the supposed heterogeneous arrangement of neutrality, Ampère's currents would have either to change their position upon the molecule, and have no fixed axis of rotation, or else the molecule, with its currents and polarities, would rotate, and thus be acting in accordance with the theory of De la Rive. 3rd. This theory does not explain why (as in the case of soft iron) polarity should disappear whenever the exciting cause is removed, as in the case of transient magnetization. It would thus require a coercive force in iron to cause exactly one-half of the molecules to instantly reverse their direction, in order to pass from apparent external polarity to that of neutrality.

The influence of mechanical vibrations and stress upon iron in facilitating or discharging its magnetism, as proved by Matteucci, 1847, in addition to the discovery by Page, 1837, of a molecular movement taking place in iron during its magnetization, producing audible sounds, and the discovery by Dr. Joule, 1842, of the elongation of iron when magnetized, followed by the discoveries of Guillemin, that an iron bar bent by a weight at its extremity would become straight when magnetized; also that magnetism would tend to take off twists or mechanical strains of all kinds—together with the researches of Matteucci, Marianini, De la Rive, Sir W. Grove, Faraday, Weber, Wiedemann, Du Moncel, and a host of experimenters, including numerous published researches by myself—all tend to show that a mechanical action takes place whenever a bar of iron is magnetized, and that the combined researches demonstrate that the movement is that of molecular rotation.

De la Rive was the first to perceive this, and his theory, like those of Weber, Wiedemann, Maxwell and others, is based upon molecular rotation. Their theories, however, were made upon insufficient data, and have proved to be wrong as to the assumed state of neutrality, and right only where the experimental data clearly demonstrated rotation.

I believe that a true theory of magnetism should admit of complete demonstration, that it should present no anomalies, and that all the known effects should at once be explained by it.

From numerous researches I have gradually formed a theory of magnetism entirely based upon experimental results, and these have led me to the following conclusions:—

1. That each molecule of a piece of iron, as well as the atoms of all matter, solid, liquid, gaseous, and the ether itself, is a separate and independent magnet, having its two poles and distribution of magnetic polarity exactly the same as its total evident magnetism when noticed upon a steel bar-magnet.

2. That each molecule, or its polarity, can be rotated in either direction upon its axis by torsion, stress, or by physical forces such as magnetism and electricity.

3. That the inherent polarity or magnetism of each molecule is a constant quantity like gravity; that it can neither be augmented nor destroyed.

4. That when we have external neutrality, or no apparent magnetism, the molecules or their polarities arrange themselves so as to satisfy their mutual attraction by the shortest path, and thus form a complete closed circuit of attraction.

5. That when magnetism becomes evident, the molecules or their polarities have all rotated symmetrically, producing a north pole if rotated in a given direction, or a south pole if rotated in the opposite direction. Also, that in evident magnetism we have still a symmetrical arrangement, but one whose circles of attraction are not completed except through an external armature joining both poles.

6. That we have permanent magnetism when the molecular rigidity, as in tempered steel, retains them in a given direction, and transient magnetism whenever the molecules rotate in comparative freedom, as in soft iron.

Experimental Evidences.

In the above theory the coercive force of Poisson is replaced by molecular rigidity and freedom; and as the effect of mechanical vibrations, torsion, and stress upon the apparent destruction and facilitation of magnetism is well known, I will, before demonstrating the more serious parts of the theory, make a few experiments to prove that molecular regidity fulfils all the requirements of an assumed coercive force.

I will now show you that if I magnetize a soft iron rod, the slightest mechanical vibration reduces it to zero; whilst in tempered steel or hard iron, the molecules are comparatively rigid, and are but slightly affected. The numerous experimental evidences which I shall show prove that whilst the molecules are not completely rigid in steel, they are comparatively rigid when compared with the extraordinary molecular freedom shown in soft iron. (*Experiments shown.*)

If I now take a bottle of iron filings, I am enabled to show how completely rigid they appear if not shaken; but the slightest motion allows these filings to rotate and short circuit themselves, thus producing apparent neutrality. Now I will restore the lost magnetism by letting the filings slowly fall on each other under the influence of the earth's magnetic force; and here we have an evident proof of rotation producing the result, as we can ourselves perceive the arrangement of the filings. (*Experiment shown.*)

If I take this extremely soft bar of iron, you notice that the slightest mechanical tremor allows molecular rotation, and consequent loss or change of polarity; but if I put a slight strain on this bar, so as to fasten each molecule, they cannot turn with the same freedom as before, and they now retain their symmetrical polarity like tempered steel, even when violently hammered. (*Experiment shown.*)

We can only arrive at one conclusion from the experiment, viz., that the retention of apparent magnetism is simply due to a frictional resistance to rotation; and whenever this frictional resistance is reduced, as when we take off a mechanical strain, or by making the bar red hot, the molecules then rotate with an almost inconceivable freedom from frictional resistance.

Conduction.

You notice that if I place this small magnet at several inches' distance from the needle, it turns in accordance with the pole presented. How is the influence transmitted from the magnet to the needle? It is through the atmosphere and the ether, which is the intervening medium. I have made a long series of researches on the subject, involving new experimental methods, the results of which are not yet published. One result, however, I may mention. We know that iron cannot be magnetized beyond a certain maximum, which we call its saturation point. It has a well-defined curve of rise to saturation, agreeing completely with a curve of force produced by the rotation of a bar magnet, the force of which was observed from a fixed point. I have completely demonstrated by means of my magnetic balance (*shown in the Library*) that our atmosphere, as well as Crookes' vacuum, has its saturating point exactly similar in every respect to that of iron: it has the same form through every degree. We cannot reduce nor augment the saturating point of ether; it is invariable, and equals the finest iron. We may, however, easily reduce that of iron by introducing frictional resistance to the free motion of its molecules.

From consideration of the ether having its saturating point, I am forced to the conclusion that it could only be explained by a similar rotation of its atoms as demonstrable in iron.

Reflection would teach us that there cannot be two laws of magnetism, such as one of vibrations in the ether and rotations in iron. We cannot have two correct theories of heat, light, or magnetism; the mode of motion in the case of magnetism being rotation, and not vibration.

Let us observe this saturation point of ether compared with iron. I pass a strong current of electricity in this coil. The coil is quite hot, so we are very near its saturation. I now place this coil at a certain distance from the needle (8 inches); we have now a deflection of 45° on the needle. I now introduce this iron core, exactly fitting the interior previously filled by the ether and atmosphere. Its force is much greater, so I gradually remove this coil to a distance, where I find the same deflection as before (45°). This happens to be at twice the distance, or 16 inches, so we know, according to the law of inverse squares, that the iron has four times the magnetic power of the ether. But this is only true for this piece of iron: with extremely fine specimens of iron I have been enabled to increase the force of the coil forty times, whilst with manganese steel containing 10 per cent. of manganese it was only 30 per cent. superior. We see here that the atmosphere is extremely magnetic. Let us replace the solid bar by iron filings. We now only have twice the force of ether. Replace this by a bottle of sulphate of iron in a liquid state: it is now a mere fraction superior to the atmosphere; and if we were still further to separate the iron molecules, as in a gaseous state, it is reasonable to suppose that if we could isolate the iron gas from that of ether, that iron gas would be strongly diamagnetic, or have far less magnetic capacity than ether, owing to the great separation of its molecules. These are assumptions, but they are based upon experimental evidences, which give it value.

Let us quit the domain of assumption to enter that of demonstration. Here I have a long bar of neutral iron. If I place this small magnet at one end, we notice that its pole has moved forward three inches, having a consequent point at that place. Let us now vibrate this rod and you notice the slow but gradual creeping of the conduction until at the end of two seconds it has reached 14 inches. The molecules have been freed from frictional resistance by the mechanical vibrations, and have at once rotated all along the bar. (*Experiment shown.*) Let us repeat this experiment by heating the rod to red heat. You notice the gradual creeping or increased conduction as the heat allows greater molecular freedom. (*Experiment shown.*) Let us now again repeat this experiment by sending a current of electricity through the bar. You notice the instant that I touch the bar with this wire, conveying the current through it, that we have identically the same creeping forwards, no matter what direction of the current. (*Experiment shown.*) If you simply looked at the effects produced, you could not tell which method I had employed; either mechanical vibrations, heat vibrations, or electrical currents. Consequently, knowing the two first to be modes of motion, it is fair to assume that an electrical current is a mode of motion, the manner of which is at present unknown; but that there is a molecular disturbance in each case is evident from the experiments shown.

Neutrality.

If I take this bar of soft iron, introduce it in the coil, and pass a strong electric current through the coil, you notice that it is intensely magnetic, holding up this large armature of iron and strongly deflecting the observing needle. I now interrupt the current, the armature falls, and the needle only shows traces of the previous intense magnetization. What has become of this polarity? or what has caused this sudden neutrality? Coulomb supposes that the magnetic fluids have become mixed in each molecule, thus neutralizing each other. Ampère supposes that the elementary currents surrounding each molecule have become heterogeneous. De la Rive, Wiedemann, Weber, Maxwell, and all up to the present time have accounted for this disappearance as a case of mixture of polarities or heterogeneous arrangement.

My researches proved to me that neutrality was a symmetrical arrangement; I stated this in my paper upon the theory of magnetism to the Royal Society last year. I have since made a long series of researches upon this question, and my paper upon this subject will shortly be read at the Royal Society. This paper will demonstrate beyond question—1. That a bar of iron under the influence of a current or other magnetizing force is more strongly polarized on the outside than in the interior; that its degree of penetration follows the well-defined law of inverse squares, up to the saturation point of each successive layer. 2. The instant that the current ceases, a reaction takes place, the stronger outside reacting upon the weaker inside, completely reversing it, until its reversed polarity exactly balances the external layers.

We might here suppose that there existed two distinct polarities at the same end of a neutral bar, but this is only partially true, as the rotation of the molecules from the inside to the exterior is a gradual, well-defined curve, perfectly marked, as shown in the diagrams. (*Diagrams explained.*) We see from these that in a large solid bar the reversed polarity would be in the interior, but in a thin bar under an intense field the reversed polarity would be on the outside. Thus a bar which had previously strong north polarity under an external influence would, the instant it formed its neutrality, have a north polarity in the interior covered or rendered neutral by an equal south exterior, the sum of both giving the apparent neutrality that we notice. I must refer all interested upon this question to my paper shortly to be read, but I will make a few experiments to demonstrate this important fact.

If I take this piece of soft steel and magnetize it strongly, it has a strong remaining magnetism, or only partial neutrality. If I now heat this steel to redness, or put it into a state of mechanical vibration, the remaining magnetism almost entirely disappears, and we have apparent neutrality. This piece of steel being thin ($\frac{1}{2}$ millimetre), I know that the outside is reversed to its previous state. I place this piece of steel in a glass vase near the observing needle, and at present there seems no polarity. I now pour dilute nitric acid upon it, filling up the vase. The exterior is now being dissolved, and in a few minutes you will see a strong polarity in the steel, as the exterior reversed polarity is dissolved in the acid. (*Experiment shown.*)

Let us observe this by a different method. I take two strips of hard iron, and magnetize them both in the same direction.

If I place them together and then separate them, there seems no change, although in reality the mere contact produced a commencement of reversal. Let us vibrate them whilst together, allowing the molecules greater freedom to act as they feel inclined; and now on separating we see that one strip has exactly the opposite polarity to the other, both extremely strong, but the sum of which when placed together, is zero or neutrality. (*Experiment shown.*)

Let us take two extremely soft strips placed together, and magnetized whilst together. On withdrawal of the inducing force, the rods are quite neutral. (*Experiment shown*).

We now separate these strips, and find that one is violently polarized in one direction, whilst the other is equally strong in the reversed; the sum of both being again zero.

We might suppose that the reaction is due to having separate bars. I will now demonstrate that this is not the case by magnetizing this large ⅜-inch bar with a magnetizing force just sufficient to render the rod completely neutral when held vertically or under the earth's magnetic influence. (*Experiment shown.*)

You notice that it is absolutely neutral, all parts as well as the ends showing not the slightest trace of polarization. I reverse this bar, and you perceive that it is now intensely polarized. This is due to the fact that the earth's influence uncovers or reverses the outside molecules, and consequently they are now of the same polarity as its interior. Upon reversing this rod, the magnetism again disappears, and reappears if turned as previously. We have thus a rod which appears intensely magnetic when one of its ends is lowermost, whilst if that same end is turned upwards all traces of magnetism disappear.

These and several other demonstrations which I shall now show you (proving the enormous influence which thickness of a bar has in the production of neutrality or its retention of magnetism) are simple lecture demonstrations. For the complete proof of my discovery of neutral curves I must refer you to my forthcoming paper upon this subject. (*Experiments shown proving the great influence of a thickness of a bar upon its retentive and neutral powers.*)

Inertia.

I have remarked in my researches that the molecules have true inertia, that they resist being put in motion, and if put in motion will vanquish an opposing resistance by their simple momentum. To illustrate this, I take this large ⅜-inch bar, magnetize it so that its south pole is at the lowest end. We know that the earth's influence is to make the lower end north. I now gently strike it with a wooden mallet, and the rod immediately falls to zero. I continue these blows, but the rod obstinately refuses to pass the neutral line to become north, the reason being in so doing it would have to change the whole internal reversed curve that I have discovered. It requires now extremely violent and repeated blows from the mallet to make it obey the earth's influence.

Let us repeat this experiment by starting the molecule rapidly in the first instance. The rod is now magnetized south as before. I give one single sharp tap; the molecules run rapidly round, pass through neutrality, breaking up its curve, and arrive at once to strong north polarity. (*Experiment shown.*)

A very extraordinary effect is shown if we produce this effect by electricity; it then almost appears as if electricity itself had inertia. I take this bar of hard iron and magnetize it to a fixed degree. On the passage of the current, you notice that the magnetism seems to be increased as the needle increases its arc, but this is caused by the deflection of the electric current in the bar. The current is now obliged to travel in spirals, as my researches have proved to me that electricity can only travel at right angles to the magnetic polar direction of a molecule, consequently in all permanent magnets the current must pass at right angles to the molecule and its path will be that of a spiral. Let us replace this bar by one from a similar kind of iron well annealed. The molecules here are in a great state of freedom. We now magnetize this rod to the same degree as in the previous case; the electric current now, instead of being deflected, completely rotates the molecules, and the needle returns to zero, all traces of external magnetism having ceased. The electricity on entering this bar should have been forced to follow a tortuous circular route, its momentum was, however, too great for the molecules, and they elected to turn, allowing the electricity to pass in a straight line through the bar. Thus, in the first instant, magnetism was the master directing the course of the current; in the last, it became its servant, obeying by turning itself to allow a straight path to its electric master. (*Experiment shown.*)

Superposed Magnetism.

It is well known that we can superpose a weak contrary polarity upon an internal one of an opposite name. I have been enabled thus to superpose twenty successive stratas of opposite polarities upon a single rod, by simply diminishing the force at each reversal. I was anxious to prepare a steel wire so that in its ordinary state it would be neutral, but that in giving it a torsion to the right one polarity would appear, whilst a torsion to the left would produce the opposite polarity. This I have accomplished by taking ordinary soft steel drill wire and magnetizing it strongly whilst under a torsion to the right, and more feebly with an opposite polarity when magnetized under torsion to the left.

The power of these wires, if properly prepared, is most remarkable, being able to reverse their polarity under torsion, as if they were completely saturated; and they preserve this power indefinitely if not touched by a magnet. It would be extremely difficult to explain the action of the rotative effects obtained in these wires under any other theory than that which I have advanced; and the absolute external neutrality that we obtain in them when the polarities are changing we know, from their structure, to be perfectly symmetrical.

I was anxious to show some mechanical movement produced by molecular rotation, consequently I have arranged two bells that are struck alternately by a polarized armature put in motion by the double polarized rod I have already described, but whose position, at 3 centimetres distant from the axis of the armature, remains invariably the same. The magnetic armature consists of a horizontal light steel bar suspended by its central axle; the bells are thin wineglasses, giving a clear musical tone loud enough, by the force with which they are struck, to be clearly heard at some distance. The armature does not strike these alternately by a pendulous movement, as we may easily strike only one continuously, the friction and inertia of the armature causing its movements to be perfectly dead-beat when not driven by some external force, and it is kept in its zero position by a strong directive magnet placed beneath its axle.

The mechanical power obtained is extremely evident, and is sufficient to put the sluggish armature in rapid motion, striking the bells six times per second, and with a power sufficient to produce tones loud enough to be clearly heard in all parts of the hall of the Institution.

There is nothing remarkable in the bells themselves, as they evidently could be rung if the armature was surrounded by a coil, and worked by an electric current from a few cells. The marvel, however, is in the small steel superposed magnetic wire producing by slight elastic torsions from a single wire, 1 millimetre in diameter, sufficient force from mere molecular rotation to entirely replace the coil and electric current. (*Experiment shown by ringing the bells by the torsion of a small $\frac{1}{16}$ inch wire placed 4 inches distant from bell-hammer.*)

Correlation of Forces.

There is at present a tendency to trace all physical forces to one, or rather a variation of modes of motion. In my last experiment the energy of my arm was transformed in the wire to molecular motion, producing evident polarity; this, again, acted upon the ether, putting the needle-hammer into mechanical motion. This by its impact upon the glass bells transformed its motions into sonorous vibration; but this does not mean that we can convert directly sonorous vibrations into magnetism, or *vice versâ*.

Let us take this soft iron rod; it seems quite neutral, although we know that the earth's magnetism is trying to rotate its molecules to north polarity at its lowest extremity. We now put it in mechanical vibration by striking it gently with a wooden mallet; the molecules at once rotate, and we have the expected strong north polarity. Let us repeat this experiment by employing heat, and here, again, at red heat an equally strong north polarity appears.

Again we repeat, and simply pass an electric current of no matter what direction; again the same north pole appears. Thus these forces must be very similar in nature, and may be fairly presumed to be vibrations, or modes of motion, having no directive tendency except a slight one, as in the case of electricity. For the same three forces render the rod perfectly neutral, even when previously magnetized, when placed in a longitudinally neutral field, as east and west.

Motion of the molecules gives rise to external magnetism to a rod previously neutral, or renders it neutral when previously magnetized; in other words, it simply allows the molecules to obey an external directing influence; the only motion, therefore, is during a change of state or polarity. If there is constant polarity, there is no consequent motion of the molecules: in fact, the less motion of any kind that it can receive, the more perfect its retention of its previous position; consequently, constant magnetism cannot be looked upon as a mode of motion, neither vibratory nor rotatory; it is an inherent quality of each molecule, similar in its action to its chemical affinity, cohesion, or its polar power of crystallization. A molecule of all kinds of matter has numerous endowed qualities; they are inherent, and special in degree to the molecule itself. I regard the magnetic endowed qualities of all matter or ether to be inherent, and that they are rendered evident by rotation to a symmetrical arrangement in which their complete polar attractions are not satisfied.

Time will not allow me to show how completely this view explains all the phenomena of electro-magnetism, diamagnetism, earth currents—in fact, all the known effects of magnetism—up to the original cause of the direction of the molecules of the earth. To explain the first cause of the direction of the molecules of the earth would rest altogether upon assumption as the first cause of the earth's rotation, and of all things down to the inherent qualities of the molecule itself.

The mechanical theory of magnetism which I have advocated seems to me as fairly demonstrable as the mechanical theory of heat, and it gives me great pleasure to have been allowed to present you with my views on the theory of magnetism.

SOCIETY OF ARTS.

Alloys used for Coinage.

The first of what promises to be an interesting course of four Cantor lectures by Professor W. Chandler Roberts, Chemist of the Royal Mint, upon the "Alloys used for Coinage," was delivered on Monday, the 17th inst., at the Society of Arts. This lecture was principally confined to noticing the gradual development of the process of coining, the subject of the composition of the coins in ancient and modern times also being slightly touched upon. Although barter generally answered for the purpose of obtaining the necessaries of life, it is evident that when a higher stage of civilization was attained it was necessary that some recognized medium of exchange should be determined upon. The Chinese manufactured coins of the shape of the equivalent article of commerce, the lecturer showing an engraving of a coin representing a shirt. At first the currency was not confined to any particular object, stone and bronze implements being used amongst other things, and none of them possessing any stamp authoritatively indicating their real value. Circular masses of metal were then used, until the Greeks, who were the first to strike their coins, in the 7th century, B.C., introduced a semi-spherical form, on one side of which a head or some figure was impressed by means of a soft iron or bronze die, whilst the reverse only bore signs of the nail-head, used to keep the metal in position whilst it was being struck. The engraving rapidly improved, and the lecturer considered that some of the coins he exhibited might be classed amongst high works of art. The Romans cast a great number of their coins, using moulds of sand for the operation; an ingenious method was also used for casting by the Chinese and Japanese, the metal being run into long narrow bags of wired wet canvass, ingots being formed from which they manufactured their blanks. In 1515 Leonardo da Vinci introduced an improved form of cutter and die, which ensured coins equal in point of size; the coins, as stamped from the sheets of metal, passed up inside the cutter, whilst in the die process, the coin was encircled by a metal ring to prevent the flattening consequent from the blows of the hammer. A similar form was used until a few years ago in the Scotch mint, the cutter being solid and fitting loosely into a hollow anvil; this was also the origin of the monkey die. In 1540 Benvenuto Cellini invented the screw-press, which gradually superseded the use of the hammer. Professor Roberts considered that it would be wasting time to give a full description of the methods of coinage used in the Royal Mint at the present time, as a very complete one is given in the new edition of the 'Encyclopædia Britannica,' and notices of all new machines are given in his official annular reports; he therefore only glanced at the chief points for ensuring the accuracy of the composition of the coins. The ingots are first carefully assayed and brought up to the required standard and then made into the form of bars. These bars are rolled out between chilled iron rollers into thin layers, out of which disks are cut, and these disks are again assayed. It is found necessary to "pickle" the blanks in sulphuric acid to remove the superficial layer of base metal. It is generally known that pure gold and silver is not used for coinage, but it is not so widely known that the amount of base metal in the alloys is guarded by most rigorous laws; it will be seen how necessary this is, when it is known that there are between seven and eight hundred tons of alloy of gold and copper in circulation at the present time. It is also important that money should be made of some metal not too common. At the close of the lecture, Professor Roberts remarked upon the relation of the mechanism employed in coinage in regard to scientific progress; at times the mechanism was far behind and at other times far in advance of the progress of science. Steel dies were not used until A.D. 300, whilst nearly all the work was done by hand till 1662. Rollers were known long before their introduction into mints, but now sheets could be rolled with such accuracy as to be reckoned to the $\frac{1}{2000}$th part of an inch. Milling until 1882 had been performed by means of a split collar, but improvements had now been made in that operation.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, March 13, Mr. H. G. Greenish, Vice-President, in the chair. Mr. T. S. Dymond read some—

Notes on the Synthesis of Uric Acid.

BY T. S. DYMOND.

The synthesis of uric acid having been effected by Herr Horbaczewski, and his report on the work published in the *Berichte der deutschen chemischen Gesellschaft*, November, 1882, I attempted to confirm his experiments and brought the results of part of my work before this Association last year. Having now completed my work on the subject, I venture to bring the matter before you again.

The production of uric acid by synthesis is very important, because its composition has long been a point of dispute, and this discovery will aid in finding its true chemical constitution, and when this is once determined, we shall be better able to understand its occurrence in the animal economy, and to regulate its formation in the animal tissues in complaints brought on by the deposition of its compounds.

The synthesis of urea, another important constituent of urine, was accomplished more than seventy years ago from ammonium cyanate, but uric acid has never before been obtained by synthesis. Uric acid occurs in the excrements or tissues of carnivorous animals only, though at the same time it has been found that, in the case of human beings, a vegetarian diet makes but little difference in the quantity of uric acid produced, and has even been noticed to increase it.

It occurs very largely in serpents' dung and guano as the ammonium salt, and in small quantities in human urine chiefly as the sodium salt. Occasionally a deposition of the more insoluble urates or uric acid takes place within the bladder, producing a variety of urinary calculus, or as the sodium salt within the muscles, producing gout. It is the product of the proteid tissues, and is derived from the nitrogenous elements of the food. Chiefly produced in the liver it is taken up by the blood, passed through the body, filtered out by the kidneys, and carried away by the urine.

The following is the method by which Herr Horbaczewski effected the synthesis of uric acid:—

One part of pure glycocine was mixed with 10 parts of urea, and the mixture was heated in a metal bath at 200°—230° C., till the fused mass, at first clear and colourless, had become golden brown and thick. When cold this was dissolved in dilute potash, and the solution supersaturated with ammonium chloride. Ammoniacal solutions of silver and magnesia were then added and the liquid was filtered. The precipitate was well washed with solution of ammonia, and decomposed with solution of sulphide of potassium, and again filtered. The filtrate was saturated with hydrochloric acid and the whole concentrated, when the impure uric acid separated out, and was purified by twice repeating the process, and finally, by washing with alcohol, ether and carbon bisulphide. The substance thus obtained was identified as uric acid by its crystalline form, by the action on copper and silver solutions, by the murexide test, and by its insolubility in water, alcohol, and ether.

In order to confirm this experiment I tried it myself, but at first failed, apparently because equal parts of urea and glycocine were used. Having since used 10 parts of urea to 1 of glycocine I have been more successful. The following are a few notes on my work:—

Glycocine may be obtained by three methods:—

I. By the action of either sulphuric acid or potash on gelatine. By this method amido-caproic acid (leucine) and amido-acetic acid (glycocine) are formed thus—

$$C_6H_{10}N_2O_2 = \left\{\begin{matrix} C_5H_{10}.NH_2 \\ CO.OH \end{matrix}\right. + \left\{\begin{matrix} CH_2.NH_2 \\ CO.OH \end{matrix}\right. + xNH_3, \text{ etc.}$$

The glycocine being insoluble in alcohol is thus separated from the leucine, which is soluble. Having some of that prepared by this method, I purified it from the leucine with which it was still contaminated, by washing with absolute alcohol, and then, by a long series of recrystallizations from water purified it from the colouring matter and obtained this pure specimen.

II. By the action of ammonia on bromacetic acid, a method only interesting scientifically, as it shows what might be the constitution of glycocine:—

$$\left\{\begin{matrix} CH_2.Br \\ CO.OH \end{matrix}\right. + 2NH_3 = NH_4Br + \left\{\begin{matrix} CH_2.NH_2 \\ CO.OH \end{matrix}\right.$$

III. By the action of hydrochloric acid on hippuric acid, an important constituent of cattle urine. I have also prepared glycocine by this method. The hippuric acid was boiled with strong hydrochloric acid, dark oily drops of benzoic acid being formed as the hippuric acid disappeared. After diluting and cooling, the benzoic acid was filtered off, and the solution containing hydrochlorate of glycocine was evaporated until most of the free acid was expelled, and then neutralized by ammonia and precipitated by absolute alcohol. The glycocine was freed from the ammonium chloride by washing with more absolute alcohol, and finally crystallized from water. The reaction is as follows:—

$$\left\{\begin{matrix} CH_2.NH(C_6H_5.CO) \\ CO.OH \end{matrix}\right. + \left\{\begin{matrix} H \\ HO \end{matrix}\right. = \left\{\begin{matrix} CH_2.NH_2 \\ CO.OH \end{matrix}\right. + \left\{\begin{matrix} C_6H_5 \\ CO.OH \end{matrix}\right.$$

Glycocine in many respects resembles sugar; its taste is very sweet, and it is also difficult to decolorize by crystallization alone; it is hence called sugar of gelatine, but it more readily crystallizes than sugar, being not so soluble in water. It is distinguished from cane sugar but resembles grape sugar by the reduction of copper solutions and in other ways. I found that it is distinguished from grape sugar by not giving the borax reaction, as it has been shown by Mr. Dunstan many of the polyhydric alcohols do. This indeed is what one would expect, as glycocine has not the constitution of an alcohol. Glycocine may be represented as acetic acid where one atom of hydrogen of the methyl group has been replaced by amidogen; or it may be perhaps acetic acid where one atom of the acid group oxatyl has been replaced by amidogen— $\left\{\begin{matrix} CH_3 \\ CO\ .\ ONH_2, \end{matrix}\right.$ for it appears to be not a true acid, as it has a sweet taste, no reaction on litmus paper, and crystallizes from alcohol, in the presence of ammonia.

Urea occurs in most urine, in human blood and in many animal secretions, and is prepared either by the exhaustion of evaporated urine with alcohol, or better by the action of sulphate of ammonium on a solution of cyanate of potassium. Cyanate of ammonium is found in solution, which on boiling with water yields the isomeric body urea. Urea may also be produced by the action of heat on carbonate of ammonium, one of the constituents of commercial ammonium carbonate. Cyanate of ammonium is first formed and this is changed into urea.

$$NH_4NH_2CO_2 = H_2O + NH_4CNO = (NH_2)_2CO$$

$$\text{or}\quad \begin{array}{c} H-N-H \\ | \\ CO\ .\ ONH_4 \end{array} \qquad \begin{array}{c} N \\ ||| \\ C-O-NH_4 \end{array} \qquad \begin{array}{l} O \\ ||\ /NH_2 \\ C—NH_2. \end{array}$$

Urea is, then, diamide of carbonyl or carbamide.

With these two substances, urea and glycocine, I have made the following experiment:—1 drachm of glycocine was mixed with 10 of urea and heated in a beaker by an oil bath to a temperature of 230° C. The mass soon liquefied and a copious evolution of ammonia together with a gradual darkening in colour followed. When the evolution of gas lessened the beaker was removed and allowed to cool. The hard residue was dissolved in potash and the solution decolorized with animal charcoal (a great improvement on the process of purification proposed by Horbaczewski, who had laboriously gone over the entire process of separation again and again, till the residue had become colourless, and I had found by previous experiment on pure uric acid that the uric acid was not lost or changed in any way by the process). On evaporating a portion to dryness and heating with nitric acid and adding ammonia, purple murexide was obtained, and the synthesis of uric acid confirmed.

Now came the question of how to isolate the uric acid, and this I found a very difficult matter.

The rationale of Horbaczewski's method is this. The urates and cyanurates of potassium are precipitated as ammonium, magnesium and silver salts. These are decomposed with potassium sulphide, the silver being thus thrown out. The uric and cyanuric acids are precipitated by acid and any sulphur thrown out is dissolved away by bisulphide of carbon. The cyanuric acid is then separated by alcohol and ether and the uric acid remains pure.

Horbaczewski's method does not work well, because in the presence of other matters ammonium chloride and ammonio magnesium and silver solutions do not readily precipitate uric acid, and because the separation of uric acid from cyanuric is not readily effected by alcohol, uric acid, I find, being slightly soluble in even absolute alcohol, and more so in the presence of cyanuric acid.

The methods attempted for effecting this separation were the following:—

To the decolorized solution in potash of the mass obtained as above ammonium chloride was added and the precipitate filtered off. The more insoluble salts were separated from the solution by three successive crystallizations, and the mother liquor, which gave the murexide very clearly, was evaporated to dryness, dissolved in sulphuric acid and precipitated by water, this being a good way of obtaining uric acid in a crystalline form. The resulting crystals were, however, found to be chiefly cyanuric acid, mixed with a few crystals of uric acid, and as the three crops of crystals I had obtained before contained much uric acid, this method of isolating uric acid by crystallization was unsuccessful. Some of these crystals were dissolved in boiling water and evaporated just to dryness with hydrochloric acid. The residue, which contained uric acid, was boiled with successive portions of absolute alcohol. Nearly the whole dissolved, but on testing residue and solution, neither contained any uric acid, showing that it was impossible thus to separate the two acids. Some more of the crystals, which contained uric acid, were dissolved in water; ammonio-sulphate of magnesium and ammonio-chloride of silver were added. The precipitate was filtered off and decomposed with solution of sulphide of potassium. The sulphide of silver was filtered off and the solution acidified with hydrochloric acid and allowed to crystallize. The residue, however, after the removal of the sulphur with CS_2, was found to contain no uric acid, thus showing that silver and magnesia, though precipitating uric acid when present in considerable quantity, will not do so when in small quantities and when salts of other acids largely preponderate.

I have, then, been unsuccessful in materially improving upon Horbaczewski's method for the isolation of uric acid when obtained from glycocine and urea, except in the one point of decolorization of the impure urate solution by animal charcoal.

Turning to the question of the constitution of uric acid, this reaction does not, unfortunately, settle the point. The reaction, indeed, might be represented simply thus—

$$\left\{\begin{matrix} CH_2.NH_2 \\ CO.OH \end{matrix}\right. + 3\,CO\begin{matrix}\diagup NH_2 \\ \diagdown NH_2\end{matrix} = \left\{\begin{matrix} CH_2NH(C_3N_3O) \\ CO.OH \end{matrix}\right. + 3\,NH_3 + 2\,H_2O$$

and uric acid would be glycocine in which a cyanuric acid residue has been inserted, just as hippuric acid is glycocine in which a benzoic acid residue has been inserted:

$$\left\{\begin{matrix} CH_2.NH(C_3N_3O) \\ CO.OH \end{matrix}\right. \qquad \left\{\begin{matrix} CH_2.NH(C_6H_5.CO) \\ CO.OH \end{matrix}\right.$$

And this seems to be possible, for uric acid when heated with hydriodic acid yields glycocine, carbonic acid and ammonia.

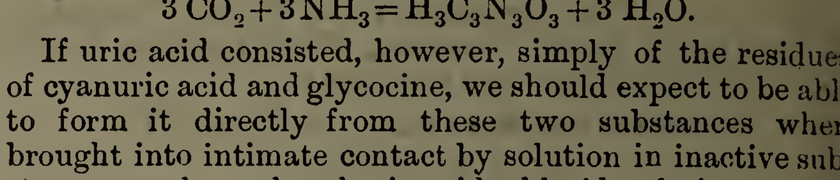
$$C_5H_4N_4O_3 + 5\,H_2O = \left\{\begin{matrix} CH_2.NH_2 \\ COOH \end{matrix}\right. + 3\,CO_2 + 3\,NH_3$$

the carbonic acid and ammonia representing exactly one molecule of cyanuric acid with three of water.

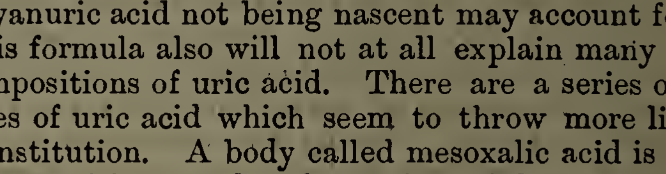
$$3\,CO_2 + 3\,NH_3 = H_3C_3N_3O_3 + 3\,H_2O.$$

If uric acid consisted, however, simply of the residues of cyanuric acid and glycocine, we should expect to be able to form it directly from these two substances when brought into intimate contact by solution in inactive substances, such as phosphoric acid, chloride of zinc or glycerine; this I have not been able to do, but the fact of the cyanuric acid not being nascent may account for this.

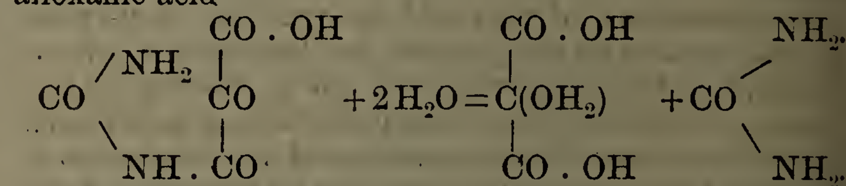
This formula also will not at all explain many of the decompositions of uric acid. There are a series of derivatives of uric acid which seem to throw more light on its constitution. A body called mesoxalic acid is formed together with urea by the action of baryta water on alloxanic acid—



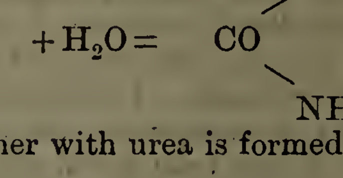
Alloxanic acid is formed by the action of baryta water on alloxan.



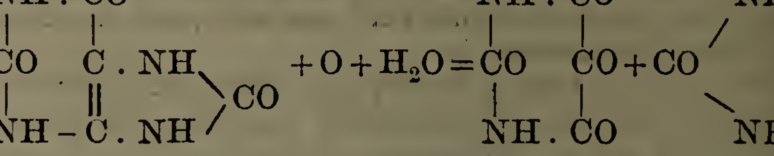
Alloxan together with urea is formed on the oxidation of uric acid.



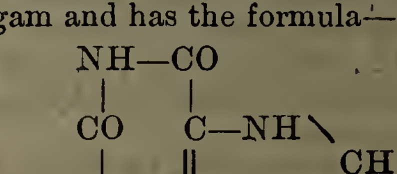
Uric acid, then, is probably built up of a tricarbon nucleus and two urea nuclei. The correctness of this formula is also shown by another class of derivatives of uric acid. Xanthine is obtained from uric acid by reduction with sodium amalgam and has the formula—



Theobromine and caffeine or theine are di- and trimethyl xanthine and have the formulæ—



Finally all these bodies, uric acid, alloxan, xanthine, theobromine and caffeine yield on oxidation with nitric acid and addition of ammonia the purple body known as murexide, an ammonium salt of purpuric acid, having a constitution very analogous to two molecules of alloxan—



From these decompositions it would appear that the urea, not the glycocine, is the important element in the production of uric acid from urea and glycocoll, but what the exact decomposition is, we cannot at present presume to say.

This work has been done in the Laboratories of the Pharmaceutical Society; my thanks are due to Mr. Dunstan for his help and valuable suggestions.

The paper was illustrated by specimens, diagrams and experiments.

A discussion followed, in which the Chairman, Secretary, Messrs. Ranken and Short took part.

Mr. Dymond then took the chair and Mr. H. G. Greenish gave his Report on Pharmacology, "Notes on Nigella Sativa and Nigella Damascena."

The report was followed by a discussion, in which the Chairman, Secretary, Messrs. Lowe and Ranken took part.

The meeting then adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the above Association held on the 12th inst., Mr. C. Parkinson, President, in the chair, a paper on "Photography by aid of the Incandescent Electric Lamp," was read by Mr. F. W. Branson.

The commencement of the paper related to the utility of photo-micrography to scientists as an easy and rapid method for obtaining photographic prints of microscopic objects to illustrate papers and as an aid in the production of blocks for book illustration by means of photo-zincography or some allied process. A description of the apparatus was next given. A large four-celled bichromate battery was used, with arrangements for increasing or diminishing the zinc area immersed in the solution, to which latter was added 1 per cent. mercuric sulphate. The lamp used was 2½ candle power, aspecial feature of the lamp being the frosted surface obtained by means of a special varnish, the advantage hereby gained being a strong but diffused and equal illumination in close proximity to the lamp, rendering condensing lenses, when low powers are used, quite unnecessary. A resistance coil of simple construction was included in the circuit to regulate the current and also to switch on the lamp for the requisite number of seconds. The description next related to an ordinary monocular microscope with short and wide tube, the eye-piece being inserted within the flange of a bellows camera, the ground glass of which receives the image of the object it is desired to photograph. A special arrangement of the lamp for use with high powers was also alluded to and shown. The use of the eye-piece for photography was recommended, provided that both eye-piece and objective possessed good optical properties. Objectives must have a flat field, perfect definition and preferably exact coincidence of visual and actinic foci. To determine this the author advised the placing on the microscope stage, in a slightly oblique position to the optical axis, a test plate having parallel lines or markings; the image of the central lines should now be formed, and if these photograph sharply the lens may be noted as a perfect one for photo-micrographic purposes, but if not the differences may easily be measured by means of the fine adjustment and either corrected by means of the addition of a biconvex lens to the objective or the focus may be altered after the visual focus has been obtained to the extent of the difference previously found. It was then stated that transparent objects must be stained before being submitted to the process, such reagents as picro-carmine, which gives non-actinic colours, being most satisfactory. The combined action of light and reducing agents on a sensitive photographic plate next received attention, as did also the manipulations requisite for the production of successful negatives and prints. Lastly, some advantages of the electric lamp were enumerated, the principal being the comparative absence of heat rays, also the very actinic character of the light when considerable battery power is used; the apparatus is, moreover, easy of manipulation. The object photographed before the meeting was a transverse section of echinus spine, a two-inch objective being used with thirty minutes' exposure. The specimens exhibited included some very good photographs, showing early progressive embryonic development of the chicken.

A discussion followed, in which the President, Messrs. Glew, Killick and Leckenby took part.

A vote of thanks to Mr. Branson for his valuable and interesting paper was proposed by Mr. Allen, seconded by Mr. Snow, and carried with acclamation.

Parliamentary and Law Proceedings.

Patent Medicines.

The following is the text of the Bill introduced into the House of Commons by Mr. Warton, the second reading of which is fixed for the 26th inst.:—

A Bill to Restrict the Sale of Patent Medicines.

Whereas patent medicines containing poison have caused sickness and death:

Be it enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:

1. From and after the first day of January, one thousand eight hundred and eighty-five, any person claiming to be a proprietor or part proprietor of any patent medicine, and any vendor or purchaser by wholesale or retail of any patent medicine, may require the same to be analysed by the Pharmaceutical Society of Great Britain.

2. If the said Society find on analysis that any patent medicine contains poison, such poison being one of the poisons in Schedule A. of the Pharmacy Act, 1868, or declared to be a poison by the said Society by resolution within the powers contained in the second section of the said Act, then the said Society may from time to time by resolution declare that such patent medicine contains poison; and thereupon the said Society shall submit the said resolution for the approval of the Privy Council, and if such approval be given, then such resolution and approval shall be advertised in the *London Gazette*; and on the expiration of one month from such advertisement, the patent medicine named in such resolution shall be deemed to be a poison within the meaning of the said Act.

3. If the said Society find on analysis that any patent medicine does not contain poison within the meaning of the second section of this Act, the said Society may from time to time by resolution declare that such patent medicine is free from poison; and thereupon the said Society shall submit the said resolution for the approval of the Privy Council, and if such approval be given, then such resolution and approval shall be advertised in the *London Gazette*; and on the expiration of one month from such advertisement, the patent medicine named in such resolution shall be deemed to be free from poison, and any proprietor or vendor thereof may label the box, bottle, vessel, wrapper, or cover in which such patent medicine is contained with the words "free from poison."

4. Any patent medicine shall, unless and until the said Society have analysed the same, be deemed to be a poison within the meaning of the Pharmacy Act, 1868.

5. The sixteenth section of the Pharmacy Act, 1868, shall be read and construed as if the words "nor with the making or dealing in patent medicines" were not contained therein.

6. This Act shall be read and construed with the Pharmacy Act, 1868, and any Act amending the same.

7. This Act shall not extend to Ireland.

Poisoning by Phosphorus Paste.

On Tuesday an inquest was held before the Borough Coroner, Mr. J. C. Malcolm, at Armley Gaol, Leeds, on Bridget Hogan, aged 47, who died at the gaol on Saturday from the effects of taking phosphorus paste on the previous Wednesday, she at the time being under remand on a charge of attempted suicide. The evidence showed that the deceased had been in a low state of mind for some time past. In returning a verdict of "Suicide whilst labouring under temporary insanity," the jury desired the Coroner to call the attention of the Home Secretary to the dangerous nature of Steiner's Phosphorus Paste, used for the destruction of vermin, and the facilities offered for obtaining that preparation for unlawful purposes.—*Leeds Express.*

MYSTERIOUS CASE OF POISONING BY STRYCHNIA.

On Tuesday, Dr. Housely, district coroner for Retford, resumed an inquiry which had been adjourned from the 17th of last month at Warsop, near Mansfield, as to the death of Hannah Head, a girl, ten years of age, who had died on the 16th of February from having taken Epsom salts, supposed to have contained strychnia.

The following evidence was taken:—

Mr. G. Stein, surgeon of Warsop, said that on Monday, February 18, he made a *post-mortem* examination of the deceased. The body was very thin. The hands were clenched, the fingers being drawn into the palms of the hands. The feet were clubbed, the soles being arched. There was lividity about the lips. The expression of the countenance was natural. On opening the body he found the right cavity of the heart to contain blood, which was fluid and dark. After the *post-mortem* he was not able to state positively the cause of death, and considered an analysis necessary. The symptoms were consistent with poisoning by strychnia. Witness placed the stomach and its contents into a jar, which was sealed and given to Police-constable Stevenson on February 18. The symptoms somewhat resembled tetanus, which was a spasm of the muscles. On Saturday night, February 16, witness received a packet said to contain Epsom salts.

Police-constable Stevenson, stationed at Warsop, said he received from Dr. Stein the packet said to contain salts, on Monday, February 18, and a jar containing the stomach of the deceased. The jar was sealed. These together with a small bottle of toothache tincture he delivered to Dr. Truman, of Nottingham.

Dr. Edgar Beckit Truman, of Nottingham, county analyst, said that on February 20, he received from the last witness three articles—a white jar sealed and unbroken, a blue paper containing what was said to be Epsom salts, and a bottle of toothache tincture. The jar contained the stomach, which weighed thirteen and a half ounces. There was no diseased appearance about the coating of the stomach. The contents amounted to eight and a quarter ounces and consisted of a brown fluid with an acid reaction and some animal flesh, probably ham fat, and potatoes. Witness took half of the stomach and half of the contents and submitted them to analysis. He found evidence of the presence of sulphate of magnesia, commonly called Epsom salts, and also of strychnia. The strychnia obtained from the stomach gave the usual reaction. Witness examined the remainder of the stomach for poisons with a negative result. He next examined the salts of which the packet produced was the residue. There were 355 grains of it. He found that in a teaspoonful levelled there were 52½ grains, but tested it for mineral poisons with a negative result and also for oxalic acid, of which there was also none. Strychnia was present in varying amounts, on an average 3 per cent. In a teaspoonful there would be about a grain and a half. The small bottle simply contained a solution of camphor and chloroform.

The Coroner: If a child lived four hours after taking strychnia would a much larger quantity have been taken than you found in the stomach?

Dr. Truman: If the child had died sooner more strychnia would have been found. Half a grain has been known to produce death.

Does strychnia undergo any change in the stomach?—No.

How much strychnia would it require to kill a child ten years old?—I should think a quarter of a grain would be a fatal dose.

How soon do the symptoms commence?—They may commence in a few minutes, but usually half an hour elapses.

How long does a person usually live after taking a poisonous dose?—About four hours only.

By a Juror: There was no colouring matter in the salts. It was alkaloid strychnia, and would take some time before undergoing the change by solution. That would account for the time the child lived. After hearing the evidence of the father of the deceased witness was of opinion that the cause of death was strychnia poisoning. The symptoms mentioned by the father in the child on the preceding Friday arose from strychnia poisoning.

Elizabeth Head, stepmother of the deceased, stated that the first lot of strychnia she bought was from Mr. Potts's shop, Mansfield, a year and a half ago. She bought a shilling's worth, and this was used in a short time for the purpose of poisoning rats. Subsequently witness took the empty bottle to Mr. Wood's, and purchased another shilling's worth of strychnia. If she had been twice to Mr. Potts's shop, she believed she took the same bottle. Afterwards witness's husband said, "There, I have made an end of all," meaning, as witness supposed, that he had thrown the strychnia into the fire. Witness had not bought strychnia at any other place, and had not known her husband to bring any into the house. Witness was in the house when her husband told the deceased child to fetch the salts. She bought two ounces. It never occurred to witness to throw away the salts after the child had the first twitchings, on the Friday. She could not say where her husband kept the strychnia. No person in the house had the same symptoms as the child after taking the salts. The child's life was insured, but in what society she did not know. They had not received the insurance money. The child had been insured between two and three years.

By a Juror: The strychnia was purchased each time at the request of her husband. The salts were purchased about five o'clock, and placed in the cupboard. In the evening, about eight o'clock, a dose was administered to the deceased.

William Head said he believed that he told the deceased to bring two ounces of salts from Mr. Tyler's shop. It never occurred to witness to connect the child's illness with the taking of the salts. After the purchase of the last lot of strychnia the bottle was thrown by witness into the stream. None of the family had similar symptoms to the deceased after taking the salts. The packet from which he took the salts to give the deceased had the appearance of not having been previously opened. All witness's children were insured. The strychnia had been bought by witness's wife at his request.

Sarah Ann Bean, a married woman, residing near to the deceased's parents, said from what she had seen the child had been kindly treated. Witness went to Mr. Head's house on February 16, when deceased was ill, and was present when she died.

Ann Stevenson, the wife of Police-constable Stevenson, said that early in January she sent for some salts—two ounces—from the shop of Mr. Bloor. Witness took some herself and did not perceive any ill effects. About a week after witness gave some to her daughter and about an hour after she complained of her legs. These symptoms were exhibited on taking a second dose two days after. The child also experienced twitchings. On hearing that Mr. Head's child was ill she threw the remainder of the salts into the fire.

Betsy Ann Crossland, of Warsop, deposed to being attacked by twitchings in the arms and legs after taking a dose of salts purchased at Mr. Bloor's shop.

George Tyler, chemist and druggist, of Warsop, was next called. After being cautioned by the Coroner, he should, he said, prefer to give evidence. He said he was not registered as a chemist under the Pharmacy Act, 1868. He sold Epsom salts, weighing them into packets. He remembered the deceased coming to his shop on the first Friday in January for salts, but supplied her with a two ounce packet, which was labelled bearing the name of John Bloor. Witness was the manager to Mr. Bloor, and had been in that position from eleven to twelve years. All the labels bore Bloor's name. Witness did not keep strychnia in the shop, but occasionally got it from Mr. Bloor's other shop at Mansfield Woodhouse for making a solution from the British Pharmacopœia, but had never kept strychnia in stock. The bulk of Epsom salts from which witness supplied the deceased were obtained from Messrs. Barron, Harvey and Co., London. It was impossible for the salts to become mixed with strychnia.

The Coroner, then, addressing the jury, said if they thought any practical purpose would be served by keeping the inquiry open they would again adjourn, but if they were satisfied with the evidence before them, he would sum up. The jury intimated that it was impossible to carry the inquiry further, and the Coroner at great length carefully reviewed the evidence given by the witnesses. He said he need not tell them that that was a remarkable and mysterious case. The inquiry was first as to the cause of death, and as to that he did not think they would have any difficulty. They had been told that the symptoms the child exhibited were consistent with strychnine poisoning, and the analysis confirmed that supposition. The next question for them to decide was how that strychnia became mixed with the salts, and then whether it was administered wilfully or not. If these questions could not be satisfactorily answered it would be better to return an open verdict simply specifying the cause of of death, and leaving the questions as to how the strychnia became mixed with the salts, and whether it was wilfully administered or not, open.

The Jury, after about a quarter of an hour's deliberation, returned a verdict to the effect that death was attributable to strychnine poisoning, there being no evidence to show how it became mixed with the salts.—*Nottingham Journal.*

Reviews.

A Manual of Chemistry. By Henry Watts, B.A., F.R.S. Vol. I. Physical and Inorganic Chemistry. Thirteenth Edition of Fownes' Chemistry.*

When a book has reached, as this one has, the thirteenth edition, it may fairly be considered as outside the range of general criticism. Neither need we with this book and in this Journal stop to give an account of its contents, for, it is to be remembered, the work originally emanated from the Professor of Chemistry to the Pharmaceutical Society, Mr. Fownes, and ever since its first appearance has been the standard text-book on chemistry for pharmaceutical students. The hand of Mr. Watts, who has edited the later editions of the work, is and has been prominent in the best sense, and this in many ways. One of the most important, perhaps the most important, way in which Mr. Watts's admirable editing is exemplified is in the definite and consistent system of nomenclature which is adopted and logically developed throughout the volume. Indeed, Mr. Watts's salutary efforts in this direction are well known and by no means restricted to the present case, but are also noticeable in his editing of the *Journal of the Chemical Society* and in many other literary undertakings with which he is associated. For the chemical student nothing is at once more important and necessary than that he should be unhampered and unfettered in his work by an illogical and arbitrary nomenclature. This, unfortunately, is too seldom the case in the majority of chemical manuals, where there is often more evidence of loose writing than of sound thinking, and where it is customary to sacrifice exactness in this respect to profuseness and even to prolixity in details which are often in themselves relatively unimportant. The anomaly reaches its height and is much more acutely felt in organic chemistry. Nothing is more fatal than this to the progress of the true student who seeks to find a connected and orderly sequence of facts designated by a correspondingly connected and orderly series of names. Accuracy, simplicity and consistency in nomenclature must for ever be one of the first canons in scientific criticism. True progress in chemistry, as in everything else, consists, at bottom, in the development of order, and until this has been attained, especially in chemical nomenclature, the eminent German physiologist and logician who lately affirmed that "chemists are at strained relations with logic and grammar" will remain unanswered—because unanswerable. But to return to the volume before us. The first section, which relates to chemical physics, has been very well brought up to date and the same may be said of the bulk of the volume; in fact the work is still in every respect worthy of the greatest confidence, and no doubt will retain its high place as a standard text-book for pharmaceutical students. At a time when crowds of typographical errors and altogether inexcusably careless mistakes stand naked and unashamed, and are even winked at by critics, in one of our great treatises on chemistry, it should be a compliment to the author of a less ambitious work to say that it is peculiarly free from such offences against literary decency. On p. 265 the "Cl_2," which is stated to be formed when Si_2C_2N is oxidized, should obviously be CO_2. "Octahedrons" (p. 409) is an innovation that perhaps is defensible. A little consistency might with advantage be observed in naming authors; thus we read on the one hand of "Dr. Frankland," "Dr. Odling," "Dr. Gladstone," etc., and on the other of "Crookes," "Roscoe," "Joule," "Tyndall," etc. The diæresis upon the "i" in "haloïd" and in "alkaloïd" seems of doubtful necessity.

* London: 1883. J. and A. Churchill. Crown 8vo. Pp. i-xvi., 1-595. 9*s*.

A Short Manual for Monthly Nurses. By Charles J. Cullingworth, M.D., etc.*

This little book is said to owe its existence to a regret expressed that the author's 'Manual of Nursing' did not deal with the subject of obstetric nursing. However this may be, we have no doubt that it is capable of being extremely useful, not only to the class for whom it is ostensibly written, but for others who from force of circumstances may have to undertake similar duties more or less involuntarily. The text is clearly written, without obscurations due to technical expressions, and whilst affording valuable information as to the best course to be taken under certain emergencies, it affords no encouragement to the nurse to step outside her proper sphere.

BOOKS RECEIVED.

Excerpts from Professor Hugo Schiff's Treatise on Eucalyptus Oil. Translated and Supplemented by Baron Sir F. von Mueller, K.C.M.G. Sydney: L. Bruck. 1884.

On the Discovery of the Periodic Law and on Relation among Atomic Weights. By John A. R. Newlands, F.I.C., F.C.S., etc. London: E. and F. N. Spon. 1884.

* London: J. and A. Churchill. Fcap. 16mo. Pp. i.-viii., 1-80. 1*s*. 6*d*.

THE GOLD-HEADED CANE. Edited by WILLIAM MUNK, M.D., F.S.A. London: Longman, Green and Co. 1884. From the Publishers.

AIDS TO PHARMACY. By ARMAND SEMPLE, B.A., M.B., etc. London: Baillière, Tindall and Cox. 1884. From the Publishers.

AIDS TO PHYSIOLOGY. By B. THOMPSON LOWNE, F.R.C.S. London: Baillière, Tindall and Cox. From the Publishers.

AIDS TO BOTANY. By ARMAND SEMPLE, B.A., M.B., etc. London: Baillière, Tindall and Cox. 1883. From the Publishers.

Correspondence.

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

THE PHARMACEUTICAL SOCIETY.

Sir,—Mr. Hart seems to have made up a man of straw for the sole purpose of knocking him down. I have never said that "The Pharmaceutical Society was not entitled to the slightest share of our gratitude;"—on the contrary I have constantly asserted that had it not been for the Society, the chemists and druggists would have been in a very different position from what they now are. But for all that I do not see that I am bound to fall down and worship the Council, or to say that everything it may say or do is the only proper thing to have said or done. There have been times when resistance to the propositions of the Council was essential to the liberty of the trade, and I think there are very few now who are sorry that the resistance was effectual.

I cannot see why Mr. Hart should drag the Benevolent Fund into the question; no doubt the relief of distressed members of the trade is a praiseworthy object, but I do not conceive that the Society exists only for that. Nor do I think nor have I ever said "that one of the principal reasons why the Council exists is to see that pharmacists are not summoned on juries." What I did say on that head, and what I still contend, is, that if a pharmacist is summoned on a coroner's jury and is threatened by the coroner with a fine in the event of his refusing to attend, the Council ought to take up the case and if necessary defend it in a court of law, and that they ought to let it be known that they will do so. Individual effort is very essential to the success of any cause, but individuals can hardly be expected to fight the battle of the whole Society at their own sole costs and charges.

I am at a loss to understand Mr. Hart's remarks about Local Secretaries and Local Committees, for I do not know of any to whom they apply; but as Local Secretaries are chosen by the members of the Pharmaceutical Society, and Local Committees by the members of their respective Associations, I suppose the electors have chosen those whom they consider the most suitable men.

It seems, however, after all, that Mr. Hart is not altogether satisfied with the policy of the Council, but has his own special grievance, and wishes it to adopt a more vigorous course in that particular direction, forgetting apparently that neither the Pharmaceutical Council nor any other Council has the slightest right to interfere with any man's trade in this country, so loug as he is not acting illegally.

To those writers who are either ashamed of their productions or afraid to acknowledge them, but under the convenient shelter of a fictitious signature indulge in statements they cannot justify, I make no reply; but would suggest that if any such persons know of people trading illegally, their time would be more profitably employed in furnishing the Registrar of the Society with evidence to enable him to prosecute.

Cheetham Hill. W. WILKINSON.

THE POSITION OF PHARMACY.

Sir,—That the position of pharmacy in this country at the present time is in a very unsatisfactory condition it would, I think, be idle to attempt to deny. The mass of evidence in proof of this assertion collected with such commendable energy by Professor Attfield, from various parts of the country, is simply overwhelming. Complaints of competition by unqualified traders reach us from every part, and murmurs, loud and long continued, against the inaction of the Pharmaceutical Society are heard on every hand. Nay, it is no uncommon thing to hear those whose want of business capacity is a conspicuous cause of their failure to earn a livelihood, lay the blame of their non-success upon the Pharmaceutical Society.

Competition from unqualified traders does not date from yesterday. From time immemorial, salts, senna, sweet spirits of nitre, syrup of rhubarb, tincture of rhubarb, and numerous other drugs and pharmaceutical preparations have been vended by grocers, hucksters, etc., etc., until they have acquired a kind of prescriptive right to the sale of them. Those of us who are anxiously waiting for any legislative enactment which shall restrict the sale of these articles to the qualified pharmacist, will, in my opinion, be doomed to sure disappointment. Moreover, the supply of drugs, etc., to these men will continue, and, however distasteful it may be to us, as qualified pharmacists, we may occasionally find ourselves so situated that out of pure self-defence we have no alternative left but that of supplying these men ourselves. Those of our members who have the fortune to reside in this neighbourhood will, I think, readily understand my meaning.

Our success as pharmacists will not be brought about by any Act of Parliament, but by our own individual effort, by taking care to place the stamp of individuality upon our business, by trying so to win the confidence of our customers that we need fear no competition either from stores or hucksters, always remembering that the calling of a pharmacist is after all quite as much a business as a profession.

72, Lancashire Hill, Stockport. THOMAS HART.

Junior.—If the father is alive, and the business belongs to him, the course would be legal.

Mr. J. P. Henry is thanked for his communication.

W. Robinson.—(1) You will find the sum properly acknowledged, *sub* "Newthorpe," p. 692, col. i. (2) See a paper on bleaching sponges, before, p. 88. (3) Tome's 'Dental Surgery.'

J. Richards.—See under "Succus Glycyrrhizæ" in 'Pharmacographia.'

H. C. H.—*Chrysosplenium oppositifolium.*

A. E. I.—The careful generation of chlorine would be sufficient for the purpose.

"*Rumex.*"—We think the form of the circular and the reputed action of one of the ingredients would suggest the wisdom of not making the experiment except under medical advice.

G. C.—To meet the views of particular prescribers the preparation is sometimes made of a gelatinous consistence by the use of soft soap.

H. B.—Hydrargyri oxid. rubrum.

J. Hardy.—We are unable to go beyond the official report in the publication of correspondence addressed to the body in question.

H. Shaw.—(1) Clinical experiments made by Mr. Ashburton Thompson appeared to show that amorphous phosphorus, free from normal phosphorus, is inert in the human system (*Pharm. Journ.*, [3], vi., 41). (2) Glycerine of tragacanth.

J. H. S.—Glycerine of tragacanth. You are recommended to consult the prescriber as to whether powders were not intended.

Student.—The object of the examination is, to quote the words of the Calendar, "to ascertain that the candidate has such an amount of ability, and made such use of it in the acquirement of elementary knowledge, as to justify the expectation of his proving a successful student." You will see therefore that we are unable to mention any one book that would enable you to prepare yourself for the competition.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Pickering, Van Eeden, Symes, Turner, Smith and Co., Scott, Richards, Inquirers, Anon.

"THE MONTH."

Mercurous tannate, the use of which was recently mentioned as having been recommended, appears to be attracting attention and is reported to have been tried in a South German university clinic in the treatment of syphilis with good results, whilst it was well tolerated by the patients (*Pharm. Zeit.*, March 8). The compound is said to be prepared by the precipitation of a solution of mercurous nitrate with potassium tannate and careful washing of the precipitate. In another journal (*Archiv*, March, p. 207) mercurous tannate is described as an odourless, tasteless, dark green powder containing about 50 per cent. of mercury. It is said not to be materially attacked by acids and not generally soluble without decomposition. Very dilute caustic and carbonated alkalies cause the separation of a slime consisting of mercury in such a minute state of division that when examined under the microscope the particles exhibit the phenomenon known as molecular movement. It is administered internally in doses of one decigram two or three times daily, and notwithstanding the comparative largeness of the dose it is said not to cause any disagreeable symptoms in the stomach or bowels. It appears to be rapidly absorbed into the system, being found in the urine twenty-four hours after administration.

Professor Eulenburg has communicated some information as to his method of treating neuralgia with osmic acid (*Pharm. Zeit.*, March 5). A one per cent. solution of the osmic acid crystals in distilled water is used and this should be kept in well closed bottles protected from the light. Notwithstanding this precaution the solution after a time darkens gradually and a dark, almost blackish, separation takes place, so that it is advisable to prepare only small quantities at a time. The darkened solution can however be used without disadvantage. The dose injected is usually 0·005 gram (=0·5 of the solution); in exceptional cases 0·01 gram (=1·0 of the solution) has been administered, but even this quantity produces no local or general disturbance. It is rather surprising that this pungent acid (resembling chlorine), which has a strongly irritating action on the outer cuticle, should cause so little pain when injected subcutaneously and scarcely produce any apparent change in the skin or tissue beneath it. At the most there is, as a rule, only a slight reddening or possibly an insignificant swelling in the neighbourhood of the puncture, but this quickly disappears. Sometimes the puncture may become blackened by the extrusion of a drop of the acid, but this has not been observed to cause any local inconvenience.

According to a note in the *Wiener med. Blatt.* (*Pharm. Centralh.*, March 13), the most suitable form for the administration of paraldehyd is an emulsion. The method and proportions recommended for the emulsion of 18 grams of paraldehyd are to rub an equal weight of powdered gum into a thick mucilage with a little water, then add a little paraldehyd, and after rubbing this to a homogeneous mass to pour in, in small portions alternately, the paraldehyd and sufficient water to bring the emulsion up to 150 grams; to this, add 30 grams of syrup. amygd. Dose, two tablespoonfuls. Each tablespoonful will contain about 1½ gram of paraldehyd; and should 3 grams not produce the desired effect, a second dose may be given half an hour after the first.

From experiments made on rabbits, it would appear, according to some details furnished by M. Baumetz to the Société de Thérapeutique, that there exists pronounced antagonism between paraldehyd and strychnia. Enough strychnia to kill twenty-five rabbits was given to one of these animals, to which a large dose of paraldehyd had previously been administered, without producing death, the only symptom of the action of strychnine being a few weak convulsions. Experiments on other animals gave the same results (*Medical Press*, March 12, p. 232).

Peroxide of hydrogen is recommended in the March number of the *Practitioner* (p. 197) as a local antiseptic and astringent. The advantages which are claimed for it are that, besides being a powerful antiseptic, it is colourless, odourless, cleansing and stimulating, does not stain or corrode, destroys pus, causes no pain in its application and is not poisonous. In purulent ophthalmia, otorrhœa, gonorrhœa, leucorrhœa, ozœna and stomatitis it has been found useful, and in all forms of ulcer, especially if of syphilitic origin, it exerts a healing effect. Dr. Shelly points out that if a few drops of the ordinary 10 per cent. solution be brought in contact with pus, a brisk effervescence at once commences and continues until all the pus is completely destroyed and a stimulant action on the wound takes place, followed by healthy repair. He suggests its use as a topical application in membranous diphtheria.

Writing respecting the use of "sulphide of calcium" solution for the cure of scabies, referred to last month (see before, p. 664), Mr. Wilkinson, of Manchester, says:—"I do not know whether it is supposed to be a new method of treatment or not, but I made the very same solution five and twenty years ago for a medical man in this neighbourhood, who found it a very effectual remedy for the itch, though I think somewhat severe. His treatment was to wash the skin thoroughly with warm soap and water, then rub the lotion well in before the fire, and afterwards again wash with soap and water."

The pharmacology of the camphor group is being investigated by Dr. Pellacani, of Modena. He reports (*Arch. f. exp. Path.*, xvii., 369) that borneol and menthol in respect to the manner of their action upon the nerve system differ essentially from other members of the camphor group. Like common camphor they act chiefly upon the central organs of the nervous system, especially the spinal cord and medulla oblongata, but it is in the direction of a diminution of their sensibility and activity, and on account of this dispressing action they are thought much more suitable for administration as a calmative. Menthol especially was found to be innocuous to the vascular system and large doses of it were tolerated by animals. Brom-camphor in its physiological action showed no specific distinction from common camphor, but it acted much more powerfully upon dogs, affecting them in doses in which ordinary camphor was quite inert. Some experiments have been made with secondary alcohols derived from decomposition products of camphors in the organism. One of these, campherol, prepared by the action of hydrochloric or sulphuric acid upon campho-glycuronic acid, occurring in the urine after the ingestion of ordinary camphor, was found to manifest in small doses administered subcutaneously an action similar to that of the camphor in large doses, together with a stimulating effect upon the heart.

The demand for eucalyptus oil and eucalyptol, based on the reputation of the products obtained from the leaves of *Eucalyptus Globulus*, has brought into commerce oils obtained from other species, which are said not to possess the same medicinal properties. However this may be, as there is a difference in their money value, it may be useful to quote from Messrs. E. Merck's circular the characters in which an oil that appears to be known in the German market as "Oleum Eucalypti australe" differs from the genuine product from *E. globulus* leaves. The genuine oil has a weak dextro-rotatory action, forms a clear solution in 90 per cent. alcohol in all proportions, does not puff when treated with iodine, turns yellowish in contact with sodium, and has a specific gravity of from 0·900 to 0·925, according as it is distilled from old or fresh leaves. The "australe" oil is strongly lævo-rotatory, only slightly soluble in 90 per cent. alcohol, puffs with iodine, is coloured red on standing with sodium, and has a specific gravity not higher than 0·860 to 0·870. The characters for *E. Globulus oil* answer for eucalyptol. The "eucalyptol puriss." has a boiling point between 170° and 173° C., a specific gravity of 0·910 to 0·920 at 15° C., and is as clear as water.

The vesicating substance obtained from the root of *Thapsia gargonica*, which is in France largely used for the preparation of plasters (see *Pharm. Journ.*, [3], ix., 143), has been submitted to an examination by F. Canzoneri, who reports (*Gazz. Chim.*, xiii., 514), that he has separated from it normal caprylic acid and two other new compounds. One of these, occurring in very small proportions, is non-nitrogenous, crystallizes in scales melting at 87° C., and in solution has a vesicating action. The other is a bibasic acid, which he has named "thapsianic acid" and represents by the formula $C_{16}H_{30}O_4$. It crystallizes from alcohol in shining scales melting at 123–124° C., and is obtained as a crystalline potassium salt upon treating the ethereal extract of the root with strong potash ley.

The artificial preparation of heliotropin (piperonal) was referred to in this Journal in connection with the Vienna exhibition. According to the *Chemiker Zeitung* (Feb. 7), the starting point is white pepper, from which the piperin is removed by extraction with alcohol, and converted into piperinate of potassium by heating it at a water-bath temperature for twenty-four hours with an equal weight of potassium hydrate and five or six parts of alcohol in a roomy retort provided with a vertical condenser. Upon cooling, the piperinate of potassium separates in shining yellowish scales, which are washed with cold alcohol, recrystallized from hot water, and when necessary decolorized by animal charcoal. The piperinate of potassium is thus obtained in nearly colourless wart-like groups of crystals, which become yellow under the influence of light. One part of this product is dissolved in forty to fifty parts of hot water, and into the hot liquid a solution of two parts of potassium permanganate is poured under continual stirring. A pasty mass is formed, which is drained and washed with hot water as long as it retains the characteristic odour of heliotropin. The united liquids are then submitted to distillation over an open fire, and from the distillate—which is fractionated because the first runnings are richest—the greater part of the piperonal separates after cooling and standing in the crystalline form; the remainder may be recovered by shaking the liquor with ether.

It was mentioned recently that Herr Ladenburg had succeeded in obtaining piperidine synthetically by treating pyridine with sodium in alcoholic solution, but the yield was at first not satisfactory. He now reports (*Berichte*, xvii., 389) that by a slight modification of the process better results have been obtained. A larger quantity of the base has been prepared so as to allow of its exact comparison with piperidine derived from piperine, and it is stated that at present the two products appear to be identical. Herr Ladenburg has also prepared in a similar way homologues of piperidine from methylpyridines and ethylpyridines derived from bone oil. One of these, γ-ethylpiperidine, has an odour resembling coniine and piperidine, which appears to confirm Professor Hofmann's opinion that coniine may be a homologue of piperidine, and for this reason the result of the investigation of propylpiperidine, with which Herr Ladenburg is now occupied, is looked for with interest. Moreover, this work will also probably remove any doubt as the nature of tropidine, the nucleus common to several Solanaceous alkaloids (*Pharm. Journ.*, [3], xii., 1049).

The occurrence of a ptomaine presenting a close resemblance to picrotoxin in its physical appearance and chemical reactions has been chronicled by Professor Giacomelli (*Zeit. œst. Apot.-Ver.*, March 1). The only reaction in which the two bodies appeared to differ was that when dissolved in water and a few drops of neutral acetate of lead solution added, upon boiling the mixture, the ptomaine remained unaltered, whilst the picrotoxin yielded a black precipitate, leaving the supernatant liquid colourless. They differed, however, entirely in physiological action. It will be remembered that the discovery of a similar body in beer some time ago, gave rise at first to the suspicion that cocculus indicus had been used, but afterwards its origin was attributed to alteration of albumenoid substances normally present in the liquor.

In fatal cases of poisoning by arsenic a yellow substance has frequently been found at periods varying from a few months to three years after interment of the body, and this colour has generally been taken for granted to be due to sulphide of arsenic. In some recent investigations as to the nature of the substance, by Dr. J. Campbell Brown and Mr. E. Davies, it has been found that the yellow pigment removed from the intestines and stomach contained no appreciable quantity of arsenic, but was readily soluble in chloroform, less so in alcohol, slightly soluble in strong ammonia, and reprecipitable by hydrochloric acid, and insoluble in water. The yellow residue obtained from the chloroform solution was reddened by strong hydrochloric acid, while nascent hydrogen from zinc and hydrochloric acid discharged the colour and dissolved the residue. Nitric acid converted it into a purple, then red, then brown substance; sulphuric acid gave a temporary red colour passing into brown. Sulphuric acid and pure sugar gave the violet-purple tint characteristic of Pettenkofer's test (*Brit. Med. Journ.*, March 15, p. 506).

In a communication to a recently-issued volume of 'Guy's Hospital Reports,' Dr. Stevenson alludes to a generally accepted opinion that water stored in zinc or zinc-coated tanks is not affected by the zinc to any appreciable extent, and states that he has abundant evidence that water does, under certain conditions, act energetically upon zinc and galvanized iron. He mentions a case in which rain water passing from a reservoir through galvanized pipes was for many weeks turbid and milky in appearance, and contained a notable quantity of zinc in suspension and some in solution. The experience is confirmed by Mr. J.L. Wills, who in a letter to the *Chemical News* (Feb. 29, p. 103), states that having left about two litres of water standing during three weeks in a galvanized iron bucket he observed an abundant white flocculent precipitate, which, collected and dried at 100° C., weighed 3·25 grams, and consisted of an oxidized product of zinc.

Confirmation has been received of the report, referred to on a previous occasion, that the German Cholera Commission has succeeded in establishing a connection between the bacillus which had hitherto been found only in the bodies or evacuations of cholera patients and suspected water. According to a correspondent of the *Daily News* (March 26), whilst the Commission was in Calcutta a sporadic outbreak of cholera of great intensity occurred in the native quarter of the city and in the neighbourhood of a dirty tank. Upon examining water from this tank Dr. Koch and his colleagues found that it swarmed with the parasite which they had previously found associated so closely with the disease. It was ascertained that the water had been used both for drinking and bathing purposes by the people among whom the outbreak occurred, and moreover it was observed that coincidently with the subsidence of the outbreak the water became clear of the parasite. Hitherto, however, the members of the Commission have failed to demonstrate the causal activity of this bacillus by communicating through it the disease to animals; but an announcement is now made that Dr. Richards, civil surgeon of Golundo, has succeeded in communicating in this way what he believes to have been genuine cholera to a pig, which died three hours after the cholera poison had been administered.

According to a note in the *British Medical Journal* (March 8, p. 476) Dr. E. Klein has recently investigated the bacillus of jequirity, and finds that the bacillus is, of itself, quite incapable of producing ophthalmia, and, further, that the pus from a case of ophthalmia contained no trace of the bacillus. He found also that the infusion of jequirity could be rendered incapable of producing ophthalmia by boiling for a time insufficient to destroy the bacilli, and that the bacilli, when cultivated in peptone solution or jequirity infusion previously sterilized by boiling for half an hour, possessed no power of producing ophthalmia. The active principle of the jequirity appears, therefore, to resemble, to some extent, in its vital properties the pepsine ferment, in that it is easily destroyed by heat. This statement is confirmed by Mr. Arthur Benson in a subsequent number of the same Journal (p. 564), in which it is stated that he has found that ophthalmia could be produced by the freshly powdered seeds, by the freshly made infusion, by the infusion after bacilli had appeared in it, by the infusion, six weeks old, swarming with various micro-organisms, and by the infusion after the bacilli had ceased all motion and had sunk to the bottom of the liquid apparently dead. He had examined, at all stages of the disease, the discharges and membranes from eyes affected with jequirity ophthalmia without ever seeing the typical bacillus. A one in ten thousand solution of corrosive sublimate prevented bacilli from forming, but did not destroy the power of the infusion to produce ophthalmia.

Dr. Klein, in an article in the *Practitioner* (p. 185), on "Micro-organisms and Disease," states that he finds a mixture of agar agar or Japan isinglass and peptone sugar solution one of the best media for cultivating bacilli, as it is solid, beautifully limpid and an excellent nourishing material. He speaks as though agar agar and Japanese isinglass were identical; the former name is, however, given to *Eucheuma spinosa*, and a jelly obtained from it, while the Japanese isinglass is prepared chiefly, if not entirely, from another alga, *Gelidium spinosum*. Of Japanese isinglass there are several varieties, but the one used by Dr. Klein is in the shape of thin shrivelled transparent lamellæ or narrow bands, and is, he says, very difficult to obtain. The isinglass is soaked overnight in distilled water, 1 to 5 or 6, and then dissolved in a water-bath, well neutralized with carbonate of sodium, filtered and mixed with a third of its bulk of broth, peptone or beef extract solution. As a rule he prefers peptone and sugar solution containing 2 per cent. of beef peptone and 1 per cent. of cane sugar, the solution being neutralized and filtered before use.

The use of tin vessels in the preparation of syrup of violets, on the ground that a preparation having a finer blue colour is thus obtained, has not yet been satisfactorily explained. It has been recently suggested (*Pharm. Post*, March 8) that the tin acts upon the colouring matter of the violets similarly as it is known to do towards other colouring matters, combining with it to form a lake, and that it is to such a compound that a syrup of violets prepared in a tin vessel owes its comparative permanence of colour.

Herr Tschirch has published (*Pharm. Zeitung*, Mar. 15) the results of an examination made to determine the responsibility as to a parcel of vanilla which had been rejected on account of its defective appearance. In the first place the capsules were disfigured by rows of roundish or oval warts. These, upon closer examination, were found to surround minute punctures, which were concluded to have been the work of an insect before the ripening of the fruit. There was also a large quantity of dust and yellow threads, which under the microscope were resolved into the gonidia and mycelium of *Aspergillus glaucus*. In addition, live and dead mites of a species of *Tyroglyphus* were found. The presence of the fungus and mites was attributed to putrefaction, due to the pods being packed before they were sufficiently dry. It was considered, therefore, that all the defects originated before the vanilla left the Mauritius, and the award was made accordingly.

At a recent Pharmaceutical Meeting in Philadelphia, Professor Maisch alluded to the fact that the *Spigelia* commonly sold twenty-five years ago has entirely disappeared from the market, its place having been taken by the much smaller roots of *Spigelia marilandica*, and by one or more species of *Phlox*, principally *P. Carolina*. He had been informed, when in Georgia, that the reputation of *Spigelia* had been built up on the results obtained by the use of *Phlox*. Dr. Miller corroborated the statement concerning *Phlox*, saying that he had found it useful in his own family before he had made extract from it for the trade. On the lists of some dealers both true and false pink root are quoted. Professor Maisch believed that different species of *Phlox* as well as *Spigelia marilandica* were known in the Southern States as Carolina pink, and it was possible that the root of *Phlox* might have been first used and the *Spigelia marilandica* subsequently taken its place (*Amer. Journ. Pharm.*, December, p. 631).

Professor Maisch has also pointed out that the root of *Nyssa grandidentata* is the species which is used under the name of tupelo for making tents, its wood being extremly light, while that of *Nyssa multiflora* and *uniflora*, growing in the Northern States, have a denser wood unsuited for the purpose (*Amer. Journ. Pharm.*, December, p. 632).

Those members of the community whose hobby is botany or natural history will be grateful to Professor Bryce for introducing into Parliament his Bill "to secure access to mountains and moorlands in Scotland." The Bill embodies every possible precaution against the abuse of the access wished for, and it may be hoped that the natural history societies and field clubs all over the country will use every available means to obtain for the Bill Parliamentary sanction. In many parts of the country the localities for rare plants, which are often among the most beautiful scenery of the country, are thrown open by their owners on certain days of the week, and the advantage is rarely abused and much appreciated. Still there are many places in this country and still more in Scotland, the botany of which has been very imperfectly explored, owing to the churlish refusal of the owners to admit persons, even of equal social rank with themselves, to explore their woods and uncultivated lands.

Several medicinal plants are now in bloom. In the country the tops of the elm trees may be seen to be brown with blossoms. On railway banks and waste clayey places the golden blossoms of the coltsfoot are brightening the almost bare soil. The sweet scented green flowers of the *Daphne Laureola* and the purplish ones of the *Daphne mezereum* are now in full bloom. In gardens the rosemary is in blossom, and the *Asarabacca* is just pushing its leaves through the ground. At Kew the *Atropaceæ* are represented by the *Hyoscyamus orientalis*, a valuable plant for botanic gardens, since it flowers at a time when it is difficult to procure specimens of that natural order. At the Royal Botanic Gardens at Regent's Park the Coca plant is now in full bloom. Among our rarer wild plants *Lathræa squamaria* is now emerging from the ground, and its white scape is so unlike any other plant met with at this time of year that it can hardly be overlooked. Further, Mr. Lynch, of the Cambridge Botanic Garden, sends word that the pretty *Muscari racemosum* and *Anemone Pulsatilla*, which grow wild near Cambridge, are now coming into blossom. At the time of writing, a specimen of *Salex Capræa* with several stamens on a female spike has been brought in from Epping Forest, an occurrence which seems to be very rare.

Another new British plant, *Juncus tenuis*, Willd., has recently been detected at Cradley, in Herefordshire, by Mr. R. F. Towndrow. According to a short note in the *Journal of Botany* (p. 91), the plant is interesting as being probably identical with a plant found by Mr. G. Don, in 1795 or 1796, by the side of a rivulet in marshy ground among the mountains of Angusshire, but very rare; it was described at the time in 'English Botany,' 1st ed., as *Juncus gracilis*, and figured under the name of *J. Gesneri*, DC., and in the second edition figured as *J. Gesneri*, while *J. gracilis* and *J. tenuis* are given as synonyms. The rare little plant, *Erythræa capitata*, var. *sphærocephala*, has also been detected by Mr. W. Matthews, in Guernsey, probably on L'Ancresse Common.

According to a note in the *British Medical Journal* (March 1, p. 428), Professor Virchow recently exhibited at a meeting of the Berlin Medical Society photographs of a gigantic plane tree growing in the Island of Cos, under the shade of which Hippocrates is said, by tradition, to have held medical consultations. The tree now stands in the market place of Cos on the east side of the island. The branches, which spread over nearly the whole of the market place, are supported by marble pillars.

The *Gardeners' Chronicle* (March 22, p. 373) publishes a letter from M. Alphonse de Candolle on a botanical point of some little interest. The names of varieties of plants are usually written in the same genderas the generic name, thus:—*Thymus Serpyllum*, *β. montanus*, Benth., while sometimes the varieties are put in the feminine gender. Mons. de Candolle considers that if the word var. be used, representing the feminine Latin word *varietas*, the name of the variety will be more correctly written with the feminine termination. He recommends the use of a feminine termination for the varietal name in all cases, whether the var. or *varietas* be expressed or understood.

One of the seeds (*Spergula arvensis*) which is found largely mixed in foreign linseed, especially in Russian varieties, appears to be likely to have some value in agriculture. Lord Walsingham has recently cultivated on twenty acres of blowing sands, useless for other crops, a quantity of the plant, which yielded an ensilage, preferred by cattle to that made from grass. The plant is also said to be valuable food for poultry. Since the seed may be obtained as a waste product by the sifting of linseed, it may be hoped that the demand likely to arise for it through this observation may lead indirectly to greater purity in commercial linseed.

Dr. Dymock, in the recently concluded 'Vegetable Materia Medica of Western India,' points out the curious fact that camphor is resublimed in India, not so much with a view to its purification as to increase its weight by getting as much interstitial water as possible into the cake. In order not to lose the profit thus obtained, the camphor is sold as soon as possible after sublimation at the same price as the crude article, the profit being thus drawn out of the water.

A case of poisoning by hemlock is reported in the *British Medical Journal* (March 22, p. 576), which occurred during the previous week to some boys belonging to the training ship *Cumberland*, stationed on the Clyde. Ten of the boys became seriously ill, the chief symptom being great stupor and loss of power in the limbs. It is to be regretted that the botanical name of the plant was not reported, all that is said being that "an examination of the herb showed that it belonged to the *Umbelliferæ*, and was one of the hemlock species." The plant most likely to have ccurred on wet streamlets near the shore is *Œnanthe crocata*, and it is also the plant whose tuberous roots are most likely to have been eaten. In the interests of toxicology it is important that this plant, the hemlock water dropwort, should be carefully distinguished from the true hemlock (*Conium maculatum*), and the water hemlock (*Cicuta virosa*).

An observation that is claimed to have a bearing on the flora of the carboniferous period and the formation of petroleum is put on record by Dr. A. B. Griffiths (*Chem. News*, Feb. 29), who states that he has ascertained that phenol exists in various proportions in the free state in the leaves, stem and cones of *Pinus sylvestris*. Dr. Griffiths suggests that as phenol is also a product of the distillation of coal, this observation confirms the views of those geologists who date the existence of the Coniferæ as far back as the carboniferous period, and that further it also supports the theory that the origin of petroleum in nature was the action of moderate heat on coal or similar matter of a vegetable origin, since it is known that petroleum contains phenol and its homologues.

In a letter addressed to Sir William Thomson and sent by him to *Nature* (March 20, p. 494), attention is directed by the writer of the letter, Mr. L. P. Muirhead, to the quantity of meteoric dust that fell in Scotland on March 1, which he has calculated as amounting, over the area of 810 square miles, on which it was observed, to 5760 tons, or at the rate of 4 grains to the square foot. Curiously enough on the two succeeding days the goats suffered from influenza, and Mr. Muirhead himself had a sharp attack followed by a severe headache for a day. The coincidence, if nothing more, is a suggestive hint as to the cause of the epidemics of influenza that are occasionally recorded.

NOTES ON TINCTURE OF HYOSCYAMUS.*

BY WILLIAM GILMOUR.

Some time ago I had a sample of tincture of hyoscyamus given me to examine, which had a peculiar odour not at all characteristic of this tincture, and which also gave on the addition of water a milkiness much more decided than anything I had ever previously observed with hyoscyamus. It is sometimes not easy to distinguish a familiar odour if cunningly masked, but here there was little difficulty, particularly on diluting the tincture with water, in discovering the all-pervading odour of balsam of copaivi, and the supposition was that the hyoscyamus leaves from which the tincture had been prepared were annual leaves and had been sophisticated with the balsam so as to give the heavy odour and the milky opacity on the addition of water, characteristic of a tincture prepared from the biennial leaves. The idea was an ingenious one, particularly if we bear in mind that the annual hyoscyamus can at present be bought for as many pence as the biennial costs shillings. Unfortunately for the idea, the contamination was ultimately discovered to be accidental, but to this accident you are indebted for the following short notes.

There have been only two methods proposed, so far as I am aware, to distinguish a tincture prepared from the annual henbane leaves from one prepared as officially directed from the biennial, namely, that of the spectroscope, by the late Mr. Stoddart, and that of a milky opacity on the addition of water, by Mr. Donovan.

In the *Medical Press and Circular*, of 1871, Mr. Donovan directs "a little of the tincture to be added to a glass of water, when if the mixture becomes slightly milky the tincture (he states) is made from a two years old plant, but if it remain transparent the plant has been in its first year." Regarding the first mentioned test, Mr. Stoddart (in vol. xi., [2], *Pharmaceutical Journal*, 1869-70,) after describing the spectrum of the biennial tincture, which gives four very dark bands, goes on to remark of the tincture prepared from the annual plant, "This spectrum is very different to the last and cannot be mistaken for it. The chlorophyll line at B. is not so decided, the second and third lines so weak as to be barely visible and the fourth absent." A year later, writing in the same journal on Bristol Pharmacology, he puts the statement even more strongly, thus, "Authors have been undecided as to whether the biennial and annual plants should be regarded as distinct varieties, or the latter only a more mature growth of the former. The latter is probably the true state of the case. . . . . The microspectroscope will immediately decide whether the tincture has been made from the biennial plant. Five dark bands are distinctly seen which are not visible in that from the annual." Both tests, I may state, have been repeatedly quoted since as authoritative. Thus, so recently as vol. viii. of the present series, we have the writer of the Month article, in the *Pharmaceutical Journal*, making reference to both and saying that "practical pharmacists should not forget that the tincture of this plant (annual) does not show a milkiness when mixed with water, as that made from the biennial does, nor that the preparation made from the two kinds can be distinguished, as shown by Stoddart, by means of the spectroscope." Now it is not easy for investigators to arrive at any definite conclusion as to what is meant *commercially* by annual henbane. I find that the term applies indiscriminately to leaves derived from a variety of sources. Thus we have the British annual henbane proper; and the root leaves of the biennial plant, which Mr. Holmes informs me usually forms the annual of English commerce; then there is what is known as German henbane, and probably a whole variety known somewhat vaguely as exotic henbane. Through the kindness and courtesy of Mr. Holmes, of the Museum department of the Society in London, I received samples of different kinds of henbane (samples of these as well as tinctures prepared from them are on the table and may be examined by members), and among others, one sample of the real German annual. I am persuaded, after comparing somewhat minutely this sample with those of the commercial received by favour from various wholesale houses, that very much of the annual henbane at present in circulation is of German origin. Be this as it may what we, as practical pharmacists, have to do is to accept and judge matters as we actually find them, and, therefore, I have to point out that of all the annual specimens which I have examined, I have not found one which did not give a spectrum as well defined as that derived from any specimen of the biennial plant. Indeed, I have found the bands of the spectrum more uniform and more decided from the various specimens of the annual plant which I have examined, than I have found from an equal number of specimens of the biennial plant. We must, therefore, once for all give up the spectroscope as an agent for distinguishing the one from the other.

It is probably not in the power of every one to apply a spectroscope to his tincture, but I will here shortly describe how a rough but very fair tes

* Read at an Evening Meeting of the North British Branch of the Pharmaceutical Society, March 19, 1884.

may be applied to this tincture, showing its age, quality, etc., without going to the expense of a spectroscope.

To two parts of tincture in a test tube, add one part ordinary commercial benzole; shake thoroughly and allow to stand for a short time. The benzole will be found to separate, taking with it almost every particle of green colouring matter, leaving after a time a clear tincture beneath. So thoroughly does the benzole extract the chlorophyll that it leaves scarcely the trace of a dark band in the tincture beneath, and from the depth of the green solution above as well as from the colour of the brown tincture below as good an indication will be given of the value of the tincture as can be got almost from the spectroscope itself. I have here a whole series of test tubes filled with tinctures thus treated, and, as can be seen at once, the shades of colour vary considerably, both in the chlorophyll solution above and in the tincture beneath. The history of these different tinctures will be referred to immediately, but I would in the meantime call attention to test tube numbered 3, which contains the tincture of German annual received from Mr. Holmes and which you will find not the least marked both as regards the chlorophyll solution above and the brown tincture beneath. So much for the spectroscope as discriminating between a tincture prepared from the annual and biennial plants.

Coming now to the other test, namely, that of the milky opacity on the addition of water, I have not found one single sample of biennial which failed to give it, nor can I recollect of ever coming across such a sample during the last eight or ten years in the ordinary course of business. I would, therefore, unhesitatingly reject as bad, owing to age, or from some defect in drying or from exposure, or other cause, any biennial plant the tincture from which failed to yield it. In saying this, however, I am saying all that can be said for this test. It is *not* a test which can distinguish the biennial tincture from the annual, for I have come across as many specimens of the latter which do give the milkiness as of those which fail to give it. Of those which give the milkiness, some give it at once, while others only give it after standing for some time. This last fact may be the reason why the reaction has not been more frequently observed. The tincture from the German annual, which we have here, for example, gives it readily and copiously, and, in every respect as well, answers all the tests of a good biennial spemen, with the exception of the odour. Probably most will have noticed the heavy fetid odour (not unlike ox-gall) which the biennial tincture gives on the addition of caustic potash. This peculiar odour is almost entirely wanting in every specimen of tincture prepared from the annual plant which I have examined, the odour being quite different. In this respect the sample of the annual on the table closely resembles the tincture prepared from the large stem leaves of the biennial sample received from Mr. Holmes. This sample makes a very inferior tincture and is not for a moment to be compared to the tincture prepared from the leafy tops received also from Mr. Holmes.

It was originally my intention to have confined my notes to the two points touched upon, but after proceeding with the examination of the different specimens placed at my disposal, my attention was directed to a paper read by Mr. Gerrard, at the last meeting of the Pharmaceutical Conference, on "The Odorous Principle of Henbane Leaf." In a concluding note to this paper, in which Mr. Gerrard practically applies his investigations to pharmacy, he points out not only what I have just shown as regards the turbidity test, but goes on also to deduce several conclusions from it which, according to my experience, will, I think, scarcely stand the test of experiment. He states for example that "many samples of tincture of henbane almost lose their property of becoming turbid with water; this is generally the result of age, for such a tincture will be found to have lost its original green colour and changed to a brown with formation of the usual dark deposit. Thus deposition and disappearance of turbidity are simultaneous and proportionate. As to the nature of the deposit in the tincture, I believe if examined it will be found to consist of a mixture of odorous principle, fat and chlorophyll, the separation of which is slowly effected by the agency of the water in the proof spirit; if this be so, then it is an argument for the use of a stronger alcohol in the making of the tincture of henbane."

I called Mr. Gerrard's attention to the fact that I had exposed a tincture of henbane to ordinary light (no sunshine), and in three weeks it had lost almost every trace of green colouring principle, while it had not deposited in the least, nor had it lost its property of becoming turbid with water. To this Mr. Gerrard replied that the tincture had not been kept sufficiently long, but that with the changing of the chlorophyll the tincture would have become acid (it shows no signs of acidity up to the present time), this acidity increasing with age, and that the deposit referred to by him would take from three to six months to form. I believe Mr. Gerrard is quite right in his observations, although I think he is wrong in his deduction that this change is "slowly effected by the agency of the water in the proof spirit." Some years ago I pointed out that these very changes here described by Mr. Gerrard took place in olive oil on exposing it to light. There was first the gradual decomposition of the chlorophyll and the disappearance of the bands in the spectroscope; next, an increasing cloudiness in the oil, accompanied by an increasing acidity, all of which, I have no doubt, would have ended in a deposit as described by Mr. Gerrard had the density of the oil permitted this, or had it been kept long enough. The water could scarcely in this instance be said to be the agent which either favoured decomposition or tended to effect separation. But further and more important still, I have to point out the much greater susceptibility of a tincture of henbane to change when prepared with a stronger as compared with a weaker alcohol. I have prepared duplicate tinctures with rectified spirit of every sample of henbane on the table, and two things cannot fail at once to strike even an ordinary observer regarding them, namely, first, the close resemblance which they all (annual and biennial) bear to each other, and, second, the striking unlikeness which they have to a tincture prepared from proof spirit. They have all the same deep green coloration, not unlike essence of bergamot, or better still, like commercial cajeput oil, and this characteristic feature, so striking in the first instance, is equally remarkable for its evanescence on exposure. I find that even twelve hours exposure will quite change their appearance, and this change goes on so rapidly that towards the end of a week the tincture becomes almost decolorized. I have here two tinctures thus exposed, which you can compare with samples of the same tincture carefully preserved. Twelve hours' exposure removed every trace of bright green, converting the tincture into a brown olive, and this in turn gradually faded, until it reached on the seventh day the dirty straw-white which you now see. This you will admit is of itself a very serious objection to any change in the spirit strength of the tincture, more especially if we keep in mind, comparatively speaking, the permanent character (to the naked eye) of the official tincture, three weeks exposure under similar conditions making scarcely any observable difference in it.

There is still one more objection to changing the spirit strength of this tincture, and to my mind it is the most serious of all, namely, that the stronger spirit does not exhaust the leaves of their active principle. In saying this I know that I am going not only in the face of Mr. Gerrard, but also of such an eminent authority as Christison, who says that the leaves impart their active principle alike to alcohol and proof spirit. From the very great change which has taken place in the rectified spirit tincture on exposure, as well as from the entire absence of any colouring principle except the chlorophyll when treated with benzole as already described (on agitating the rectified spirit tincture with water and benzole, the benzole extracts every particle of green colouring matter and leaves the tincture beneath absolutely colourless), I think there is every reason to conclude that the stronger alcohol exhausts the leaves to a very great extent of their green colouring matter and not to any extent of their active principle. In further proof of this I have to point out that with wonderful uniformity all the proof spirit tinctures contain from five to six times the amount of extractive matter compared with the stronger spirit tinctures prepared from the same samples. The table underneath sufficiently explains itself.

No. 1. German annnal, proof spt. = 1·05 per cent. extractive.

No. 2. German annual, rect. spt. = ·20 per cent. extractive.

No. 3. Large leaf biennial *ver.*, proof spt. = 1·40 per cent. extractive

No. 4. Large leaf biennial *ver.*, rect. spt. = ·20 per cent. extractive.

No. 5. Biennial tops *ver.*, proof spt. = 1·40 per cent. extractive.

No. 6. Biennial tops *ver.*, rect. spt. = ·20 per cent. extractive.

No. 7. Biennial commercial (1), proof spt. = 1·20 per cent. extractive.

No. 8. Biennial commercial, rect. spt. = ·21 per cent. extractive.

No. 9. Biennial commercial (2), proof spt. = 1·20 per cent. extractive.

No. 10. Biennial commercial, rect. spt. = ·5 per cent. extractive.

Of course extractive matter is not active principle, and the correct plan to determine the relative value of the two tinctures would be to estimate the amount of hyoscyamine present in them. I have been experimenting on quantities much too small to permit of this, and, moreover, it was not my intention, as I have already explained, to enter into the question of a stronger or a weaker tincture, so that I have not had time to do so, even although I had so desired.

To sum up my observations, we have—

First. The fact that the spectroscope does *not* distinguish between a tincture made from an annual or a biennial plant.

Second. That the milky turbidity on the addition of water is not a test to distinguish the one from the other; but it is a fairly good test as to the quality, so far as age, exposure, etc., of the biennial plant is concerned.

Third. That a proof spirit tincture, although quickly changing so far as the chlorophyll matter is concerned, does not show this change to any extent to the naked eye, while the more important chemical changes which ultimately affect the quality of the tincture therapeutically are comparatively slow.

Fourth. That a rectified spirit tincture undergoes very rapid changes, which are very conspicuous to the naked eye, and which are almost certain to end in rapid chemical changes affecting the therapeutic value (if it possesses any) of the tincture.

Fifth. That rectified spirit does not possess the same power of exhausting the henbane of its extractive matter as proof spirit.

Sixth. That a rectified spirit tincture and a proof spirit tincture are quite unlike in their appearance, so much so as practically to make them unrecognizable.

[*The discussion on this paper is printed on p.* 790.]

NOTES ON PHARMACEUTICAL APPARATUS.*

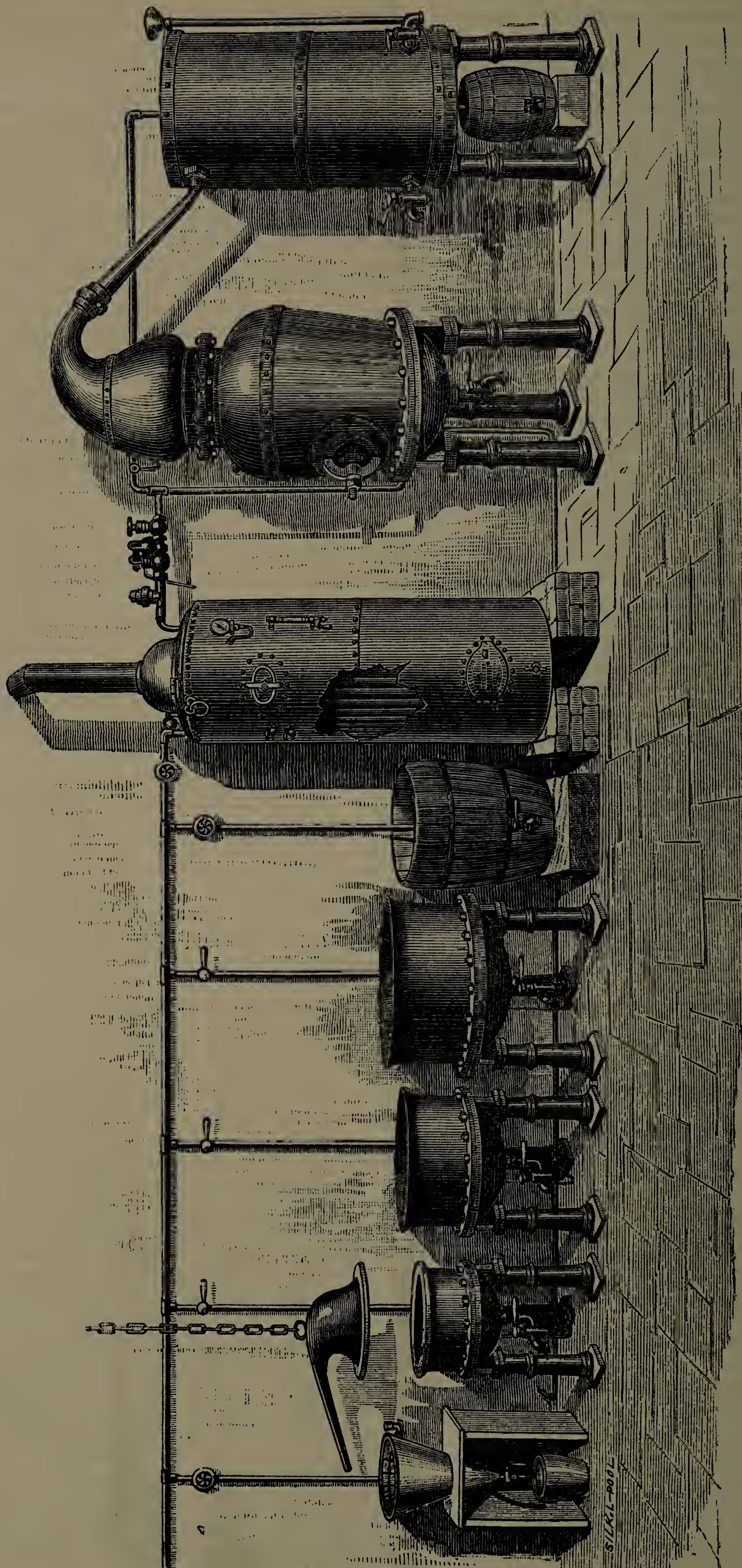
BY CHARLES SYMES, PH.D.

Some years ago, Mr. Ince (I believe it was Mr. Ince) wrote thus, or to this effect, "I have a good deal of faith in a man and a pan, provided the one has brains and the other has capacity." These words forcibly conveyed to my mind, that, in the opinion of the writer, a man of good average intelligence, with simple apparatus, sufficiently large for his purposes, could accomplish much in the way of manufacturing pharmaceutical preparations; and I think there can be little doubt that a pharmaceutical sermon, having "a man and a pan" for a text could, in able hands, be rendered both interesting and instructive.

As a busy man, having my time pretty fully occupied with the duties of my calling I merely propose to bring before you this evening some ideas concerning, and description of, a few simple but useful forms of pharmaceutical apparatus. I do so under the following circumstances.

Last year a friend from South America, when visiting Liverpool, desired to see our laboratory, about which he had probably formed some exalted notions; but on being shown the very modest equipment, after some conversation he said, "If so much practical work can be accomplished by such simple means, send me some similar things, such as your experience suggests as being necessary and useful to commence with for a small laboratory, and to which I can add as occasion requires." The work (except percolators, retorts, and minor matters) was, with rough drawings, placed in the hands of Messrs. Thomas Ryder and Co., engineers, of Manchester, and was by them executed in a highly satisfactory manner. I may add that as the apparatus

* Read at a meeting of the Liverpool Chemists' Association, February 28.



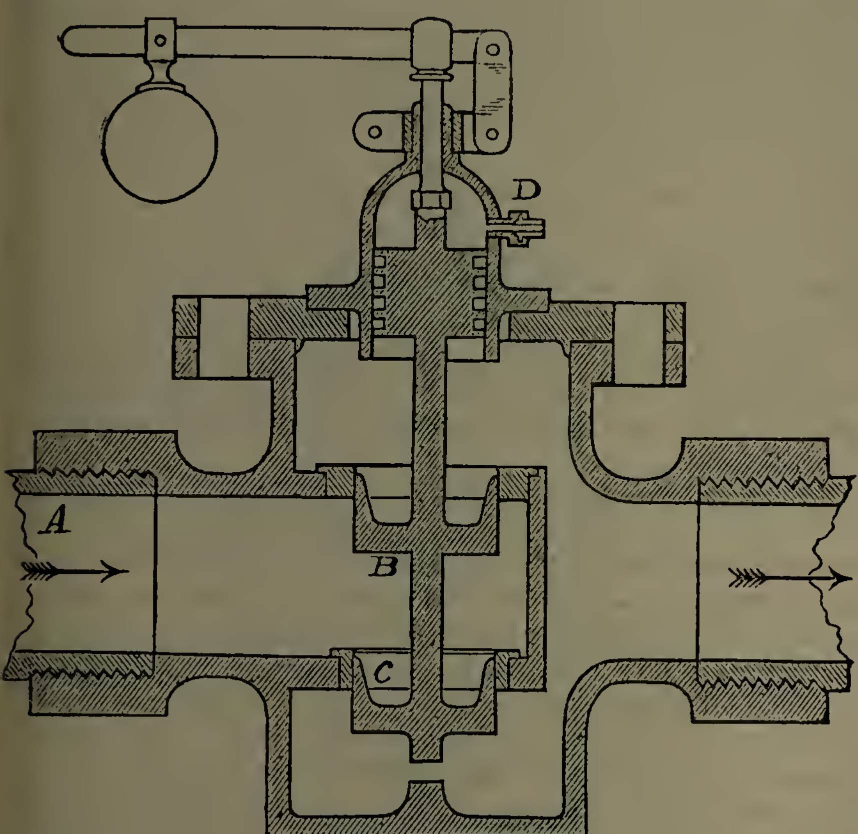
Pharmaceutical Apparatus.

As constructed by Messrs. T. Ryder and Co., Manchester, for Messrs. Symes and Co., Liverpool.

The boiler has been introduced to show the working position.

had been shipped long before it occurred to me to write this communication, I am indebted to them for a photograph and some particulars to refresh my memory and enable me to bring the matter before you in what I trust will be a clear and explicit manner.

I must mention that our friend had already a high pressure boiler working an engine and other machinery, and we had, therefore, to start with a reducing valve.



This valve is made of gun metal and is so arranged on the steam supply main that it reduces the pressure therein from the actual pressure of the boiler, say 60 lbs., to 2 or more pounds per square inch, as may be desired.

The steam entering at A, and acting equally on the two valve faces B and C, it will be seen that there would be no passage but for the lever, which is weighted in such a manner as to allow just sufficient steam to pass through to produce the lower pressure and temperature. To the small union connection, marked D, is attached a brass tube to convey away any moisture from the upper chamber which may accumulate by the condensation of steam as it is passing through the valve; and it also serves to prevent the possibilty of a vacuum being formed which would hold the valves in check and prevent them from working freely.

As most pharmacists would provide a boiler specially for working such apparatus I am about to describe, let me say a few words about boilers, the choice of one being a matter of some importance. Our own is a small upright tubular, 4½ feet high by 26 inches diameter; it stands on nine inches of brick-work, and occupies but little space in the laboratory. An iron pipe, covered with felt to lessen condensation, runs from it round two walls of the building to supply steam to stills, pans, funnels, etc.

To have a boiler too small for the purposes required is a decided mistake; it is better to err in the opposite direction, as anyone with experience in these matters will know how trying it is to run short of steam when two or three preparations are in hand and a lot of evaporation has to be done. There is of course a limit in size, beyond which it is not desirable to go, first on account of space, and secondly on the score of economy in time and fuel, for if a much larger boiler is used than is really required there is so much more water to be heated each morning at the expense of these two items.

Boilers are usually described as of one or more "horse power," and to obtain this unit in the most simple form the following conditions are necessary, viz., 1 square foot of fire grate and 1 square yard of heating surface; these, with an expenditure of 14 lbs. of coal evaporate 1 cubic foot, or rather more that six gallons of water per hour, which, in the form of steam applied to a Boulton-Watt engine would perform the work of one horse for that period of time. A two horse boiler is sufficiently large where machinery is not used, and an upright tubular one is the best for "getting up steam" quickly. In this, coke should be used in preference to coal, as the latter is liable to choke the tubes with soot very readily. Although it should be tested to bear a pressure of at least 100 lbs. to the square inch, not one tenth this amount is generally used for pharmaceutical purposes.

With a low pressure boiler, then, a reducing valve is not required, and the steam is taken direct from it to the point at which it has to be used, merely interposing a screw stop valve on the main, which in such position is better than an ordinary tap, as it affords a more convenient means of regulating the supply. In the arrangement shown, a tub, three pans and a funnel are placed on one side of the boiler; a still and condenser on the other side. Into the tub passes a block tin pipe, terminating on the bottom in a flat perforated coil; a short distance above which, rests a perforated false bottom, such an arrangement being convenient for steaming and boiling purposes, where the ingredients are bulky, as in the case of decoctum sarzæ comp., etc.

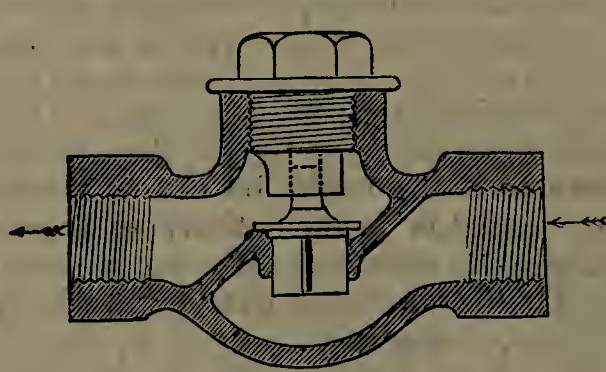
The pans are of copper, jacketted with cast iron, leaving a steam cavity over the lower part only. This provides sufficient heating surface for rapid evaporation, and avoids to some extent the inconvenience and possible deterioration of the product caused by the drying which always occurs on the outer edge of the liquid where it comes in contact with the sides of the pan when it is jacketted to the top. Constant stirring will of course obviate this to some extent, but even with this, and the old arrangement, it is not easy to remove the difficulty.

The capacities are 40, 20 and 10 gallons, and the internal measurement, 30 × 24, 24 × 20 and 18 × 17 in. respectively, and such a one is fitted with a check valve, or tap, vacuum valve, and a syphon pipe and back pressure valve at the outlet for waste steam; it is self-contained, requiring only the attachment of the steam supply and waste pipes, so that if thought desirable, the relative positions could be changed with ease. The steam funnel is made entirely of copper, well tinned inside, and the steam chamber is continued to the top. The steam supply enters at a ⅜-inch union near the top, makes the circuit of the chamber and passes out at right angles to the side of the funnel, more or less condensed, near the bottom. The exit tap is somewhat large in proportion to the funnel itself, the object of so having it being to prevent any possibility of choking up and to provide a good exit for any thick or partly solid filtrate. The interior of the funnel is fitted with a tinned wire cagework which can be removed at will, its obvious use being to prevent the filtering material from touching the sides of the funnel and for preserving a clear passage for the filtrate in all directions, whilst the support given is practically equal to that by a solid surface. Near the top is placed a small safety valve which is regulated to blow off at 5 lbs. pressure. The main steam pipe (if not required for drying closet) should terminate in this direction with a T-piece, fitted with screw tap and hose connection, so that a rubber tube can be attached when desired; it is useful for many purposes, one example is that of steaming nux vomica beans before grinding.

The still is placed on the opposite side of the boiler; it is of copper with a cast iron jacket, similar to those on the pans, and has fittings like them. In the body of the still is a gun-metal hand-hole for removing any solid residue and for cleaning out purposes. It is also fitted with a removable perforated false bottom for separating any solid matter from the liquid contents drawn off by the tap underneath. The distillate is condensed in a block tin worm contained in a circular wrought iron cistern of 60 gallons capacity, the exit being from the side near the bottom.

Passing direct from the boiler is a steam-pipe which terminates in another block tin worm at the top of the cistern, going within the coil of the other worm and out at the centre of the bottom of the cistern. Underneath is a stoneware barrel to receive the distilled water as it flows from the last-named worm. This is found to be a convenient arrangement, and whenever the pressure is increasing unduly round the still or pans, or when it is necessary to stop the working of one or more of these, then the distilled water tap can be turned on, with the result that one has a good supply of distilled water, practically free of cost.

It has been mentioned that each pan is fitted with a syphon pipe and back pressure valve. The former prevents waste of steam, and consequent power; a foot of condensed water in the pipe would represent approximately half a pound of steam pressure. The latter prevents the waste steam from one pan from entering the chamber of the next, replacing a tap and acting automatically; it is exceedingly simple, as will be seen from the drawing. The arrows indicate the direction in which the steam (or condensed water) passes, lifting the small valve in the centre and moving forward freely; but if it attempts to pass in the opposite direction, the more tightly the valve is closed against it.



The apparatus described does not by any means constitute the equipment of a pharmaceutical laboratory, but it forms some of the essentials for every-day work, and a foundation on which to build. The capabilities are but moderate, still the expense is moderate also. The cost, exclusive of main supply and waste steam pipes, the tub and stone barrel, is £110. A two horse upright tubular boiler costs £28 or £30, so that the whole could be fitted up for something like £150. The still, pans and funnel are tested by hydraulic pressure to bear 20 lbs. on each square inch of surface.

Doubtless, different pharmacists work their apparatus at different degrees of pressure. My experience is that with pans of the size mentioned a pressure of from 2 lbs. to 5 lbs. to the square inch, giving a temperature of from 216° to 225½° F., is the most suitable when stirring is actively continued, and when not stirring, a nominal pressure, say of ½ lb. to the square inch is quite ample.

[*The discussion on this paper is printed at p.* 790.]

NETTLE-FIBRE.

In the *Deutsche Allgemeine Polytechnische Zeitung*, Dr. J. Moeller gives a report of experiments on the histological characters of the fibre of the common stinging-nettle, *Urtica dioica*, and its applicability to technological purposes.

The primary bast-bundles of the stem do not form a connected ring, and its fibres are mostly separated by intermediate parenchyma. The cortical parenchyma is not sclerenchymatous. At the base of the stem the fibres are mostly about 0·12 mm. in diameter; higher up they are thinner; but even at the summit they have a diameter of 0·04 mm. The thinnest fibres of the nettle are therefore as thick as the thickest of hemp. In consequence of their isolation they are seldom polygonal. At the commencement of the time of flowering the fibres in the upper portion of the stem only are completely thickened; those in the lower part have still large cavities. There are no pore-canals. Fibres were measured 22 mm. in length; they are very irregular in form. They consist of nearly pure cellulose; their behaviour with cuoxam is characteristic. They swell with extraordinary rapidity from without inwards; a sharply differentiated internal layer resists the action for some minutes; but this is also at length dissolved; and in addition to a small quantity of contents of the fibres a delicate network remains, the primary membranes of the parenchyma cells which surrounded the fibres.

Fibres baked or treated with acids or alcohol show two peculiarities. They are very irregularly isolated, being either united into bands or disintegrated into separate fibres; there are no thin bundles, like those of combed flax or hemp. This peculiarity depends on the structure of the primary and on the want of secondary bast-fibre-bundles. The second peculiarity is their complete and nearly regular investment with parenchyma, in consequence of which they are rough and dull; resulting from the incomplete differentiation of the wall of the fibres and of that of the parenchyma-cells.

Both these peculiarities are very disadvantageous to the employment of the nettle-fibre as a technical product. The chemical means employed to separate the fibres completely from the surrounding parenchyma would affect injuriously the fineness of the fibre.

Attempts have been made to naturalize in Germany the North American *Laportea pustulata*; but similar disadvantages attend the structure of the fibre. In August the bast-fibres in the upper third of the stem are not yet developed; in the lower portion they are but imperfectly thickened. The cortex, bast and fibres, resemble those of *Urtica dioica*; but the fibres are considerably larger at the base of the stem, usually 0·5 mm. in diameter, and more than 80 mm. long; in the middle part of the stem they have still a diameter of 0·1 mm. They consist of pure cellulose; they dissolve rapidly and completely in cuoxam, leaving behind a parenchymatous network and the protoplasmic contents of the fibres.

The Pharmaceutical Journal.

SATURDAY, MARCH 29, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

THE PROPOSED LEGISLATION AS TO POISONS.

THE past week has not been without its history, for on Wednesday, Mr. WARTON's exceptional effort at constructional legislation,—the Bill to Restrict the Sale of Patent Medicines—was withdrawn, after a brief public existence of only seven days. This result was not unexpected in view of the declaration of the Government as to its intention to deal with the poison question, and little ingenuity was required to anticipate the tenour of the greater part of the discussion attending the withdrawal in the House of Commons, which will be found on another page. The member for Bridport is evidently strongly impressed with the evils consequent upon the unrestricted sale of poisons under the guise of patent medicines, and the measure proposed by him for diminishing them can hardly be said to have been wanting—in intention, at least—in stringency. Whether the provisions would have proved workable is quite another affair, and notwithstanding the high compliment to the Pharmaceutical Society implied in the willingness of the honourable member to entrust it with the onerous—and honorary—duty of carrying them into effect, it is not probable that the collapse of the proposed arrangement will arouse much regret in that quarter. Nevertheless, Mr. WARTON did good service in impressing upon the attention of the Legislature the fact that the very same poisons that it has decided shall not be sold in an undisguised form except by skilled persons and under certain restrictions, are being sold under the cover of the patent medicine stamp by any persons and without any precautions. Moreover, he very properly pointed out that the makers of innocuous preparations would have no difficulty in placing them outside the operation of the proposed law. In connection with this latter point it is rather curious—though under the circumstances perhaps hardly worth noticing—that such a high authority as the Attorney-General appeared to be imperfectly acquainted with the actual provisions of the Bill that he was discussing. In order to enforce his argument, he said that according to the Bill, if, on analysis, one trace of poison, however slight, should be found in a preparation, notwithstanding the medicine might be of a beneficial character, it must be labelled poison and the sale of it must be regulated by all the forms prescribed by the Pharmacy Act. Now apart from the fact that this appears to be a reversal of the order of the Bill, according to which a patent medicine was to be considered a poison until it had been declared non-poisonous, a reference to the second clause will show that the provision as to the Pharmaceutical Society passing a resolution to the effect that a patent medicine contained poison would have been permissive in its terms, and that even in the event of such a resolution being passed it would have required the sanction of the Privy Council before coming into force, a not unimportant limitation.

Dr. FARQUHARSON, who, from the fact that his name was on the back of the Bill, might have been expected to bless it rather than to ban it, did not betray any excessive admiration for some of its provisions. His view that an authoritative declaration, based on analysis, such as was proposed, would increase the tendency of the public, already imparted by the revenue stamp, to look upon such medicines as bearing a Government sanction, is no doubt correct. Indeed his suggestion that the Government should sacrifice the sum derived from the patent medicine stamp duty will probably commend itself to most persons who have considered the subject apart from the necessities of the public revenue. It is satisfactory to observe, however, that although it was outside the scope of the Bill under discussion, Dr. FARQUHARSON's appeal to the Government to consider the anomalous liberty at present allowed to co-operative stores in respect to dealing in poisons was endorsed by the approval of his hearers.

The arguments for the rejection of the Bill were of two kinds. That by Mr. W. JAMES was advanced from the point of view from which the Bill would naturally be regarded by persons interested in the patent medicine traffic. No doubt regulations dealing with the question in any way will constitute an interference with trade and will exercise a limiting influence in direct proportion as the nostrums to which they apply contain those substances that are supposed to exercise a deleterious influence upon the public health. But the emphasizing of the enormous proportions of the traffic and the extent to which it would be affected by restrictions imposed in the interest of the public will hardly be accepted as a reason that nothing should be done to control it. Moreover, in the face of well-known official statistics that had already been referred to in the course of the discussion, it seemed barely courteous to the House to assert that during the last two years not more than seven deaths had occurred through poisoning by patent medicines. No serious discussion could be maintained on the basis of such a statement. The reason urged by the Attorney-General for the rejection of the Bill, that the Government is prepared to deal with the question in a broader sense, was much more reasonable, and probably Mr. WARTON will consider that his object has been sufficiently attained in eliciting a definite statement as to the introduction of a Government Bill. In conclusion, we may remark that in referring to this subject recently, we ventured to express an opinion as to its unsuitability for treatment by "amateur legislators," and, although members of parliament were hardly the class to whom it was intended to allude, this latest episode in the poison controversy seems to show that even that further application of our remark would not be unwarranted.

THE PROGRESS OF METEOROLOGY.

The annual Report of the Meteorological Council to the Royal Society, which makes its appearance about this period of the year, is usually more suggestive of an enormous amount of investigation that remains yet to be undertaken than of any very marked progress in acquired knowledge of the science. This is attributable, however, rather to the *laches* of the past than to want of energy amongst present investigators, though the infinite extent and variety of the field wherein the work has to be done is apt to bewilder the uninitiated as to the object towards which all this effort is tending. In fact, observations continuous and ubiquitous are at present of prime importance, in order to provide the material from which future generalizations shall educe the laws, if there are any sufficiently apparent, that affect the rule of sunshine or of storm. The ambition of the meteorologist is far-reaching, and in this fact there is justification for the hope that the service that will be eventually rendered to mankind by his science will be great. Whether it ever will be possible to prognosticate trustworthily as so the character of a coming season, or to advise a farmer in the spring as to the crops that will best suit the weather conditions of the succeeding summer and autumn, is at present very problematical. But it is a step towards it that across the Atlantic, and in the Old World to a less degree, some success has been attained in forecasting the weather for more limited periods; whilst the acceptability to the public of this amount of service is shown by the fact that weather reports and prognostics are no longer confined to the *Times*, but are now to be found in most daily newspapers of any pretensions.

In fact the portion of the report just issued that will interest the widest circle of readers is probably that which deals with weather telegraphy, and the details connected with the preparation of the forecasts now become so familiar. Briefly it may be stated that the office receives, when the telegraphic communications are perfect, fifty-three reports every morning, thirteen every afternoon (except on Sundays) and nineteen each evening. The foreign reporting stations are twenty-three in number, and extend along the entire western coast of the Continent and include four stations on the Baltic coast and one in the Mediterranean. At present, forecasts are issued twice a day, at 11 a.m. and 8.30 p.m. The first, which is based on the reports of observations taken at 8 a.m., and arriving between 9 and 10, refers to the probable weather between noon on the day of issue and noon on the day following; this is supplied to the afternoon editions of the newspapers and posted up in several public places in London. The observations on which the 8.30 p.m. forecast is based are taken at 6 p.m. This forecast comes, however, first under the cognizance of the public in the newspapers of the following morning, so that it has the disadvantage of not being read generally until twelve hours after it has been drawn up and fourteen hours after the observations upon which it is based were taken. The Council has had the subject of this delay in the publication of the most widely-read of the two sets of forecasts under its consideration, and has ascertained that for the London morning newspapers and the local issues of those in the more important provincial towns the delivery of the forecast might be made as late as 2 a.m. This would, however, necessitate the organization of a night service, for the cost of which there are no funds available. But it is stated that should the public interest in securing at an earlier hou such information as to probable weather as is conveyed by forecasts become sufficiently developed to induce local authorities of various towns to contribute their quota of the cost of procuring it and to undertake its distribution in their respective neighbourhoods, the Meteorological Office would have no difficulty in supplying it.

In presence of this challenge it will be interesting to observe the value of these forecasts as indicated by the measure of success claimed for them in the Report. Taking the average of the eleven districts into which Great Britain and Ireland are divided the proportion of success attained during the year ending the 31st of March, 1883, is represented as having been equal to 79 per cent., being an improvement of one per cent. as compared with the previous year. This total is divisible into "complete success," 44 per cent., and "partial success," 35 per cent. The greatest amount of "complete success," 50 per cent., was attained in the south of England, the smallest amount, 40 per cent., in the north of Ireland. The proportion of storm warnings sent to the coasts which were justified by subsequent events amounted during the year to 82·5 per cent., showing a slight improvement. It is admitted that the year formed no exception to its predecessors in the fact that more than one serious storm occurred of which no warning was given, but it is believed that such occasional failures are unavoidable. This fact, however, does not detract from the value of service to life and property rendered by so large a proportion of justified warnings out of upwards of five hundred issued during the year. Another valuable service rendered by the Office was the issue of special forecasts gratis during the hay harvest of 1882 to persons selected by the Royal Agricultural

Society, the Royal Dublin Society and the Highland Society, in different parts of the three Kingdoms, on the condition that the information should be made as widely known as possible, and that a record should be kept of the value of each prediction and sent in weekly. From a tabulation of these reports it appears that "complete success" was attained in respect to 50 per cent. of the forecasts, and "partial success" in 37 per cent. more, whilst the total failures amounted to only 2 per cent. These forecasts were evidently highly appreciated as having an actual money value, and for one district where the hay harvest was late they were prolonged for an extra four weeks at the expense of the recipients. Although the foregoing deals only with a portion of the Report the facts are sufficient to shadow forth the services that meteorological science is capable of rendering to the community in one direction. In another, closely affecting the health of the metropolis, investigations have been continued, as opportunity offered, into the causes and prevalence of London fog. The opportunities, though too frequent to be pleasant, proved hardly sufficient to yield valuable results. But a previous observation as to the abnormal increase of the proportion of carbonic acid gas in the atmosphere has been confirmed, the quantity having risen to 13 parts per 10,000 on one occasion, or more than three times the usual amount.

The last Evening Meeting of the Pharmaceutical Society in the present session will be held on Wednesday next, when a paper on "The Aqueous Extraction of Cinchona Bark," by Professor Redwood, and one on "The Proximate Analysis of the Seeds of Amomum Melegueta," by Dr. Thresh, will be read. The chair will be taken at half-past eight o'clock, but the Curator will be in attendance an hour previously to furnish information respecting recent donations to the Museum that will be exhibited.

* * *

In the House of Lords, on Friday the 21st inst., the Chairman of Committees informed the House that the promoters of the Institute of Chemistry Bill did not intend to proceed further with it. The order of the day for the second reading was therefore read and discharged. It is understood that the promoters hope to attain the incorporation contemplated by the Bill by means of a Royal Charter.

* * *

A correspondent from the south has forwarded to us a warning against an impostor who appears to operate by calling upon a chemist and druggist, and upon the pretence that some person in the neighbourhood has promised to pay for a truss for him, obtaining an estimate of the price of a suitable instrument written upon a bill-head. Armed with this document he canvasses for subscriptions among the benevolent in the locality, and, it is needless to say, when he has exhausted this field betakes himself to another.

* * *

Previous to the election of the present President of the Chemical Society to that office, he had during fourteen years filled the office of one of its Secretaries, and had in many ways shown his interest in the Society. It is now proposed as a mark of recognition of these prolonged services to entertain Dr. and Mrs. Perkin at a dinner at Freemasons' Tavern on the 23rd of April. It is understood that Professor Hofmann has promised to come over specially from Berlin to preside at the dinner.

* * *

In giving evidence recently before a parliamentary commission appointed to inquire as to the causes of the commercial crisis under which France is suffering, M. Vée stated that the manufacture of chemicals had remained stationary in that country during a time in which it had increased five-fold in other parts of the world. One of the causes to which he attributed this stagnation was the imperfect education of French workmen, which made it necessary to look abroad for overseers to superintend their operations.

* * *

According to the preliminary statistics accompanying the Medical Register for 1884, the total number of registered medical practitioners in Great Britain and Ireland at the commencement of the year was 24,517 against 23,801 at the beginning of 1883, showing an increase of 716 during the twelve months. The new Dentists' Register contains 5291 names against 5252 in the previous one.

* * *

The last number of the *Moniteur de la Pharmacie* reports the arrest of a woman who was in the habit of obtaining the supply of laudanum for which she craved by presenting at a pharmacy a prescription, concocted by herself, ordering some pills and sixty grams of laudanum. The laudanum she as a rule succeeded in taking away with her, requesting that the pills might be sent to an address, which of course turned out not to be her residence. Seventeen pharmacists appeared to have received a visit from this swindler, who obtained from them jointly about a kilogram of laudanum. Another case reported in the same journal is that of a boy, aged fifteen years, who poisoned himself with prussic acid obtained by means of a prescription fabricated by himself. These cases are worthy the attention of *doctrinaires* who see a solution of the poison question in a provision making the supply dependent upon a medical order.

* * *

At the conclusion of the inquiry at Cheltenham, during which some interest turned upon the dispensing of certain prescriptions ordering oil of savin and liquid extract of ergot (see before, p. 754), the jury returned a verdict that the deceased woman died from blood poisoning, but that although the case was surrounded with very grave suspicion as to the conduct of the medical man who attended her, there was not sufficient evidence to show the cause of the blood poisoning.

* * *

Mr. Saunders, of London, Ontario, states that he has recently had submtted to him for examination two samples of oil of cassia, one of which he found to be adulterated with 50 per cent. of a mixture of castor oil and spirit and the other with about 30 per cent.

* * *

It is announced that the International Health Exhibition will be opened by the President, H. R. H. the Prince of Wales, on Thursday, the 8th of May.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

EVENING MEETING.

The fifth meeting of the present session was held in the Society's Rooms, 119A, George Street. Edinburgh, on Wednesday evening, March 19, at half-past eight o'clock.

Mr. John Nesbit, President of the Branch, in the chair.

The minutes of the former meeting were read and confirmed.

The first paper read was on—

Tincture of Hyoscyamus.

BY WILLIAM GILMOUR.

The paper is printed on p. 781, and gave rise to the following discussion:—

Mr. Stephenson, in proposing a vote of thanks to the author, said he was particularly pleased to hear that the spectroscope test for this tincture was now discredited, for it was one which pharmacists, as a rule, had not the means of applying. He was not surprised that rectified spirit had failed to give so good a tincture as proof spirit; if the active principle of the leaves existed in the natural juice, then he took it that an aqueous menstruum, containing sufficient alcohol for preservation, would be the most reasonable in the circumstances. These proof spirit tinctures of green leaves were often green when prepared, just as the rectified spirit tinctures, but this colour changed to brown after a short time. He was glad to learn that the biennial leaves were the better. This was corroborative of existing opinion, and it might be recollected that Mr. Donovan had started his investigation in the belief that biennial hyoscyamus was quite inert, but he had not gone far before he found that his opinion was based on experiments with annual leaves, so that when he came to try the biennial he found that they were quite active medicinally.

Dr. Inglis Clark seconded the vote of thanks, and said that the paper was thoroughly practical, and the meeting was greatly indebted to Mr. Gilmour for the interesting manner in which he had communicated his results. Regarding the potency of the annual leaves, he recollected that the late Professor Christison stated in his class lectures, that as grown in some parts of the country they were quite inert, while in others they were potent. He asked if Mr. Gilmour had made any experiments as to the alkaloidal value of the leaves.

Mr. Young remarked that the tincture from the annual leaves was quite different in odour and taste from that prepared from the biennial. Were there any ready means of distinguishing between the annual and biennial leaves?

Mr. Gilmour said that the annual leaves were of a paler colour, and, as Mr. Young had observed, the tincture was different from the other. He had not time to determine the alkaloidal value. The annual undoubtedly contained hyoscyamine, for most of that alkaloid prepared in Germany was obtained from the annual. In referring to some samples which were exhibited, he asked if anyone could explain why the tufted variety of the biennial leaves had now almost disappeared from the market. At the present time most of the biennial variety was received in a chopped condition from the wholesale houses; this was somewhat unsatisfactory, since it favoured adulteration.

Mr. Young stated that the tufted variety used to be more plentiful in Scotland, where it was grown for the market there. This was not the case now, but he would like to see more of the tufted leaves, because there was a feeling of security in using them.

The President moved a vote of thanks to Mr. Gilmour for the specimens which he had presented to the Museum.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The tenth general meeting of the thirty-fifth session was held at the Royal Institution, February 28. Mr. Edward Davies, President, in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations to the Library were announced:—The *Pharmaceutical Journal*, from the Society; The *Canadian Pharmaceutical Journal*, from the Editor; The *Science Monthly*, from the Editor.

The President read a letter, dated February 18, which he had received from Mr. A. H. Mason, resigning his office as Vice-President of the Association, owing to his early departure for Canada.

The President said that the subject of Mr. Mason's letter would be brought before a meeting of the Council, and probably further alluded to at the next ordinary meeting.

Mr. Davies drew attention to a statement in the newspapers in reference to the recent explosion at a London railway station, in which it was stated that an officer had tried to obtain from two chemists lignic acid and not being able to procure the same, he employed a razor to show that dynamite had been used. He (Mr. Davies) said that he was not aware of any such compound as *lignic acid*, nor could he imagine how a razor could give any clue as to nitro-glycerine having been exploded. It was possible that the razor might have been acted upon by nitrous fumes; but he was at a loss to see how this fact could be taken as a satisfactory explanation of the presence of dynamite.

Dr. Symes was then called upon to read a paper entitled "Notes on Pharmaceutical Apparatus." The paper was illustrated by a photograph and drawings.

The paper will be found printed on p. 783.

Mr. Conroy, in proposing a vote of thanks to Dr. Symes, said he had listened to the paper with great interest, and had derived a good many valuable hints from it.

Mr. T. Fell Abraham, in seconding the vote of thanks, thought that no difficulty would be experienced in consequence of the outlet from the steam filtering funnel not being at the bottom, the conductivity of copper being so high.

Mr. A. C. Abraham, in supporting the vote of thanks, remarked that the gauge pipe shown would be of advantage when the observer was opposite to it, as from the sides it was no more distinct. He took exception to the term steam funnel being applied to the one described, which was a hot water or steam *filtering* funnel, and quite different from the apparatus to which the other name was applied, either formerly or recently by himself. The head of the still figured struck him, as it had Mr. Conroy, as being very antiquated, but there might still be something to be said for that design, which was probably in use in Egypt two thousand years ago.

The vote having been put from the chair, was carried unanimously, and Dr. Symes having briefly replied, the meeting terminated.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The annual dinner of the Society was held in the Freemasons' Hall, Surrey Street, on Wednesday evening, March 19, under the Presidency of Mr. J. Preston. A goodly number of the members were present.

Letters of apology were read from Mr. A. H. Allen, F.I.C., F.C.S., Borough Analyst, and Mr. Edward Binks, Lecturer on Botany at the Sheffield Medical School.

After the removal of the cloth, the following toasts were proposed and duly responded to:—"The Queen" and "The Royal Family" were given from the chair.

Mr. J. T. Dobb, in rising to propose "The Success of the Pharmaceutical Society of Great Britain," said he regretted business was in a very depressed condition, and the outlook for chemists and druggists gloomy. The physician, the surgeon, and the apothecary, the barrister, solicitor, and the clergy, had all to pass an examination to prove their fitness before they were allowed to practise their several professions. When that examination was passed, the law stepped in and protected them from the quack, the charlatan and the pretender or anyone not duly licensed to practise. Is it so with the pharmaceutical chemist and druggist? No! Before they can open shop to dispense, sell or retail drugs, they must, equal with the above-named professions, pass a strict examination in chemistry, botany, materia medica and pharmacy, and prove their qualifications. Are they protected in their vocation after the requirements of the law are fulfilled? No! Grocers, drapers, tinkers and tailors, stores and jacks of all trades in every town and city step into the arena, and sell all the pharmaceutical preparations and drugs, save a few scheduled poisons. Ah! even "poisons," if they have paid the $1\frac{1}{2}d.$ stamp duty to the Government. Is there a chemist in Sheffield who makes £5 a year out of the A scheduled poisons? Of what use then is the Pharmacy Act? It is no protection to the public and very little benefit to the man who has spent his time and money to qualify himself scientifically to deal competently with the drugs and chemicals required by the public. If the compound preparations of the Pharmacopœia were scheduled, and none but those who had passed through the required examinations should sell retail such articles, then it would be a protection to the public that due care had been taken in the preparation and in the dispensing and vending of these chemicals and drugs, and it would induce well educated youths to enter a business where there would be some prospect of success in life. He ventured to make some remarks of this nature at Chatsworth, at the time the Pharmaceutical Conference visited Sheffield. The *savans* at that meeting turned a deaf ear to such vulgar notions as commerce and how a chemist was to earn a living; nothing but science and education could be taken up by the Society. The question had developed into one of intensity since that day, and had become an important factor in considering the position of the trade. He was pleased to find that Professor Attfield, by two recent speeches, now published, appeared to have grasped the subject. He trusted his views would be laid hold of by the Executive of the Pharmaceutical Society, and that the result would be continued success and prosperity to that body, and that all the branches of the profession would participate.

Mr. W. Ward, in responding on behalf of the Pharmaceutical Society, said he presumed he had again been singled out on account of his occupying the post of Local Secretary. On the present occasion he most heartily acquiesced—the proposer of the toast having referred to the Society in more gratifying terms than he had sometimes listened to at their annual gatherings. It had been his lot on more than one occasion, in replying to the toast, to defend the action of the Council from attacks which had been made, often based upon ignorance, as he had been able to show. Still there was a good deal of complaining that the Society had failed in giving that attention to some of the grievances which undoubtedly existed in their midst. Mr. Dobb had referred to the want of better protection of the trade and the apathy of the Council. He could not but join issue with him. Undoubtedly one of the primary objects aimed at in the Act of Incorporation was not only the advancement of pharmacy, the promotion of a sound system of education, and the safety of the public, but "the protection of those who carry on the business of a chemist and druggist." He should be delighted to see the Council displaying more energy in this direction. The recent poisoning case by infants' mixture in their town was one amongst some of the evils that existed, and which, he considered, should be dealt with by the Council. He thought the Act was sufficiently clear to gain a verdict, and, if not, it would be but another proof of the great importance of stopping the wholesale vending of poisonous preparations by unregistered men. After referring to the action of the Council with respect to the Amended Pharmacy Bill and urging the members to aid the Benevolent Fund, he begged to thank them for the way in which they had drunk to the Pharmaceutical Society.

Mr. Furness, in proposing "The Trade Association," said the Chemists and Druggists' Trade Association had been in existence ten or twelve years. It was established (not to be antagonistic—but as an aid—to the Pharmaceutical Society) more especially in accomplishing work which that Council were either unable or unwilling to perform. It had justified its existence by the good useful work it had done under considerable difficulties, and, of which, he should leave Mr. Jervis to give an account when responding to the toast. His position as a member of the Executive of the Trade Association made him better able to deal with the matter. However, he might say there was still plenty of work to be done, and suggested the Association might, with advantage, direct its attention to the recent case of poisoning by infants' mixture in the town, where the drug had been supplied by a grocer and proved to contain opium. He had reason to believe that infringements of this character were as numerous as they were dangerous to the public, and damaging to chemists and druggists. It was unsatisfactory to learn from the last Annual Report, that the Association was limited in its usefulness by want of funds. It was doing good work and was worthy of more support than it received. That this should be the case was another proof of the gross apathy existing among their fraternity, seeing that only about 4000 out of 13,000 entitled to join availed themselves of its advantages. This was about the same proportion that joined the Pharmaceutical Society's ranks, and he believed that substantially they were the same members, that was to say, there were not 4000 members of this Association, and another 4000 members of the Pharmaceutical Society, showing 8000 as taking an interest in their self-improvement and self-defence, but only about 4000 or one third of the whole body, who would voluntarily take any steps to avail themselves of representation and protection unless when individually assailed, and these outsiders were the biggest grumblers. It was a deplorable state of things, and admitted of no excuse, because whoever did not approve of the Pharmaceutical Society's work might fairly join the Chemists and Druggists' Trade Association of Great Britain, which toast he had the pleasure of proposing.

Mr. Jervis, in responding, said that the Association did its utmost in defending the interests of the chemist or druggist. As a member of the Executive and of the Law Committee, he could state that the Association which he had the honour to represent had nobly done its duty, and he would specially mention the Shepperley case—a case of itself, he maintained—had been of incalculable benefit to every chemist and druggist in the land, and if they had not been enabled to take that case into court and carry it through till victory crowned their efforts, not a chemist or druggist dare ever have prescribed or recommended the most simple remedies for the cure of a disease, no matter how simple, and, in fact, he would have been debarred from exercising a right which any old woman not having the title of a chemist could claim. He could safely say that if any clear case of infringement of the Pharmacy Act, if represented to them, would receive earnest attention and consideration; in fact they wanted work, and if the great body of the chemists would only rally round them he was sure they could be of immense benefit to them. He held that they could do a work which the Pharmaceutical Society could not undertake. He thanked them for the confidence reposed in the Association.

Mr. Jacques proposed the Sheffield Pharmaceutical and

Chemical Society, which was appropriately responded to by Mr. Cubley.

In proposing the Local Educational Institutions, Mr. Ellinor said he hoped the time would soon come when Sheffield would be one of the best instead of being at the bottom of the list; that the enlargement of Firth College and its extension would be the means of combining the education of medical, dental and pharmaceutical students, and that a full curriculum might be provided, in the which a medical, dental and pharmaceutical practitioner would be responsible for the attendance and signing up of each of their respective students. Coupled with this toast, Mr. Ellinor named the other educational institutions and the Central Higher (Board) Schools.

Mr. Garnet responded.

Mr: Ward proposed the President, which was suitably acknowledged by Mr. Preston.

Mr. J. Marshall had the pleasure of proposing the toast of the Vice-Presidents and Council of the Sheffield Pharmaceutical and Chemical Society. He said all would heartily join in drinking their health, because it was well known how careful they were to take up any matter which might deserve their attention, and the energy they displayed in carrying out any worthy object. He regretted that the Council did not meet with the support which they might reasonably expect. In looking at the small annual subscription (5*s.*), he said there could be no excuse for non-membership. He considered that the chemists and druggists stood very much in their own way; they wished for protection in their calling, and when this was necessary, who were more ready to call out than those who held aloof? There was no doubt about the Society doing good. The Council were now carefully watching the much to be regretted state of affairs (the many poisoning cases), and would no doubt do what all wish to be done when the right time is at hand. He remarked how necessary it was for all to be united at a critical time like this. He had noticed how the Council had frequently taken up matters which concerned all chemists aud druggists, and had often sent up resolutions and suggestions to the Pharmaceutical Society which had been respected, and would still be more so if all were to attend the meetings and use the power which they possessed. The junior members had great reason to be thankful to the Council for their help in connection with their studies, especially for the free use of the Society's rooms and library, and in the many ways in which they had shown their interest in the welfare of the younger ones, and he had no doubt but that they (the juniors) would still have their influence (both collectively and individually), and help to obtain admission to the Local Botanical Gardens. He had great pleasure in coupling with the toast the names of Mr. Watts and Mr. Furness.

Mr. Furness responded.

Mr. Dobb proposed the toast of the "Treasurer and Secretary," which was replied to by Messrs. Jervis and Newsholme.

Mr. Fox proposed the "Assistants' Association," to which Mr. Smith responded as follows:—The introduction of this toast is an honour the Junior Association has reason to be proud of, and I respond to it with much gratification and pleasure. Being so recently inaugurated we have no extensive history to review, but looking forward there are signs of an increasingly useful and successful career for this Association. The classes are well attended and most satisfactorily conducted, and, when we consider the number of students, and the distance many have to come who attend, together with the fact that the only attraction is that of an intellectual nature, I think we have a proof that good and real work is being done. The Association has increased the number of members in your Society, and I would suggest in return that some of the papers read at the monthly meetings be specially addressed to the students, papers tending to produce a familiarity with the ways of Bloomsbury Square,—the very name of Bloomsbury Square being a terror to many provincial students—a familiarity being productive of confidence, which is half the battle. The obtaining of permission to use the Botanical Gardens, I think we may well leave to the Council. Such permission is most desirable and needful. To the Council also we would tender our warmest thanks for the great help they have given us and for the lively interest they take in our proceedings.

After the complimentary toast of the "Visitors" had been proposed and responded to, the meeting, which was continued to an early hour in the morning, separated.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, March 20. Dr. W. H. Perkin, President, in the chair.

The following certificates were read for the first time:—Messrs. W. D. Borland, A. F. Dimmock, J. Gaskell, W. H. Perkin, jun., A. G. Perkin, and J. W. Pratt.

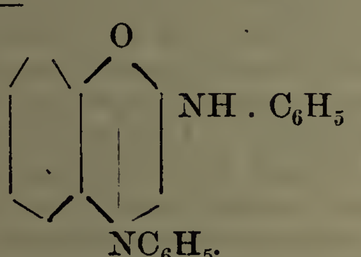
During the evening a ballot was held and the following gentlemen were declared by the Scrutators, Drs. P. Frankland and Morley, duly elected Fellows:—Messrs. F. W. Brown, H. Cave, F. W. Fleming, E. E. Graves, A. E. Lewis, J. E. London, G. A. Parkinson, S. Smith, G. Tunbridge, and T. U. Walton.

Mr. Tribe then read a note—

On the Preparation of Marsh Gas. By J. H. GLADSTONE and A. TRIBE.—In 1873 (*Chem. Soc. Journ.*, xi., 682) the authors described two reactions, in which marsh gas was produced free from other hydrocarbons by the action of the copper-zinc couple on methyl iodide in the presence of water or alcohol. The loss of methyl iodide was, however, considerable, varying from 23 per cent. to over 50 per cent. In the present note the authors describe a slight modification of the apparatus, by means of which this loss can be prevented. About 600 grams of thinly granulated zinc are immersed in a 2 per cent. solution of copper sulphate until the latter is decolorized. The copper-zinc couple is washed with water and finally with alcohol; it is introduced into a flask, the mouth of which is closed by a doubly perforated cork. Through the cork pass the end of a stoppered funnel containing the methyl iodide, and the end of an upright wide glass tube, 12″ long and 1″ in internal diameter, filled with copper-zinc couple. The upper end of this tube is also closed by a doubly perforated cork, into which fit a delivery tube and the end of a stoppered funnel containing alcohol. This upright tube serves the double purpose of a copper-zinc scrubber and an inverted condenser. A mixture of 20 c.c. of alcohol and 20 c.c. of methyl iodide being allowed to run into the flask, a steady evolution of marsh gas proceeds; the first litre was evolved in eight minutes, 7053 c.c. were obtained, the theoretical yield being 7100 c.c. The reaction can be much expedited by gently heating the flask.

The Secretary then read a paper—

On the Action of Dibrom-α-Naphthol upon Amines. By R. MELDOLA.—In a preliminary note (*Chem. News*, Jan. 19, 1883) the author called attention to the remarkable facility with which dibrom-α-naphthol entered into reaction with certain amines, forming, in the case of anilin, paratoluidin, and β-naphthylamin, well characterized crystalline bases. The action of this dibromnaphthol upon diamines has been made the subject of a patent by L. Casella and Co. (*Germ. Pat.*, No. 20,850), and the reaction has been investigated by R. Möhlau (*Ber.*, 1883, 2853). The author, therefore, confines himself to a description of some results of the action of dibrom-α-naphthol upon monamines. On mixing dibrom-α-naphthol with about three times its weight of aniline, a white crystalline mass of aniline dibromnaphtholate is formed. On heating to nearly the boiling point of aniline, the contents of the flask acquire a deep reddish brown colour; the reaction is complete in about ten minutes; when cool the mass forms a solid cake of crystals. The substance was purified by washing and recrystallization from boiling alcohol and formed orange red needles melting at 179°, it possessed basic properties and agreed with the diphenyldiamidonaphthol of Goes and of Tincke. The zinc and platinum salts were prepared and analysed and the identity of the substance with β-naphthoquinonedianilide conclusively established. With orthotoluidin a similar reaction took place, but nothing separated out on diluting the contents of the flask with alcohol. With paratoluidin similar results were obtained and the product crystallized out in silky orange needles melting about 175°. A crystalline body was also formed when α-naphthylamine was used. The action of dibrom-α-naphthol upon amines, therefore, furnishes a most simple method of obtaining these quinone-imide derivatives in large quantities. The author then discusses the significance of this production, as affording an insight into their constitution and considers that the constitution of β-naphthoquinonedianilide must be—



The Secretary then read—

A Note on the Existence of Salicylic Acid in the Cultivated Varieties of Pansy and in the Violaceæ generally. By A. B. Griffiths and E. C. Conrad.—The authors have extracted colourless acicular crystals from pansy leaves, etc., soluble in ether, alcohol and boiling water, which gave with ferric chloride a violet colour. A combustion gave numbers agreeing with the formula of salicylic acid. The leaves yielded 0·13 per cent., the stems, 0·08 per cent., the roots 0·05 per cent., whilst the flowers contained only a trace. The authors cut sections of the leaves, etc., but failed to discover any crystals of salicylic acid in the cells.

The Society then adjourned to April 3.

The Anniversary Meeting will be held on Monday, March 31.

SOCIETY OF ARTS.

Alloys used for Coinage.

At the commencement of the second lecture of the Cantor series upon "The Alloys used for Coinage," Professor W. C. Roberts explained the use of several terms not always clearly understood. The terms alloy, allay or lay, are generally applied to characterize the base metal used in the mixture, and not, as correctly they should be, to the mass itself, the term was most probably derived from the Latin *adligo*—to bind to, or a Teutonic word meaning to lessen. Though the terms sterling and standard are now almost synonymous, yet formerly the term sterling was used to distinguish a special alloy of silver and copper of a higher degree of purity than the standard. The standard of fineness is a term employed to designate the amount of pure metal in an alloy, and is now almost universally calculated to the decimal method; nations now maintain a nearly equal "standard of fineness" in order to avoid loss and facilitate commerce. For the purpose of melting the metals and mixing the alloys, crucibles composed of graphite and fire clay are employed; the crucibles used for melting gold hold about 1200 ounces and those for melting silver about 4000 ounces. Coke is generally used as the heating material, although in Berlin, the crucibles are heated by means of gas generated in a retort in direct communication with the furnace. Reverberatory furnaces are only used in the melting of bronze, as the loss of the rarer metals owing to leaky hearths would be too large to allow their use. It is necessary that alloys should be so prepared as to ensure rigidity, durability and uniformity of composition; it is further imperative that the alloy shall be able to *flow* easily into the finest lines of the engraved die when struck. The "fineness" of the alloys can be tested by means of an electric current, on which test the lecturer expressed his intention of speaking more fully; it is also noticeable that both the ring is clearer and the rigidity greater in the case of the standard alloy than in that of the pure metal. Copper is found most convenient to alloy with gold, as the colour is rather heightened than lessened by the admixture; the reverse is the case when silver is used, for if the alloy contain more than one-third of silver the colour of the gold is completely lost. The use of triple alloys has been suggested, but this would only lead to more intricate details. Professor Roberts then entered into an explanation of the differences of the troy, carat and decimal systems. The carat system was either derived from the Arabs or from the Roman mint; the decimal system, first employed on the Continent in 1794, was not introduced into England till 1882. The lecturer then gave a number of tables showing the changes in the composition of alloys from the most ancient times. A Greek coin of about 359 B.C. was found to contain 99·7 per cent. of pure gold, this being the greatest purity obtainable by the method then in vogue; the early British coins (B.C. 50) contained only 40·5 per cent. of pure metal, whilst the Anglo Saxon alloys differed greatly in their "standard of fineness." Since the Norman conquest, however, gold coins have contained nearly the same percentage of pure metal, excepting in the latter part of Henry VIII.'s reign, when it fell as low as 83·3 per cent. The present standard of 91·66 per cent. is also that of British India, Russia, Portugal, etc., whilst that of France and the remainder of the Latin Union is about 90 per cent. In regard to silver coins, they also sustained only one very marked deterioration of standard, falling in the sixteenth century to 25 per cent. of pure metal. The English standard is at present 92·5 per cent., whilst France has two, one of 90 per cent. and the other of 83·5 per cent. Professor Roberts then gave the composition of a number of alloys which had been introduced. That of Peligot consists of 58·1 per cent. of gold, 36·1 per cent. of copper and 5·8 per cent. of zinc; the modern nickel alloy consists of 75 per cent. of copper and the remainder of nickel, whilst the older alloy consisted of 77·6 per cent. of copper and 20 per cent. of nickel, the remainder being made up by small quantities of cobalt and iron. The advantage of these nickel alloys consists in the value of their magnetic properties for testing. Alloys of aluminum have also been suggested owing to their light weight.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the above Association, held March 19, Mr. H. M. Hadfield in the chair, a paper on "Essential Oils: their Derivatives and some of their Uses," by Mr. W. A. Wrenn, was read by Mr. H. Cracknell (Hon. Sec.).

The author first mentioned oleum amygdalæ essentiale, giving an account of the collection of the almonds, their habitat, and the amount per cent. of essential oils yielded both by the almonds themselves and also the cake, being ·4 per cent. to ·95 per cent., and ·75 per cent. to 1·6 per cent. respectively, the crude oil having a specific gravity varying from 1·056 to 1·070. The percentage of hydrocyanic acid was stated to vary between 8 per cent. and 12 per cent., the processes for freeing the oil from this acid were mentioned, distillation with red oxide of mercury being given as the most convenient for small quantities. Tests were also given for the impurities in the oil; the pure oil should have a specific gravity of 1·049 to 1·051. Oleum cajuputi was next mentioned. Four samples of this oil having been examined all gave evidence of traces of copper. The author had submitted four samples to redistillation, and in all cases obtained a colourless product, having a specific gravity of ·916 to ·918. Oleum caryophylli next received attention, the various sources of the oil being alluded to, and the product stated to be from 12 per cent. to 22 per cent.; the distinctive characters of the oils distilled from the flower buds and the stems of the plants were enumerated. A short account of oleum copaibæ essent. was then given, the quantity yielded from the balsam varying from 36 per cent. to 60 per cent.; the Para balsam yields by far the largest amount of oil, and the oil thus obtained has the best aroma. The specific gravity varies from ·878 to ·900. Oil of turpentine is the chief adulterant of this oil, and may readily be detected by its relative solubility in alcohol. The boiling point of oleum copaibæ is very high, being about 500° F. Oleum cubebæ was then alluded to. The drug is now causing a little sensation in the market on account of the very high price which is obtained for it. This is supposed to be due to the great demands from America, where it is now largely used in catarrhal affections of the air-passages. The product of oil from the fruit is about 7 per cent. to 12 per cent. The specific gravity is from ·924 to ·929. Oleum juniperi, oleum santal. flav., and oleum sassafras were all briefly mentioned, and the paper was brought to a conclusion with a few remarks on the two varieties of wintergreen oil, viz., that obtained from *Gaultheria procumbens*, the American source, and that obtained in East India from *Gaultheria punctata*.

Parliamentary and Law Proceedings.

House of Commons.

Patent Medicines Bill.

In the House of Commons on Wednesday, Mr. Warton in moving the second reading of this Bill, remarked that in bringing the subject of patent medicines before the House he had two objects in view. In the first place he wished to point out that the Government stamp gave undue prominence to patent medicines and induced people to take that which was injurious to them. Many people who read patent medicine advertisements believed that both Houses of Parliament had in some way sanctioned and almost sanctified those medicines. He submitted that it was very wrong for the Government to derive any revenue from such an unworthy source. When this question was last before the House the Under-Secretary for the Home Department said he could not make any promise as to what the Government would do in the matter, but he hoped that some better system than that now in force would be adopted. The Government, however, had done nothing at all, and it appeared to him that whatever course they adopted they were in favour of spreading disease. In his opinion it was the duty of the Government to bring this subject forward because they alone could deal with the fiscal part of the question. The second object he had in view was to show that patent medicines contained poison. Many persons had died through taking those medicines. The man who recklessly sold them was little better than a murderer, and the Government who failed to take measures to alter such a state of things connived at murder. What was the use of analysing those medicines when a poor child—for children were generally the victims—or a poor woman was dead? What he wished was that some feeling should be shown for these poor women and children so as not to have them poisoned by quacks. By the Pharmacy Act of 1868, the Pharmaceutical Society had the power of declaring what were poisons, and, when any new drug with poisonous properties was brought to light, of inluding it in the list. The Society was to pass a resolution to the effect that a certain drug was a poison, that resolution was to be submitted to the Privy Council, and if the Privy Council approved it was to be published in the *London Gazette*, and thenceforth the article so named became a poison under the Act of 1868. The effect of that was that any person going to a chemist's shop and asking for arsenic or any other drug in the list of poisons had to give his or her name and address and answer a variety of questions. But one might buy patent medicines in bottles 18 inches high and 12 inches wide containing an immense amount of poison, and the curious part of the Pharmacy Act was that the rights of the proprietors of patent medicines were carefully preserved. Now, he was for preserving vested interests, but there was one vested interest he would not preserve and that was the vested interest in poisoning people. At present one might buy these poisonous medicines by wholesale, not only in the shops of chemists, where there were generally gentlemen of education and responsibility, but in grocers' and petty village shops. His Bill provided that any person who was the owner or proprietor of a patent medicine might have his medicine analysed by the Pharmaceutical Society, and so in like manner any respectable chemist who sold patent medicines, or persons who bought them might have them analysed by the Pharmaceutical Society. If it was found that the medicine contained poison let the Pharmaceutical Society pass a resolution similar to that provided by the second section of the Act of 1868, and let them state that "this elixir"—for that was the favourite word—contained poison, and the resolution having been approved by the Privy Council, let it be published in the *London Gazette*, and after that the medicine became a poison subject to the restrictions of the Act. He thought that the Government might put aside their political nostrum of the Reform Bill for a time and attend to the lives and health of the people.

Dr. Farquharson considered that there was little need for saying much to urge upon the House the necessity for legislation of this kind, as the Government themselves had shown their appreciation of the importance of the subject. It was an absurdity to fence round the sale of poisons, when any one could, by putting a Government stamp on the bottle, sell any farrago of poisonous stuff. Great loss of life and health was caused by the sale of these patent medicines, as was shown by the Registrar-General's report. In 1881 there had been twenty deaths from the use of chloral hydrate, two from Godfrey's cordial, one from anodyne cordial, eight from chlorodyne, one from aniseed, one from Stather's soothing syrup, and fifty-one from patent medicines the names of which were not stated. It was certain, moreover, that these deaths could not possibly indicate the amount of loss of life caused by these deleterious substances. There had been a great increase in the consumption of patent medicines since teetotalism had become fashionable. There was a great demand for pick-me-ups and cordials, and there was no doubt that an enormous quantity of chloral was consumed by ladies. It was impossible altogether to check the sale of these patent medicines, although he himself would like to see a sweeping Bill on the subject. All medical men detested secret remedies, but of course it was impracticable to suggest any sweeping measure. There were great vested interests in the way, and the British public was fond of domestic medication, and even of a little quackery. What they had to do, then, was to regulate the sale of these medicines as best they could. This Bill was founded on French lines. In that country a medicine could not be stamped until it had been officially analysed, but the regulation was frequently evaded, in fact, unless the analysis were repeated every week or so, it would be of little use. He would suggest one or two alterations in this Bill. The word "proprietary" should follow "patent," so as to include unstamped mixtures, frequently containing deleterious ingredients, which were sold to a large extent in villages where there were no druggists' shops. Then there was a difficulty as to the analysis of the Pharmaceutical Society that it would only refer to statutory poisons, without including preparations which, without being absolutely poisonous, were on the borderland. Another objection was that the sanction thus given by the Pharmaceutical Society would largely increase the use of these patent medicines. He would recommend that the Government should harden their hearts and give up the patent medicine stamp, which brought in £154,000. This might, in his opinion, be made up by an increased charge on the licences for the sale of these drugs. Under the present system the Government stamp implied to many ignorant persons a direct sanction and a patent which did not exist. The stamp might be used for any preparation composed of more than one ingredient and recommended for some specific purpose which was only liable under the excise laws. A second recommendation which he would make would be that every proprietor of a patent medicine containing poison should be obliged to put a label with the word "poison" on the bottle and wrapper, with a direction that such medicine must be prescribed with caution. This caution might be extended to substances of injurious, if not directly poisonous, nature, such as teething powders, which contained mercury and opium. Then, again, the innocent seller should have a remedy against the proprietor and manufacturer. If the proprietor failed to put the word "poison" on the bottle, the Pharmaceutical Society might be called on to analyse the medicine, the cost to be paid by the proprietor in the event of its being found to contain poison, with penalties recoverable under the Pharmacy Act. The most important part of the Bill was the 5th section. It was absurd that when such precautions were taken under the Pharmacy Act anything might be sold when labelled as a patent medicine at any grocer's or at any stores. He thought it was anomalous that the druggists should be hampered by restrictions which were not imposed on stores. He further submitted that powers should be vested in the local authorities to enable them to undertake prosecutions under the Pharmacy Act as under the Adulteration of Food Acts. Those prosecutions at present were undertaken by the Pharmaceutical Society, thereby bringing upon it, on occasions, unmerited obloquy. In conclusion, although he could not agree to all its provisions, he thought the House owed a debt of gratitude to the hon. member for Bridport for bringing in the Bill.

Mr. W. James asserted that the preamble of the Bill, reciting that many deaths had occurred from the use of patent medicines, had not been made out. During the last two years not more than seven deaths had arisen from the use of these patent and proprietary medicines, against one hundred and fifty-two deaths caused by drugs sold by chemists, the use of which resulted in death by suicide, misadventure, and other causes. A boy died last year who had been taking Holt's whooping-cough specific, but the medical man admitted that he merely guessed that death was due to the effects of antimony contained in it, and it was almost impossible to say whether death was caused by the antimony or by natural causes. The matter was too serious and far-reaching to be treated in a private Bill; if it was taken up at all, the Government should deal with it. The present Bill was utterly unworkable, and would inflict great hardship on an immense number of persons. There were no less than from eight hundred to one thousand owners of these proprietary medicines, nineteen thousand people were employed in their manufacture or sale [Mr. Warton: So much the worse], they brought in £150,000, and thirty million packets were sold in the course of a year. Under these circumstances he did not think the Bill ought to be supported by the House, and he therefore moved that it be read that day six months.

Mr. Hopwood, in supporting the motion, doubted whether any legislation of this character had been productive of any real benefit to the community. He believed the Sale of Poisons Act had done no good, its effect being only to delude the public and to vex a number of honest men in their employment. Such legislation further tended to create a medical monopoly, and something of the feeling of trades unionism might be detected in the hostility shown by coroners and medical gentlemen towards patent medicines when the deceased had been shown to have lately used them. If these medicines were deleterious, the producers of them ought to be answerable to the common law.

The Attorney-General said the Government could not assent to the second reading of the Bill, although it was introduced with objects with which any one might sympathize; but it was necessary to look to the means proposed for the attainment of those objects, and, doing this, the Government could not accept the provisions of this Bill, which would treat as a poison any medicine containing any poison, however innocuous the quantity might be in the preparation of which it formed part. The Government had the matter in hand, and was prepared to treat it in a much broader sense in a Bill which would be introduced into the other House, and when it reached this House he hoped the desire of the hon. member for Bridport for legislation on the subject would induce him to stay his obstructive hand, and that his own introduction of a Bill would constitute a sort of implied contract with him for the adoption by him on this subject of a course, the novelty of which would be fully appreciated by the House. But the Bill of the hon. member could do no good and must do evil by harassing people unnecessarily; for, in this respect, it would constitute one of the most flagrant specimens of the kind of legislation against which the hon. member frequently protested.

Mr. A. O'Connor said if he approached the consideration of the subject without bias he should be inclined to support the Bill, for he had not been convinced by the arguments used against it, and it was admitted that illness and death were caused by patent medicines. He failed to see that the subject required such large treatment that only the Government could deal with it. If the Bill would be beneficial in its operation, he could not understand why Ireland was to be excluded therefrom.

Mr. Warton said that the reason why he had excluded Ireland was that he did not know what body in that country would take the place of the Pharmaceutical Society in Great Britain; and he had but followed the wording of the Pharmacy Act. The case of the widows and orphans who were interested in the sale of patent medicines could scarcely be put forward seriously against the safety of the public. The hon. member for Stockport's objections applied not so much to the Bill as to the doctors, whose alleged monopoly, especially as regarded vaccination, he was always opposing; but, as even medical coroners occupied an independent position, the suggestion that they conducted their inquiries with a bias against patent medicines, was an unworthy imputation. With regard to the argument put forward by the Attorney-General, he thought they might trust the Pharmaceutical Society not to brand a medicine as a poison unless it was really poisonous. Unless the quantity of the deleterious ingredient which it contained rendered the medicine poisonous, he did not want it to be branded as a poison. He was glad that the result of the motion which he brought forward on that subject two years ago had been so far beneficent that the Government were now pledged to introduce into the other House a bill relating to it; and he hoped that the Chancellor of the Exchequer would consent to abandon as a source of revenue the stamp duty now payable on medicines of that sort, which was supposed to give them the sanction of the State. Unless the Government gave him a positive pledge that they would deal with the fiscal question as well as with the other part of the subject, he should feel compelled to take the sense of the House on that measure, in order to show that that was a question of great importance which had been too long shelved and neglected.

The House was cleared for a division, but ultimately the second reading of the Bill was negatived without one being taken.

SUPPOSED DEATH FROM TAKING CHLORODYNE.

On Monday, the 17th inst., Mr. T. C. Brian, the Plymouth Coroner, held an inquest relative to the death of Christopher Snell.

The wife of the deceased said that her husband was 64 years of age. For a year or so his health had not been very good, although, on the other hand, he had not been so unwell as to require medical aid. For about five years he had suffered from a cough. Witness had given the deceased chlorodyne since the previous Tuesday. She usually administered ten or twelve drops in the evening, but she discontinued it on Friday because she thought the cough was better. Witness was certain that he had not taken any chlorodyne without her knowledge. Her reason for discontinuing the chlorodyne, was because he seemed stupid. Now that her attention had been called to it she fancied that the deceased had seemed drowsy after every dose. She had bought this medicine at Messrs. Wills, Son and Box, in George Street. Deceased died in a stupor, but complained of a pain in his side.

William Henry Andrews said that the deceased had often spoken of his cough. On Tuesday evening witness was at the house, and the bottle of chlorodyne was produced, when the deceased requested him to read the directions. He did so, and poured out ten drops, and having put them into half a glass of water gave them to the deceased. On Wednesday he had two similar doses. The directions stated that the dose must be given when the cough was troublesome.

Mrs. Snell, recalled, stated that it was a fact that the deceased took the dose twice in one day; it was given him by her son.

The inquiry was adjourned until Wednesday in order that a *post-mortem* examination might be made.

At the adjourned inquest, the widow, recalled, said the bottle of chlorodyne used by the deceased was not kept in the room occupied by the deceased. As far as she knew the medicine had not been touched since she placed it in the kitchen on Friday. When he awoke on the Monday morning deceased was not drowsy. She first saw a great change in him about half-past ten in the morning, and from then to his death she did not leave him.

Mr. E. H. Edlin, surgeon, stated that he had made a *post-mortem* examination. The brain was slightly congested and in a state indicative of disease. The heart was flabby, there being fatty degeneration. The right lung was also in a congested state, indicating chronic pleurisy. There was, however, nothing to account for death under the circumstances described. According to the evidence the deceased did not take a dose of chlorodyne after Friday, but if it had transpired that he had had one on the Friday morning, witness would have considered that with the disease it had accelerated death. Chlorodyne was very poisonous, and contained three distinct poisons, for any one of which, bought separately, the purchaser would have to sign a book at the chemist's shop. He considered it a very unsafe thing.

After a brief deliberation the Jury returned a verdict of "Death from natural causes," adding a rider to the effect that "The Jury consider it is a matter of regret that chlorodyne can be freely purchased by the public, without any kind of restriction."—*Western Morning News.*

Correspondence.

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

THE POSITION OF PHARMACY.

Sir,—"A man of straw," it appears, may sometimes be of very great service; in fact, we are told that even a single straw may play a very important part on the stage of life. My "straw man," in falling, has evidently had an effect upon Mr. Wilkinson, and has restored his equilibrium. A correspondent writes me—"Mr. Wilkinson must either have forgotten what he wrote first or else he does not know the English language." Another says, "Mr. Wilkinson's second letter is strangely at variance with his first."

Now I do not suppose that either of these gentlemen have hit the mark. Mr. Wilkinson's first letter was the outward and visible sign of an inward organic disturbance, that has now passed away (hastened in its departure possibly by the shock occasioned by the fall of "a man of straw"); his second letter is the result of a fast returning convalescence, so that we may now, I think, safely leave him, assured of the fact that instead of a vigorous opponent the Council has, as hitherto, a loyal and intelligent supporter, and what you, sir, and most of us thought was a weakness "in the chain" has turned out to be only a little rust which has been rubbed almost entirely off by a "bit of straw."

Before bidding Mr. Wilkinson adieu, kindly allow me to say that if he does not really "know of any to whom my remarks apply," he is the only chemist for miles round who does not; and lastly, to quote his own words, as all the members of the Council are chosen by members of the Society, and as year after year the *personnel* of the Council remains almost identically the same, we must suppose that the electors have "chosen those whom they consider the most suitable," and are, on the whole, perfectly satisfied with them. Your Stockport correspondent I would advise to apply the advice of Jupiter to the gentleman who prayed him to assist him out of his difficulty, and I would say to him, *Qui s'excuse, s'accuse.*

131, *Embden Street, Manchester.* J. HART.

Messrs. Bourne, Johnson and Latimer.—The information has been already published that the Inland Revenue authorities have decided that if the preparation consists entirely of pure menthol it will be exempt from stamp duty.

F. R. M.—We do not think any further steps were taken.

J. Thompson.—You will see that the Bill, which did not have the sanction of the Government, has been rejected.

"*Broad.*"—Professor Graham's Lectures on the Chemistry of Breadmaking will be found in vol. x. of the present series, pp. 804, 883, 923, 1028 and 1049.

G. Gordon.—*Lathræa squamaria.* Please attend in future to the instructions on another page as to addressing communications intended for the Editor, and make sure that the stamps affixed are sufficient.

J. Epps.—*Lathræa squamaria.*—It is rather local than rare.

Apprentice.—The solubility cannot be increased to any important extent without additions that alter the character of the compound. See a paper in vol. vii., p. 490.

Errata.—On p. 773, col. i., line 3 from bottom, for "minutes" *read* "seconds." On p. 775, col. ii., line 38 from top, the word quoted from Watts's 'Chemistry' should be "octohedrons," instead of "octahedrons."

W. Mackereth.—Your letter has been handed to the Secretary, to whom all communications concerning the non-delivery of Journals should be sent.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Ball, Bell, Smith, Dott, Williams, Rook, Wyley and Co., Hearder, Sedford, Vulcan.

AQUEOUS EXTRACTION OF CINCHONA BARK.*

BY PROFESSOR REDWOOD.

Among the various forms that have been devised for the administration of cinchona bark, preparations produced by aqueous extraction have always occupied a prominent position. Even since the discovery of the alkaloids, which are the only powerfully active therapeutic constituents of the bark, medical men have not been always satisfied with the use of these to the exclusion of other constituents, and therefore tincture, infusion, decoction, and fluid extract, are preparations which have been frequently employed, and from the use of which effects have resulted which the alkaloids alone have failed to produce. Where water alone is used for extracting medicinal properties from bark, as in the three last named preparations, there is a strong ground of objection to the mode of operating officially authorized in those cases, which is that a great part of the most valuable constituents of the bark operated upon is left in the marc, the menstruum used being incapable of dissolving them, and holding them in solution. This result, with reference especially to *Extractum cinchonæ liquidum* of the British Pharmacopœia, has called forth a good deal of criticism when that preparation has come under discussion; but the defects which have been pointed out and commented upon, as indicated by analyses made both of commercial samples and of samples specially prepared for the purpose, may, in several, and in all the most glaring instances, be ascribed in great part to faults other than those which essentially appertain to the process. It cannot, however, be contended that the process is a good and satisfactory one. Some of our best practical pharmacists have for some time past been seeking, or having found have been applying, processes which are said to yield better results, but unfortunately we have no published account of the investigations which have led to those results.

I have on several occasions endeavoured to induce some of my pharmaceutical friends to undertake the investigation of the best mode of preparing *liquid extract of cinchona*, with a view to publication; but, not having succeeded in that direction, I have made some experiments myself, for the purpose of testing the feasibility of obtaining aqueous extracts of cinchona better suited for use in medicine than those which are at present official.

I started with a decided opinion, founded on previous observations, as to the direction in which the investigation should be pursued, and the objects which it was most important to accomplish. They may be stated as follows:—

1. That the red, or succirubra bark is the sort most suitable for use in these operations.

2. That the extracting liquid should be water, an acid being used to render the active medicinal constituents of the bark soluble in this menstruum.

3. That the bark should be exhausted of its alkaloids in the process adopted, and that the extract should contain such other constituents of the bark as are considered to be medicinally valuable.

4. That the liquid extract should contain a specified quantity, say 5 per cent., of the mixed alkaloids of the bark.

5. That the liquid extract should admit of dilution with water without becoming turbid, and, on the other hand, that it might be evaporated to dryness without impairing its solubility to any appreciable extent.

In view of the numerous discussions that have taken place from time to time with reference to the selection and treatment of cinchona bark in its preparation for use in medicine, it will not, I think, be considered necessary that I should enter here into a detailed representation of the advantages resulting from the accomplishment of the foregoing objects. I will therefore at once describe the process I have adopted, by which those objects appear to be completely, easily and economically carried into effect.

Extract of Red Cinchona.

Take of—

Red cinchona bark, in No. 50 powder	1 pound.
Distilled water	4 pints.
Hydrochloric acid	½ fluid ounce.

Mix and macerate at a temperature of 180° F. for four hours, stirring frequently, and replacing the water that evaporates. Allow the mixture to cool; then transfer it to a percolator, and when the liquid ceases to pass, carefully introduce distilled water over the surface of the solid matter in the percolator, and continue to percolate slowly until ten pints of liquid have passed, or it is found that what is passing has ceased to give a precipitate on the addition to it of an excess of *liquor sodæ*.

Evaporate the percolated liquid, at the heat of a water-bath, until it is reduced to one pint. Let it cool, then add three pints of distilled water; stir them together while a precipitate is forming; separate the precipitate by filtration; well wash the filter and its contents with distilled water; evaporate the whole of the filtered liquid at a temperature not exceeding 180° F. until it has acquired a syrupy consistence, and dry this either in thin laminæ on the surface of glass, or in thicker masses by exposing it in shallow dishes in a drying closet.

Dissolve 20 grains of this extract in a fluid ounce of distilled water and add three fluid drachms of *liquor sodæ*. Mix thoroughly and let it stand for twelve hours that the precipitate may subside. Collect the precipitate on a filter, wash it first with distilled water rendered alkaline with *liquor sodæ*, and, finally with water alone, and when it has drained transfer it to a dish and dry it at 212° F. Its weight multiplied by five will represent the percentage of total alkaloids in the extract.

Liquid Extract of Red Cinchona.

Take of

Extract of red cinchona, as much as contains of total alkaloids.	437·5 grains
Distilled water	A sufficiency.
Rectified spirit	5 fluid ounces.

Dissolve the extract with the aid of a gentle heat in twelve ounces of the water, when cold add the spirit, make up the volume to 20 fluid ounces by further addition of water, and filter.

The principal object in this process has been the production of a liquid extract of known and uniform alkaloidal strength, which, while it possesses the aromatic flavour and astringency of the bark, is free from much inert matter, and from the peculiar extractive (chiefly quinovin) which, in our official liquid extract, forms a dense, unsightly and disagreeable precipitate when diluted with water.

* Read at an Evening Meeting of the Pharmaceutical Society, April 2, 1884.

Hitherto it has been the practice to prepare the liquid extract so that it shall bear a definite relation in volume to the weight of the bark from which it has been made; but as it is practically impossible to ensure uniformity of composition or of alkaloidal strength in the samples of bark employed, the properties of the prepared extract have necessarily differed as widely as those of the barks from which they have been obtained.

The mode of proceeding in this process admits of the use of any but the lowest qualities of the red barks of commerce. The total alkaloids contained in the dry extract produced in the first stage of the process are easily estimated, and the percentage of alkaloids being determined, while the extract itself is soluble in water, there will be no difficulty in ensuring uniformity of strength in the liquid extract. By the process as given it will contain 5 per cent. of mixed alkaloids in addition to the other constituents of the bark that are left in it. Thus a fluid ounce of the liquid extract may be considered to contain all the valuable medicinal properties of an ounce of red cinchona bark of good average quality.

It is obvious that the result indicated could not be obtained without using an acid in addition to that present in the bark, and there is no evidence that I am aware of to show that by causing alkaloids which would otherwise be wasted to combine with 9 or 10 per cent. of their weight of hydrochloric acid and thus become available for use, the efficacy of the resulting preparations would be in any way impaired

The small quantity of hydrochloric acid used in the process is sufficient to ensure the entire removal of the alkaloids from barks of average, and even more than average, quality. I have avoided the use of more than appears to be necessary, because its action with heat is said to be injurious. A slight excess of acid would be dissipated in the final concentration or desiccation to which the extract is subjected. I have ascertained that by following the instructions given the whole of the alkaloids extracted from the bark is within a small fraction contained in the dry extract in a soluble state. These alkaloids are associated in the extract and also in the liquid extract with other constituents of the bark which partake of the general character of some of the extractive matter of the *liquid extract of yellow cinchona* of our Pharmacopœia, but in one respect there is a marked difference between the two liquid extracts. There is nothing contained in the preparations made by this process that is not freely soluble in water, and therefore there is no precipitation or turbidity produced by aqueous dilution.

Having obtained several varieties of the red barks of commerce for the purpose of comparing the results obtained from them by this process, I have observed that they do not all yield the same sort of extract, arising from the fact that some are much richer in quinovin and red cinchonic than others. The thick flat varieties are the richest in those worthless constituents, while the thin young bark which, having been removed from the small branches with a spokeshave, is imported in small chips, is comparatively free from anything that causes turbidity on diluting the first concentrated extract with water.

This result, however, does not interfere with my process. The dilution would still be adopted as a safeguard, and being adopted the final results will then, as far as I have yet observed, be uniform or nearly so.

The formation of dry extract as a preliminary step towards the production of liquid extract was adopted for the purpose of facilitating the adjustment of the alkaloidal strength of the latter; but the properties of this dry extract which is soluble in water, forming a clear solution, will probably suggest its employment for other purposes, especially where the entire absence of spirit may be desired.

In the production of the liquid extract on the large scale, as well as otherwise, it is probable that manufacturers will often avoid the trouble of drying the extract, and stop the evaporation when the liquid contains the specified proportion of alkaloids, or carry it a little beyond the required point and then dilute it to what is required.

There are some experimental results connected with the subject which I have not yet had time to complete, but I have thought it desirable at once to submit the essential features of this process for medical and pharmaceutical criticism, reserving further details for a subsequent communication.

[*The discussion on this paper is printed at p.* 810.]

PROXIMATE ANALYSIS OF THE SEEDS OF AMOMUM MELEGUETA (ROSCOE).*

BY JOHN C. THRESH, D.SC.,

Pharmaceutical Chemist.

In investigating the action of various solvents, oxidizing agents, etc., upon the active principles of the fruit of the official capsicum, and of the rhizome of *Zingiberis officinalis*, I have become so convinced, from the many properties they possess in common, that they belong to a well-defined and hitherto unexamined group of proximate principles, that as leisure permits I purpose continuing their examination, and to ascertain whether other vegetable substances of a pungent character contain the same or similar principles I am now examining a number of such drugs. In some cases these have previously been only very imperfectly examined; they are therefore being submitted to proximate analysis with the view of placing the results obtained on record. As yet the examination of the so-called "grains of paradise" has alone progressed sufficiently far to form the basis of a communication to this Society. I may add, however, that I have succeeded in isolating the active principles of this drug and also of the rhizome of *Alpinia officinarum* (Hance) the "galangal" of commerce, and the very imperfect examination to which I could submit the small quantities obtained was sufficient to prove that whilst not identical with either of the principles previously mentioned and differing from each other yet that both unmistakably belonged to the same class of bodies.

Grains of paradise appear to have been analysed in 1811 by Willert, who found volatile oil, ·52; acrid resin, 3·40; extractive, 1·27; tragacanthin and woody fibre, 82·8; water and loss, 12·01 per cent. respectively Later, Sandrock found in the alcoholic extract two resins, one precipitable by neutral lead acetate, and the other not. The volatile oil, however, is the only constituent which can be said to have been examined and the result obtained by Flückiger will be found

* Read at an Evening Meeting of the Pharmaceutical Society, April 2, 1884.

in the 'Pharmacographia,' and need not be transcribed. Flückiger also exhausted 10 grams of the seed with boiling ether and obtained "·583 gram of a brown viscid residue, almost devoid of odour, but of intense pungency." This residue was soluble in glacial acetic acid and spirit of wine.

The information thus available was too meagre to permit of any deduction as to the best mode of procedure in conducting a proximate analysis, and the following preliminary experiments were therefore made.

Ten grams of the seed in fine powder were exhausted with ether (ether, B.P.). The extractive obtained weighed ·571 gram. It proved to be incompletely soluble in petroleum ether; the insoluble portion contained both resinous and astringent matter (striking a blue-black colour with ferroso-ferric salts), but was entirely soluble in spirit of wine.

Two grams of the seed were then exhausted with boiling 95 per cent. alcohol and upon evaporation ·140 gram or 7 per cent. of a soft, dark red-brown pungent residue was obtained, only partially soluble in ether.

By exhaustion with 70 per cent. alcohol 10 grams yielded (after deducting ash) ·66 gram of extractive, of which ·13 dissolved in water.

We have therefore—

Substances extracted by ether, 5·71 per cent.

Substances extracted by 95 per cent. alcohol, 7 per cent.

Substances extracted by 70 per cent. alcohol, 6·6 per cent.

I concluded from the results thus obtained that it would be best to exhaust successively with petroleum ether, dry ether, and 95 per cent. alcohol, before treating with water, etc. I am now, however, of opinion that it would have been better to have omitted the percolation with ether, as the solution so obtained was entirely soluble in alcohol and contained a considerable proportion of the astringent matter which I had hoped would have been left in the marc and afterwards taken up by the alcohol. It is an open question as to whether the tannins are absolutely insoluble in dry ether, but apparently in presence of resinous matter ether may take up no inconsiderable quantity.

For the proximate analysis of the seeds a quantity was carefully picked over and reduced to an exceedingly fine powder, by repeated grinding and careful sifting.

*Exhaustion with Petroleum Ether.** — 20 grams were placed in a flask with 100 c.c. of the petroleum and boiled for some hours, then transferred to a percolator and continuous percolation with the boiling menstruum continued for twenty-four hours. Two lots of ether were employed and as the latter was only very faintly tinted after several hours' percolation, exhaustion was deemed complete. During the ebullition a small quantity of pale yellow semi-fluid matter was deposited and from this after cooling the supernatant fluid was poured off. One-twentieth (5 c.c.) of the solution was placed in a small flask and a current of dry coal gas passed through the flask until a constant weight was attained. The flask was next kept at 100° C. until the loss of weight after fifteen minutes' further exposure was trifling. The loss is set down as essential oil, but the result is probably a little too high, for the active principle, a portion of which is present in this solution, is slowly decomposed at this temperature with continuous diminution in weight. Thus were obtained—

Volatile oil, ·63 per cent.

Total petroleum extractive, 5·09 per cent.

Volatile Oil.—My observations simply confirm those of Flückiger previously referred to.

Active Principle. — I purposely refrain from giving this substances a name until my examination of it is more advanced. Both the semi-fluid portion deposited by the petroleum and the petroleum solution were very pungent; they were, therefore, mixed and the ether distilled off. The pale yellow oily fluid upon standing deposited a very small quantity of indistinctly crystalline matter. The whole of this residue was shaken with equal quantities of petroleum ether and 70 per cent. alcohol when it entirely dissolved. The alcoholic solution, which from its pungency evidently contained nearly the whole of the active principle, was agitated with a fresh quantity of petroleum ether, and then precipitated with basic lead acetate. The bright yellow precipitate produced adhered to the side of the containing vessel and was removed by agitation with a little silica and filtration. The filtrate after treatment with H_2S was evaporated in a partial vacuum (b. h. about 360 mm.) until all or nearly all the alcohol was removed, and the residue agitated with chloroform. The chloroform solution deposits upon evaporation the active principle. It is a straw coloured, viscid, odourless fluid, pungent in taste (not nearly so hot as capsaicin, but probably hotter than the pungent principle of ginger). It is slightly soluble in petroleum ether and petroleum, very soluble even in dilute alcohol, also in benzol, chloroform, ether, carbon disulphide, glacial acetic acid and solution of potash. From the latter solution it is precipitated by CO_2 and by ammonium chloride. The KHO solution gives with $BaCl_2$, $CaCl_2$, $Mg(C_2H_3O_2)_2$ and $Zn(C_2H_3O_2)_2$, very voluminous pale yellow precipitates soluble in alcohol. Copper acetate gives a green precipitate which upon heating adheres to side of tube. It is very readily oxidized. Warm chromic acid mixture acts energetically upon it with copious evolution of carbonic acid gas and formation of two or more acids of the $C_nH_{2n}O_2$ series. Strong sulphuric acid dissolves it and if care is taken to prevent rise of temperature (which otherwise is considerable and causes carbonization and evolution of SO_2) a dark red solution is obtainable, which if poured into a large quantity of cold water yields a slightly opalescent nearly colourless solution. It readily reduces an ammoniacal solution of silver nitrate with production of a metallic mirror. Hot dilute nitric acid oxidizes it, yielding a reddish resinous mass, which by the action of solvents is found to be a mixture of two or more substances; also carbonic acid, an oily acid with odour of caproic acid, oxalic and succinic acids. Strong nitric acid acts energetically upon it, yielding a pale yellow solution miscible with water. On evaporation a crystalline residue is obtained consisting chiefly of oxalic acid together with succinic. The action of fused potash, of reducing agents, etc., has also been tried, but the results obtained need confirmation by experiment upon larger quantities of material, and are reserved for a future communication.

* The petroleum ether employed in these investigations was portion of a large fraction which came over between 40° and 44° C. upon distilling a light gas oil.

Resin Precipitated by Lead Acetate from the Alcoholic Solution.—The lead salt was decomposed by H_2S and the solution evaporated. The soft, reddish-brown resinous residue had a pungent taste. It appeared to be a mixture of the active principle and a resin. It dissolved in dilute alcohol, the solution, if not too dilute, precipitating with neutral lead acetate. With basic lead acetate it gave a copious yellow precipitate, the lead salt not passing into solution when shaken with petroleum ether. This resinous matter corresponded to about ·5 per cent. of the seed.

The petroleum solution was distilled to remove the ether and the residue dissolved in a little glacial acetic acid. Upon adding a few drops of water and warming, the essential oil separated and floated on the acid. The latter upon cooling became almost solid from deposition of what appeared to be a granular fat. This was removed, and the following properties noted. Melting point (about) 80° F.; upon cooling it had an indistinctly crystalline, pale brown, fatty appearance; very readily soluble in ether, petroleum ether, carbon disulphide, chloroform, benzol, acetic acid and rectified spirit. It has a slightly acid reaction and dissolved in warm 50 per cent. alcohol, in hot solution of sodium carbonate and in solution of potash; in the two latter cases with production of an orange colour. With neutral lead acetate it yields a white precipitate, with the basic acetate a yellow precipitate, which dissolves instantly when shaken with petroleum ether to an orange solution. Upon evaporation this leaves a bright yellow varnish-like residue.

This principle, which I hope to further examine, constitutes about ·80 per cent. of the seeds.

Extraction with Dry Ether.—The percolator containing the marc exhausted with petroleum ether was attached to a filter pump and a current of dry air drawn through to remove the petroleum still remaining in the residue. Ether (specific gravity ·717) was then poured on and after two days' digestion continuous percolation with boiling ether was conducted for about eight hours. The pale yellow solution thus obtained was partially distilled, the remainder of the ether driven off in a current of air at a low temperature, and then exposed for a few minutes to the heat of a water-bath.

The residue corresponded to 1·42 per cent. of the original seed, and was resinous, soft, slightly pungent, pale brownish-yellow and odourless. Treated with carbon disulphide or petroleum ether, a very small portion only was dissolved and this proved to be in the latter case a trace of the active principle which had escaped the previous action of this solvent. It was entirely soluble in rectified spirit, and the solution precipitated copiously with neutral lead acetate. The precipitate was collected, decomposed by H_2S, the solution (alcoholic) evaporated and the residue weighed. It corresponded to ·56 per cent. of the drug. It undoubtedly consisted of a tannin associated with a little resinous matter, difficult to separate. It was amorphous, hard, brittle, red-brown and formed with water an opalescent solution. Soluble in dilute alcohol, and in ether, B.P., but almost unaffected by pure ether, benzol, carbon disulphide and chloroform. Ammonia did not readily dissolve it, but with potash it yielded a rich red solution, and partial precipitation ensued upon addition of ammonium chloride to this solution. In aqueous solution ferroso-ferric salts struck a blue black colour, barium hydrate gave a blue precipitate, silver nitrate and ammonia a black precipitate instantly. It precipitated gelatine solution, and solution of cinchonine salts and reduced Fehling's solution. All attempts to obtain any crystalline bodies by treatment with ether, acetic ether, etc., and careful evaporation were unavailing.

The portion of the ethereal extract insoluble in boiling petroleum ether and not precipitated by lead acetate was devoid of pungency and consisted of resinous matter with probably some decomposition products of the tannin. By action of benzol it could be divided into two portions, the one soluble, the other insoluble therein. Both were unaffected by water, but soluble in solution of the fixed akalies and in glacial acetic acid and in chloroform. The former also dissolved in solution of ammonia and in carbon disulphide; the latter was unaffected by both.

Exhaustion with 84 *per cent. Alcohol.*—The percolator containing the marc from the ether treatment was again attached to the filter pump, and after removal of the ether, rectified spirit was passed through to exhaustion. 100 c.c. of a pale yellowish tincture were thus collected. 20 c.c. upon evaporation to dryness left a residue weighing ·040 gram, and upon ignition this yielded ·003 gram ash. The combustible matter, therefore, taken up by the spirit represents ·93 per cent. of the seeds employed. The red-brown brittle residue left on distilling off the spirit under diminished pressure had a faintly astringent taste. The portion soluble in water was estimated, and in its properties found to coincide closely, but not entirely, with the astringent matter found in the ethereal extract. It only precipitated gelatine distinctly after addition of common salt, and it did not give instantly a black precipitate with ammoniacal solution of silver nitrate, but it rapidly reduced it when heated therewith. I am inclined to think there are two distinct astringent tannin-like bodies present in the seeds, but it is not improbable that the differences observed may be due to impurities associated therewith.

The portion of the alcoholic extract not dissolved in water was almost completely soluble in very dilute ammonia, yielding a red-brown solution. When heated it did not melt, but gave off a disagreeable odour and burnt with a luminous flame, leaving a voluminous char. The precipitate produced by addition of an acid to the alkaline solution, when dry was almost black, and not completely soluble in rectified spirit. Quantitative estimations of an aliquot part of the alcoholic extract gave the following results:—

Astringent matter	·43 per cent.
Phlobophane	·50 ,,
Matter insoluble in water, ammonia and spirit	·07 ,,

Exhaustion with Cold Water.—The marc left after exhaustion by petroleum ether, ether and alcohol was now transferred to a beaker and dried at a low temperature. 200 c.c. of water were then added and the mixture stirred from time to time for two days. The liquid was neutral, colourless, tasteless, and though limpid it filtered very slowly. 10 c.c. of the filtrate yielded ·0225 gram of dry residue, containing ·0035 gram ash.

The mucilage was determined in the usual manner, and after removal of the alcohol in the filtrate from mucilage precipitate the organic acids present were precipitated by lead acetate and estimated by ignition of the precipitate. The aqueous solution did not reduce Fehling's solution until after ebullition with acids, but appeared to contain an appreciable amount of nitrogenous matter.

The aqueous infusion when evaporated on the water-bath deposited flocks of nitrogenous matter which refused to redissolve in water. Mixed with one-fourth its volume of a saturated solution of salt it at once became turbid and slowly deposited a white flocculent matter. Addition of more salt, of acid or of water again dissolved it. The infusion was also coloured brown by iodine, and precipitated with ferrocyanide of potassium and acetic acids.

The total aqueous extract (— ash) was made up of—

Mucilage	·22	per cent.
Organic acid, etc., precipitated by lead acetate	·38	„
Albumenoid	1·3	„
Total	1·9	„

From the difficulty in effecting filtration of the infusion and the fact that it frothed readily and precipitated copiously with barium hydrate, a special search for saponin or an allied body was conducted, but with negative results.

Exhaustion with ·2 per cent. Caustic Soda Solution.—After decanting and filtering the aqueous infusion the residue was digested in ·2 per cent. solution of caustic soda for twenty-four hours. The solution thus obtained filtered easily, and a portion was precipitated with acetic acid and alcohol and the metarabin and ash estimated. Upon evaporating the filtrate the residue was found to weigh less than the sodium acetate which should have been present. Titration of a portion of the alkaline solution proved that about two thirds of the caustic soda used had been taken up by the insoluble vegetable matter.

Estimation of Starch.—The residue which had been treated with dilute alkali was boiled with 200 c.c. of water, and digested with a little fresh diastase in the usual manner, and when the action was completed an aliquot portion was filtered off, acidulated with hydrochloric acid, boiled for four hours and the sugar finally determined with Fehling's solution. The glucose found corresponded to 27·3 per cent. of starch in the original seed.

Pararabin.—After removal of the starch the residue was boiled with 1 per cent. hydrochloric acid and in the filtrate the pararabin estimated. It corresponded to 3·12 per cent. of the seed employed.

The acid solution was dark brown in colour and much more of the constituents of the seed had been dissolved (probably only after decomposition) than was afterwards precipitated by alkalies.

Cellulose.—The residue from the above treatment was finally digested with warm dilute nitric acid (sp. gr. 1·18), to which a little potassium chlorate was added, and the colourless insoluble portion collected on a filter and washed successively with water, dilute ammonia, and alcohol, dried and weighed. The amount of cellulose thus obtained was 1·13 gram.

Moisture and Ash.—Two determinations of the moisture were made by exposing the finely ground seeds in a hot air oven to a temp. of 110° C., until there was no further loss of weight.

1·292 grams lost	·333 or 16·7	per cent.
2·195 grams lost	·368 or 16·8	per cent.

deducting ·6 per cent. for volatile oil, we have as mean of both experiments—

Moisture . . . . 16·15 per cent.

The ash was determined by burning the portion first dried in a platinum crucible in a kind of muffle. The ash was of a pale brown colour, and weighed, ·0668 gram corresponding to 3·36 per cent. of the undried seed.

My assistant (Mr. Thornton) examined the ash from a larger quantity of seed and obtained the following results:—

Ash soluble in water	·60 per cent.
Ash soluble in acid	1·30 per cent.

The remainder (1·44 per cent.) consisted chiefly of sand.

The soluble ash was only faintly alkaline and did not efferverse perceptibly with acids. It consisted almost entirely of potassium and sodium sulphates.

The portion soluble in hydrochloric acid consisted of the phosphates of calcium and aluminium and magnesium, with large traces of manganese and iron.

Albumenoids.—The nitrogen in 1·487 gram of the seed was determined by the method of Will and Varrentrap. The platinum obtained weighed ·0905 gram, corresponding to ·86 per cent. of nitrogen in the undried seed. This may be regarded as equivalent to 5·4 per cent. of albumenoids.

Tabulated Results of the Analysis.

Soluble in Petroleum Ether.	Volatile oil	·63
	Active principle	3·39
	Resin	·50
	(?) Acid	·80
Soluble in Alcohol.	Tannin	·99
	Phlobophane	·50
	Resins	·63
Soluble in Cold Water.	Mucilage	·22
	Organic acids, etc., precipitated by lead acetate	·38
	Albuminoid	1·30
Taken up by successive treatment with dilute alkali; boiling water and dilute acids.	Metarabin	·79
	Starch	27·30
	Pararabin	3·12
	Albuminoids not soluble in water	4·10
	Other substances taken up by acid	6·59
Lignin, etc.		23·70
Cellulose		5·65
Ash		3·36
Moisture		16·05
		100·00

SAPONIN FROM SAPONARIA OFFICINALIS.*

BY C. SCHIAPARELLI.

The analyses hitherto made of saponin obtained from different plants are not very concordant, the results varying indeed from 47·52 per cent. C. and 7·16 H. (Overbeck) to 52·63 C. and 7·48 H. (Rochleder and Schwarz). Moreover the experiments of the last-named chemist lead to the conclusion that the carbohydrate obtained in the first instance from saponin by decomposition with acids, is not grape-sugar, but a body convertible into that sugar by the further action of acids,—and consequently that saponin is not a glucoside but an amyloid. To throw further light on this matter, the author has endeavoured to determine whether the products extracted from different plants and included under the name of saponin, are really identical, and in the present paper he describes the results obtained with saponin from *Saponaria officinalis*.

The root of this plant, dried and coarsely pounded,

* From *Gazzetta*, xiii., 422–430. Reprinted from the *Journal of the Chemical Society*.

was boiled for three days in a reflux apparatus with alcohol of 90°; after which the boiling alcoholic decoction was separated and left for some days in a cool place, whereupon the sides of the vessel became coated with a copious yellow flocculent deposit which, when freed from colouring matter by treatment with a warm mixture of alcohol and ether, consisted of saponin, still, however, very impure. Treatment with alcohol and animal charcoal still left it contaminated with about 3 per cent. of mineral matter. It was, therefore dissolved in the smallest possible quantity of water; the cold solution was precipitated with saturated baryta-water; the resulting barium saponate, after washing with baryta-water, was suspended in water and decomposed by a current of carbonic anhydride, then heated to the boiling point, and filtered; the filtrate evaporated to a syrup at a gentle heat was precipitated with alcohol; and the still yellowish saponin was further purified with alcohol of 90 per cent. The substance thus obtained still contained barium salts, to remove which it was dissolved in water and treated with dilute sulphuric acid, added drop by drop; and the filtered liquid, after concentration at a gentle heat, was precipitated with alcohol and ether, these operations being repeated a second and a third time, and the product finally purified with boiling alcohol of 90 per cent. in quantity not sufficient to dissolve it completely. The alcoholic solution evaporated in a vacuum left perfectly white flocks of pure saponin, which were washed with ether and dried over sulphuric acid.

Saponin thus prepared gave, as the mean result of five analyses, 52·65 per cent. carbon and 7·36 hydrogen, agreeing nearly with the formula $C_{32}H_{54}O_{18}$, which requires 52·86 C. and 7·44 H. Saponin from *Gypsophila* was found by Rochleder to contain 52·65 carbon and 7·34 hydrogen.

Pure saponin is a very white amorphous inodorous powder, which excites sneezing when inhaled by the nostrils; it has a pungent disagreeable taste, and is poisonous; dissolves very freely in water, but is insoluble in ether, benzene, and chloroform, and only slightly soluble in alcohol. Heated on platinum foil, it decomposes, emitting an odour of burnt sugar, and leaving a porous residue difficult to burn. Saponin is lævogyrate, like most glucosides; specific rotatory power $[\alpha]_D = -7·30$: it is the least optically active of all known glucosides.

Saponin, as already observed, is remarkable for the power of its aqueous solution to dissolve salts which are insoluble in water. When its aqueous solution, mixed with lead acetate, is precipitated by hydrogen sulphide and filtered the liquid which passes through is black from dissolved lead sulphide, which may be precipitated from it by adding a small quantity of alcohol. A boiling aqueous solution of saponin dissolves barium carbonate (up to 10 per cent.), which may be precipitated by sulphuric acid; nevertheless barium sulphate is slightly soluble in aqueous saponin. This property of dissolving salts throws great difficulty, as already observed, in the way of purifying saponin. This substance likewise dissolves gases and incloses them mechanically. A dilute aqueous solution of saponin forms on agitation a very persistent froth.

An aqueous solution of saponin mixed with hydroxide of potassium, barium, or strontium, yields precipitates of the corresponding compounds. The barium compound has the composition—

$$C_{32}H_{53}O_{18}.BaC_{32}H_{52}O_{18}.BaC_{32}H_{53}O_{18}.$$

Products of Decomposition of Saponin.—An aqueous solution of saponin was heated on a water-bath with dilute sulphuric or hydrochloric acid, the liquid being filtered after two hours, in order to remove the flocculent substance which separated, and thereby prevent its further decomposition by the acid; the filtered solution was then again boiled, the new precipitate separated, and these operations were repeated a third time. The three precipitates thus obtained agreed very closely in composition, giving as the mean result of their analysis, 60·65 per cent. carbon and 8·22 hydrogen, numbers agreeing nearly with the formula $C_{40}H_{66}O_{18}$, which requires 61·06 carbon, 8·38 hydrogen, and 3·56 oxygen. The decomposition of saponin by dilute acids may therefore be represented by the equation—

$$2\,C_{32}H_{54}O_{18} + 3\,H_2O = C_{40}H_{66}O_{15} + 4\,C_6H_{12}O_6.$$

The compound $C_{40}H_{66}O_{15}$ is called by the author saponetin, to distinguish it from the *sapogenin* of Rochleder and others, which was not of constant composition. Saponetin is a whitish microcrystalline substance, insoluble in water, alcohol, and ether.

The glucose formed by the action of dilute acids on saponin is dextrogyrate, its specific rotatory power being $[\alpha]_D = +52·48$. It is fermentable, has a saccharine taste, and has not yet been crystallized, its solution, after concentration to a syrup, having remained for six months without giving any sign of crystallization. Further experiments are, however, required to determine whether it is a peculiar sugar distinct from dextrose, or whether the difference between its optical rotatory power and that of the latter is due to some other cause.

HYDROCYANIDES OF ORGANIC BASES.*

BY A. CLAUS AND E. A. MERCK.

Aniline, toluidine, quinine, cinchonidine, and strychnine, dissolve in aqueous hydrocyanic acid. An excess of acid renders the solution very unstable. The salts have not been isolated, as they are decomposed by evaporation in a vacuum. Although the bases are completely withdrawn from these liquids by ether, the solutions are not mere mechanical mixtures, since they yield double cyanides with mercuric cyanide; *e.g.*, when mercuric cyanide is added to a solution of aniline hydrocyanide, white tabular crystals, $NH_2Ph,HCN + Hg(CN)_2$, are deposited, which dissolve in water, alcohol, and ether.

When mercuric cyanide is added to tetramethylammonium iodide, two salts are formed, viz., a white salt of the composition $NMe_4I,Hg(CN)_2$, freely soluble in water, and a yellow salt, $NMe_4.CN,HgICN$, sparingly soluble in water. The white salt slowly changes into the yellow isomeride at the ordinary temperature, more rapidly at 200°.

Tetramethylammonium cyanide, $NMe_4.CN$, prepared by the action of barium cyanide on tetramethylammonium iodide, has been described by C. Thompson. The clear crystals of the salt become opaque at 150°, decrepitate at 215°, and melt at 295°. The salt can be volatilized at 225–230° without melting. With mercuric cyanide it forms a double salt, $NMe_4.CN,Hg(CN)_2$, crystallizing in prisms melting at 275°. The corresponding silver salt, $NMe_4.CN,AgCN$, has been described by Thompson. Tetramethylammonium cyanide dissolves cobalt cyanide and ferrous cyanide, forming tetramethylammonium cobalticyanine and ferrocyanide respectively. The latter compound has been described by Barth (*Ber.*, viii., 1484). The former crystallizes in yellow plates, and resembles the potassium cobalticyanide in its properties.

Cinchonidine ethylcyanide, $C_{19}H_{22}N_2O,EtCN$, prepared by the action of barium cyanide on cinchonidine ethylsulphate, forms white crystalline needles, which are decomposed by carbonic acid, and rapidly absorb moisture from the air. It is soluble in water but insoluble in ether and chloroform. The crystals melt with decomposition at 140°. *Quinine ethylcyanide*, $C_{20}H_{24}N_2O_2,EtCN$, crystallizes in needles soluble in alcohol. The crystals melt at 90° and begin to decompose at 95°. *Strychnine ethylcyanide*, $C_{21}H_{22}N_2O_2,EtCN$, is less hygroscopic and more stable than the quinine and cinchonidine compounds. It dissolves freely in water, but is less soluble in alcohol.

* From *Ber.*, xvi., 2737-2748. Reprinted from the *Journal of the Chemical Society*.

The Pharmaceutical Journal.

SATURDAY, APRIL 5, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

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

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

PHARMACISTS AND THE PHARMACOPŒIA COMMITTEE.

The announcement made in a recent number of this Journal that the Medical Acts Amendment Bill, as reintroduced by the Government into the House of Lords, contained the previous provisions as to the preparation of future editions of the British Pharmacopœia in an unaltered form, will have prepared our readers for the tone of some correspondence with the Privy Council department which was submitted to the Council of the Pharmaceutical Society at its meeting on Wednesday last, and is printed on page 809. It was hardly to be hoped that the omission of the Government to respond to the reasonable request of the pharmacists of Great Britain and Ireland that provision should be made to give them a proper position in future pharmacopœia committees, backed as it was by the presentation to the House of Commons last August of upwards of two hundred and fifty petitions, bearing more than four thousand signatures, could have been the result of oversight or inadvertence. Nevertheless, as the Lord President of the Council had intimated in his place in the House of Lords that it was his intention to move some amendments whilst the Bill was in Committee, the President of the Pharmaceutical Society took the opportunity of inquiring by letter whether it was intended to include among those amendments one providing for the formation of a Pharmacopœia Committee including pharmaceutical chemists as well as medical practitioners. The reply was simply an expression of regret that the Lord President did not see his way to amend the Medical Acts Amendment Bill in the manner suggested.

This reply evidently left to the Pharmaceutical Council the alternative of retreating from the position it has taken up in respect to this question, or of making an attempt to impress its views upon Parliament more effectively than it had upon Her Majesty's ministers. As to which course the Council would decide to adopt there could be little doubt, and we believe that the members of the Society will, almost without exception, approve of the instruction given to the Law and Parliamentary Committee to take such steps as it may deem advisable to secure the amendment of the Bill in the direction desired before it passes into law The particular steps that will be found desirable are as yet uncertain and will require most careful consideration; but meanwhile the field in which they can be taken has become more circumscribed, since during the past few days the Bill has been pushed through its remaining stages in the House of Lords and on Thursday it was read a third time and sent down to the House of Commons. Probably its first reading in that assembly will take place early next week; but in the present state of public business the succeeding stages are very uncertain. We presume, however, that an effort will be made to ensure that on the occasion of the second reading the case of pharmacists shall, in some way, be laid before the House of Commons, but presumably the principal effort will have to be made when the Bill is in Committee. It will, therefore, almost certainly become necessary to call upon the local secretaries and other friends to repeat the good work done last year in securing the filling up of petitions from their respective localities and arranging for their presentation when they receive an intimation that the proper time has arrived. Meanwhile every opportunity should be taken by all chemists and druggists to lay before any members of Parliament whom they may be able to approach a clear statement of the nature of the amendment which it is proposed to effect in the Bill, and to point out that the privilege for which British and Irish pharmacists are asking is one already possessed by the corresponding class in almost every other civilized country and has everywhere been acknowledged by the medical profession to be of material benefit. If the question were once properly comprehended by the members of the Legislature there would hardly be a doubt as to the result; whilst, on the other hand, the dread of interfering without the requisite special knowledge in a technical dispute may induce many to follow blindly what might appear to them authoritative guidance. In the words of Mr. Hampson, what is wanted is not so much to exercise pressure upon the Government, as to show the House of Commons that this claim put forward by pharmacists and supported by many medical practitioners is a just and reasonable one. Very few of our readers need now to be informed as to the conditions under which the most important national pharmacopœias other than our own are prepared; but in the event of anyone wishing to refresh his memory as to the facts, he will find them epitomized in an article that appeared in this Journal exactly a year ago. It would, however, seem to be worthy the consideration of the Law and Parliamentary Committee whether it might not be advisable to draw up and issue, in a pamphlet form, a brief statement, suitable for conveying information on the chief features of the subject succinctly to the minds of members of the Legislature and others whom it may be desired to interest.

In conclusion, reference may be made to the fact that at the sitting of the Medical Council on the 27th ult., a report was presented from the Pharmacopœia Committee as to its proceedings since April in last year. From this we learn that "the "arrangements for the preparation of the next "edition of the Pharmacopœia have been continuous; "the Sub-Committee has met on four occasions and "has been in communication with the editors per-"sonally and by written reports." Mention is made of a "memorandum" that has been issued to various medical authorities, pharmaceutical bodies and gentlemen holding prominent positions as practical pharmacists and manufacturing chemists, and it is stated that in reply many valuable suggestions have been received for which the thanks of the Medical Council are due. The pharmacists and manufacturing chemists mentioned by name as having afforded valuable information for which the Committee is very much indebted are Messrs. J. B. Barnes, London; W. Inglis Clark, D.Sc., for Duncan, Flockhart and Co., Edinburgh; S. Gale, for John Bell and Co., London; D. Howard, for Howard and Sons, Stratford; F. J. Macfarlane and Co., Edinburgh; B. S. Proctor, Newcastle; J. C. Thresh, D.Sc., Buxton; Thomas Farries, for Burgoyne, Burbidges, Cyriax and Farries, London; John Moss, for Stagg, Harker and Moss, London; F. W. Fletcher, Edinburgh; and T. and H. Smith and Co., Edinburgh. Many of the suggestions made are said to have been previously anticipated, but all the communications have been handed over to the "skilled editors" for their consideration, and the Committee expresses itself satisfied that the information already in their hands will be sufficient to render the next edition of the British Pharmacopœia worthy of the approval of the Council and the profession. This statement seems to suggest that a considerable advance has been made in the preparation of the new work, and is in accordance with a rumour that it will make its appearance in the early part of next autumn.

EXAMINATION STATISTICS.

The proportion of candidates who fail to pass the examinations under the Pharmacy Act will naturally always be scanned with interest, lest an undue degree of stringency may involve a corresponding amount of hardship. Especially is this interest apt to acquire a tinge of uneasiness when, as is sometimes the case, the proportion of rejections attains a very high figure. It is therefore useful, when opportunity occurs, to note the "pass and pluck" statistics of other bodies, in order to see how far the experience is common to different examinations. Such an opportunity is afforded by the publication of some statistics presented to the Medical Council during its recent session. First in order, as dealing with the earliest stage, may be mentioned a communication from the College of Preceptors, giving the results of the Preliminary examination for medical students and others, under its superintendence, in September last. From this we learn that out of 264 candidates who were examined in London and other centres only 82, or rather less than one-third, succeeded in obtaining certificates qualifying for registration as medical students. Of the remainder, 20 passed in all the obligatory subjects, but failed to obtain the minimum number of marks to entitle them to be placed in the second division of the second class, as required by the regulations of the Medical Council. As to those who were unsuccessful in obligatory subjects, 61 failed in one, 25 in two, 26 in three, and 38 in four or more. Thirty-two candidates were reported for defective spelling, and one was disqualified on that account alone. This proportion of failures, it is needless to say, is considerably larger than the average of failures among candidates in the pharmaceutical Preliminary examination.

Advancing to the next stage, we may refer to a return which was presented showing the percentage of successful and unsuccessful candidates amongst all who presented themselves at the different medical examining boards in the three kingdoms during the year 1883. From this document it appears that the total number of candidates who presented themselves at the first professional examinations was 4171, of whom 2579, or 62 per cent., passed, and 1592 were rejected. In the second examinations the proportion of passes was a little higher, for out of 1239 candidates 815, or nearly 66 per cent. were successful. The third examinations showed still more decided indications as to the quality of the class that had been previously eliminated, for in these the proportion of successful candidates rose to 71 per cent., the number being 2700 out of 3802. As compared with the average results attending the Minor pharmaceutical examination the proportion of passes in each of these medical examinations, taken individually, seems to be more favourable; but if it be remembered that in the latter case the single Minor examination is all that a candidate has to pass, after the Preliminary examination, to entitle him to registration as a fully qualified chemist and druggist it will be seen that the discrepancy is more apparent than real.

Another point which has occasionally been the subject of discussion among pharmacists was illustrated by some volunteer statistics presented to the Medical Council by Dr. Aquilla Smith, showing the relation which the proportions of candidates successful in the examinations of the present day bear to those which obtained in former years. Some of these figures are rather remarkable, since they show that medical examining boards, in some instances, last year rejected two and three times as many candidates in proportion to those who passed as in the year 1867. It is true that, in some instances, it might be objected that possibly passing events may be exercising more or less temporary influence on the stringency of the examinations but it is somewhat striking to find that last year the percentage of rejections by the Royal College of Physicians, London, was 20 per cent., against 11·2; and the percentage of rejections by the Royal College of Surgeons, England, 36·7 per cent. in 1883, against 12 per cent. in 1867. Although probably to produce this result several distinct causes have contributed, important amongst which it may be assumed stand the wider demands of the examiners in view of the enormous strides taken by science in the last quarter of a century, the force of Dr. AQUILLA SMITH'S remark must be admitted when he says that the large proportion of candidates rejected by the College of Preceptors, considered in conjunction with the large proportion of failures in the primary professional examinations, furnishes unmistakable evidence that there is a great defect in the primary education of young men of the class that seek to enter the medical profession.

The goodly list of Stewards published on another page, numbering about one hundred and fifty names, is a promising indication that on the occasion of the Annual Dinner of the Members of the Pharmaceutical Society and their friends, on the 20th of next month, the President will have the support of a large number of leading pharmacists. This is as it should be, for although these *réunions* were primarily initiated with a view of facilitating social intercourse between the members of the Society resident in London and those who come up from the country to attend the annual meetings, they furnish admirable opportunities for demonstrating the practical unity of the body of pharmacists at important crises like the present. We would recommend in order to promote those arrangements that are so essential to the general comfort at such gatherings that persons intending to be present should make an early application for tickets to the Honorary Secretary, Mr. Richard Bremridge.

* * *

In the House of Commons, in reply to a question put by Mr. Warton, on Thursday, Mr. Mundella stated that the Government Bill relating to the sale of poisons will be introduced in the House of Lords after Easter.

* * *

A report that will be found on another page incidentally illustrates the position which no inconsiderable number of chemists and druggists take towards every attempt at the organization and improvement of the body to which they belong. A Mr. Gibson, carrying on business as a chemist and druggist in Southampton, having in the course of evidence given at an inquest stated that he was a registered chemist and druggist, the coroner, having consulted the Register without finding a corresponding entry, called his attention to the fact, when Mr. Gibson offered the explanation that he was registered as living at Middlesborough-on-Tees. Upon the coroner asking him, very pertinently, whether he did not consider it his duty to see that his address in the Register was corrected now that he was residing in Southampton, he is reported to have replied that "that was for the Local Secretary who assisted in compiling the book to see to." Why Mr. Gibson should assume that it is the business of an honorary official of a Society from which he has hitherto held aloof to attend to business that concerns himself alone, we are unable to understand, though we prefer to attribute it to some misapprehension. However this may be, it is certain that if his neglect to keep the Registrar under the Pharmacy Act informed as to any changes of residence he may make results at some time in his name being struck off the Register, he will have himself only to thank for any inconvenience that may follow. Since a question is said to be frequently raised as to what the Pharmaceutical Society does for the trade, we may mention, as a contribution towards answering it, that a few days ago upwards of seven hundred registered letters were sent out, at the Society's expense, to persons whose place of residence was suspected to be no longer represented by the entry in the official Register, and that the greater number of these have already been returned through the Dead Letter Office.

* * *

A paragraph in the current number of the *Journal de Pharmacie* calls attention to the fact that the poisonous variety of star anise derived from *Illicium religiosum*, Sieb., has been detected in the stock of a herbalist in Paris, and that its use is known to have already been followed by serious consequences in two cases at least in that city. As, therefore, it would appear that parcels of this dangerous drug are still met with in commerce, it may be useful to remind our readers that the "star anise" from different species of *Illicium* have been described and figured in an article by Mr. E. M. Holmes, which appeared in the number of this Journal for December 18, 1880.

* * *

In connection with the International Health Exhibition arrangements have been made for the establishment of a library and reading room, which are to be located in a large double room in the Albert Hall, overlooking the Conservatory. It is intended that the library shall contain a representative collection of literature on vital statistics and public health, and that the reading room shall be supplied with the current numbers of periodical publications of a sanitary or educational character. Foreign powers and the Indian and Colonial Governments have been invited to assist in making this department of the exhibition as complete as possible and a general request is made to authors and publishers to contribute copies of works treating of cognate subjects.

* * *

A meeting of the London Section of the Society of Chemical Industry will be held on Monday evening next, at 8 p.m., in the Chemical Society's rooms, Burlington House. The first business will be the election of the Local Committee. Afterwards, papers will be read on "Certain Bye-Products of the Pintsch Oil-Gas Manufacture, in Relation to the Conditions under which Benzenes are formed," by Dr. Armstrong; "The Estimation of Sulphurous Acid in its Compounds," by Messrs. Giles and Shearer; and "The Solidification of Liquid Oils," by Mr. W. J. Carpenter.

* * *

The next meeting of the Chemists' Assistants' Association will be held on Wednesday, April 9, at 9 p.m. precisely, when a paper on "Operative Dentistry" will be read by Dr. Albert J. Kutz.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, April 2, 1884.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Messrs. Andrews, Borland, Bottle, Butt, Churchill, Gostling, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Symes, Williams, and Young.

The minutes of the previous meeting were read and confirmed.

Nominations for Council and Auditors.

Council.

The Secretary reported that he had received *twenty* nominations to fill the *fourteen* vacant seats on the Council and that the following *eighteen* had declared their willingness to accept office if elected:—

Atkins, Samuel Ralph, Market Place, Salisbury.
Baldock, John Henry, 3, High Street, South Norwood, S.E.
Borland, John, 7, King Street, Kilmarnock.
Butt, Edward Northway, 13, Curzon Street, Mayfair, W.
Churchill, Walter John, 46, New Street, Birmingham.
Dyer, William, 1 Corn Market, Halifax.
Gostling, Thomas Preston, Market Hill, Diss.
Greenish, Thomas, 20, New Street, Dorset Square, N.W.
Radley, William Valentine, 42, Hampton Road, Southport.
Robbins, John, 147, Oxford Street, W.
Savage, William Dawson, 4, Park Road East, Brighton.
Schacht, Geo. F., 52, Royal York Crescent, Clifton, Bristol.
Shapley, Charles, 11, Strand, Torquay.
Squire, Peter Wyatt, 413, Oxford Street, W,
Williams, John, 16, Cross Street, Hatton Garden, E.C.
Woolley, George Stephen, 69, Market Steeet, Manchester.
Young, James Robertson, 17, North Bridge, Edinburgh.
Young, John Rymer, 42, Sankey Street, Warrington, Lancs.

The following *two* had declined to accept office:—

Allen, Charles Bowen, 3, Manchester Ter., Kilburn, N.W.
Pickering, Atkinson, 45, Lowgate, Hull.

Auditors.

The following had been nominated as Auditors for the ensuing year, and had declared their willingness to accept office if elected, except Mr. Thompson, who does not seek re-election:—

Hodgkinson, William, 198, Upper Whitecross Street, E.C.
Lescher, Frank Harwood, 60, Bartholomew Close, E.C.
Stacey, Samuel Lloyd, 300, High Holborn, W.C.
Thompson, Henry Ayscough, 22, Worship Street, E.C.
Watts, William Manning, 32, Lower Whitecross St., E.C.

The President said he was sure the Society would be sorry to lose the services of Mr. Ayscough Thompson as auditor, but in consequence of his eyesight not being so good as formerly, and the increased work of the audit, he felt that it was proper to retire. It was the duty of the Council in these circumstances to nominate someone in his place, and he would therefore, on the suggestion of Mr. Thompson himself, nominate Mr. Hopkin, 16, Cross Street, Hatton Garden.

The nomination was unanimously acceded to, and the thanks of the Council accorded to Mr. Ayscough Thompson for his valuable services.

Elections.

Chemist and Druggist.

Joseph Hobley, of Llanberis, a chemist and druggist, registered as being in business on his own account before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society.

Allen, Frederick Charles	Walsall.
Charles, Thomas	Hanley.
Constance, Herbert Edward	London.
Crofts, John Ernest	Birkenhead.
Francis, William Henry	London.
Graham, Robert	Paisley.
Hutchin, William Francis W.	Saffron Walden.
Keeling, Arthur Gadsby	Walthamstow.
Neale, John	King's Lynn.
Smith, John Henry	London.
Tilley, Joseph	Bristol.
Wardle, Thomas	Burslem.
Wilcock, John	Lancaster.
Wrack, Frederic George	Bridlington.

ASSOCIATES.

The following, having passed the Minor examination and tendered their subscriptions for the current year, were elected "Associates" of the Society:—

Arthur, Samuel	Redruth.
Collen, William Cresswell	London.
Hill, Charles Walter	Leeds.
Jackson, Frederick	Manchester.
McLanachan, John	Sheffield.
Ray, Charles	Eastbourne.
Sapsed, William George	London.
Shannon, Robert James	Birmingham.
Stewart, Alexander Kennedy	Kilmarnock.
Taylor, Edward	Tonbridge.
Thwaites, Frederick	Bishop Auckland.
Tupholme, Frank	London.
Wilkinson, Robert	Kirkham.

APPRENTICES OR STUDENTS.

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

Baker, Sydney John	Exeter.
Berridge, Oliver Gillett	Leicester.
Bloomer, Joseph	Cradley Heath.
Bowie, George	Aberdeen.
Brown, Frederick Edward	Ipswich.
Capell, James Ralph	Kettering.
Clarke, Charles Henry	London.
Golding, Frank Oliver	London.
Greaves, William	Ironville.
Hart, Edgar Thomas	Rochester.
Horry, William Thomas	Boston.
James, Hugh	Bodedern.
Jeeves, Henry	Brighton.
Jones, John Morgan	Brechfa.
Lee, Charles Henry	Melton Mowbray.
MacBean, James Barnet	Edinburgh.
Mart, Oliver George Russell	London.
Middleton, David	Aberdeen.
Miner, Major Thomas	Walsall.
Thomas, Ivor Edward	Merthyr.
Vallance, Arthur Clayton	Mansfield.
Watson, Edwin Joseph	Birmingham.
Watts, John William	Finchley.

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

Restoration to the Register.

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

Thomas Williams, 1, Cleveland Villa, Northcote Road, Clapham Junction, London, S.W.
Alfred Yeatman, Chagford, Devon.

The Registrar reported that—
Richard Lewis, of Llansaintffraid, Montgomeryshire, having made a statutory declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been duly supported by a qualified person, his name had been placed on the Register.

Honorary Members.

The President said the next business on the agenda was the selection of names for nomination as Honorary Members to be elected next month, but inasmuch as the bye-laws were now under consideration, and it was proposed to make some alteration in the regulations for electing Honorary and Corresponding Members, he apprehended the Council would prefer leaving the question in abeyance for the present.

This view being acquiesced in, no names were mentioned.

Reports of Committees.

FINANCE.

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

BENEVOLENT FUND.

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

£10 to the widow, aged 58, of a member from 1841 to 1877. Applicant had a previous grant of £15 in October, 1881. Is in ill-health, and has a daughter in ill-health also. Hampshire.

£5 to the widow, aged 44, of a former member. Surrey.

£15 to the widow, aged 51, of a registered chemist and druggist. Surrey.

£10 to a registered chemist and druggist, aged 72, formerly in business for forty-five years; became paralysed in 1881. Yorkshire.

£10 as the usual quarterly allowance towards the support of the Isherwood orphans.

One other application had been deferred for further information, and four had not been entertained.

The report and recommendations of the Committee were adopted on the motion of the Vice-President, who stated that a very satisfactory report had been received with regard to the boy Isherwood, who had recently been apprenticed.

FREEHOLD INVESTMENTS.

This Committee presented a report, which was considered in committee.

After a long discussion the report and recommendation were unanimously adopted.

LIBRARY, MUSEUM, LABORATORY, AND HOUSE.

Library.

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

Attendance.		Total.	Highest.	Lowest.	Average.
February	Day	545	32	11	22
	Evening	174	20	2	8

Circulation of books.	Town.	Country.	Total.
		No. of Entries.	
February	175	131	306

Carriage paid, £2 5*s*.

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

Journal of the Chemical Society, 1883.
Berichte der deutschen chemischen Gesellschaft, 1883. From Mr. Walter Hills.
Johanson (E.), Heizwerth eines Torfes.
— Ein Ei im Hühnerei.
— Zur Bestimmung des Alters der Biere, 1883.
— Zur Frage der Brennmaterialien.
— Zur Untersuchung von Zuckerwaren.
— Eine russische Steinkohle.
— St. Petersburger Hausseifen.
— Ein Desinfectionsmittel.
— Zur Gerbstoffbestimmung.
— Ein Patentmittel. From the Author.
Fourth Annual Report of the State Board of Health, Lunacy, and Charity of Massachusetts, 1883. From the Board.

The Committee recommended the purchase of the undermentioned works:—

Codex medicamentarius, Pharmacopée française, 1884. 2 *copies.*
Parrish (E.), Treatise on Pharmacy, 5th ed. 2 *copies.*
Proctor (B. S.), Lectures on Practical Pharmacy, 2nd ed. *A third copy.*
Remsen (I.), Principles of Theoretical Chemistry, 2nd ed.
Thudichum (J. L. W.), Pathology of the Urine, latest ed.
Ure (A.), Dictionary of Arts, Manufactures and Mines, 7th ed., vols. 1, 2, 3.
Watt (A.), Art of Soap Making.

Curator's Report.

The Curator had reported the attendances in the Museum during February to have been:—

	Total.	Highest.	Lowest.	Average.
Morning	585	42	15	28
Evening	98	20	1	3

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

Specimens of crystallized Jambosin and of Di-mercuric chloride atropine hydrochlorate. From Mr. A. W. Gerrard.
Specimens of the resin of *Xanthorrhœa Greiossii.* From Mr. H. Hart, West Australia.
Specimens of Red and of White Kola Nuts and of the fruits of *Myristica surinamensis.* From Messrs. T. Christy and Co.
Specimens of Kola Nuts wrapped in the leaves used for preserving them by the natives. From Messrs. Symes and Hallawell.
Specimen of Essential Oil of Limes from Trinidad. From Messrs. Wright, Layman and Umney.
Specimen of pure Cymene, prepared from Austraterebinthene by the action of Iodine upon it. From Miss E. C. Hacon, Laboratory Student.
Fresh specimen of the root of *Urginea Scilla.* From Messrs. H. Roberts and Co., Florence.
Specimen of a variety of Sarsaparilla collected in Paraguay. From Messrs. Burgoyne, Burbidge, Cyriax and Farries.

An application for the loan of specimens from the Museum to illustrate a lecture on Tea had been received from Mr. Hasselby, of Doncaster.

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

A letter had been received from the India Office notifying the dispatch of a further collection of cinchona barks for the Society's Museum.

The President made an explanation in Committee as to inquiries he had been requested to make with regard to obtaining the paper required for the Journal on better terms. He then moved the adoption of the report.

Mr. Williams seconded the motion, which after some conversation was carried unanimously.

GENERAL PURPOSES.

The report of this Committee was taken as usual in committee. It included the reports from Professors

Bentley and Redwood as to the class examinations at the end of the first five months course.

Professor Bentley had reported that fourteen students had competed for the prizes, of whom a large proportion were worthy of distinction, and the general result was most satisfactory. He had never had a better conducted class, and the system of *vivâ voce* examination after each lecture had been found very useful. The number of students in attendance had been larger than last year.

Professor Redwood's report was also very satisfactory. He stated that the assistance he had received from Mr. Dunstan and Mr. Ince had contributed to make the instruction provided such as ought to be satisfactory to the students, and he believed it had been generally appreciated. Mr. Dunstan, in addition to his lectures on organic chemisty, had given six supplementary afternoon lectures. Mr. Ince had given thirty-eight demonstrations, preceded by short lectures, on practical pharmacy and dispensing.

The attendance at all these lectures and demonstrations had been regular, and the conduct of the students unexceptionable.

The Committee, having opened the motto envelopes to ascertain the names of the successful competitors, recommended that the following awards be made:—

Chemistry and Pharmacy.

Bronze Medal		Fraser McDiarmid.
Certificate of Merit ...		Ernest John Eastes.
" "		Robert Wynne Chas. Pierce.
" "		Frederick Edward Johnson.
" "		George Frederic Callaway.

Botany and Materia Medica.

Bronze Medal		Fraser McDiarmid.
Certificate of Merit ...		Ernest John Eastes.
" "	Equal.	Frederick Edward Johnson.
" "	Equal.	Richard Henry Norman.
" "	Equal.	Josiah William Steward.
" "		Robert Roberts.
" "		Robert Wynne Chas. Pierce.
" "	Equal.	Ernest Haworth Earle.
" "	Equal.	Albert Wilson.

The report also included the usual letter from the Solicitor, reporting the progress of cases placed in his hands.

Several other cases of alleged infringement of the Pharmacy Acts had been considered by the Committee. In some cases proceedings were recommended to be taken, and in others further information was desired.

The President having given details of some of the cases referred to, a long discussion ensued with reference to one of the cases recommended for prosecution.

On resuming, the report and recommendations were unanimously adopted.

The North British Branch.

The President, referring to the resolution passed a short time ago authorizing the purchase of premises in Edinburgh suitable to the requirements of the Society, stated that an opportunity had been presented for purchasing a house in York Place, with a garden at back and stable in the rear. It was well situated and larger than was at present required, and an offer had been made for it. A condition was imposed by the vendors that no lettering or sign board should be affixed to the walls of the house for a period of ten years, and this condition he thought might well be acceded to.

Mr. Greenish asked what amount would be required to make the house suitable for the purposes of the Society.

The President said he believed about £200 would cover it. He added that a communication had been received from the Council of the North British Branch recommending this purchase.

The Council went into committee to consider the details of the proposed purchase.

Mr. Young said there would be some little expense in connection with moving and making various arrangements in fitting up the new building, but he did not think there would be much difference between what the Society was now paying and what it would eventually have to pay and he believed the step would give an immense impetus to the Society in Scotland. During the last forty years it had been growing, but none of the places in which it had been located was at all equal in importance to this one, or at all in keeping with what might be wished.

The President said he thought it might be taken that the new building would not cost more than £100 a year. Edinburgh was an academic city and it was very desirable that the Society should show medical men there that it was progressing.

Mr. Hampson said it appeared to him the purchase was very eligible, as it seemed to be just the kind of property the Council had been looking for. There was one consideration, however, and that was as to whether the Scottish Branch had ever paid. He did not think it had; but still he thought the members of the trade would in future show their loyalty to the Society, and give more encouragement to it. It was absolutely necessary that the Society should be well represented in Scotland, and the purchase was desirable on that account; but still he hoped Scotch chemists and druggists would consider it also to their interest to help forward their common objects by joining the Society.

Mr. Borland said that he was quite alive to the remark made by Mr. Hampson that many Scotch chemists and druggists had not supported the Society in the way they might have done; but it might be considered that in a place like Scotland, where there were only one or two chemists in a locality, there was great difficulty in bringing the men together. They had not the facilities which existed in the large towns of England to call meetings, and they probably did not meet each other once a year. He had several times expressed an opinion to his friends that by a little exertion on the part of those who took an interest in the Society, there would be no great difficulty in adding to the members, and he was quite sure it only required a little explanation of the benefits to be derived from the Society to add largely to its numbers. There was no antagonism whatever to the Society in Scotland, but there was this difficulty, that before anyone could be proposed as a member he must be known to a member of the Council, and he had had that difficulty put before him within the last few days.

Mr. Young agreed with what Mr. Borland had said; he was happy, however, to tell Mr. Hampson that he had lately had the pleasure of auditing the accounts of the North British Branch, and was pleased to find that it was in the favourable position of being able to pay all its debts.

Mr. Bottle said there need be no difficulty in Scotchmen joining the Society. At the last meeting he nominated a Scotchman, because, although personally unknown to him, he was represented to him, by gentlemen on whom he could rely, as being a fit and proper person to be elected, and, therefore, he had no hesitation in signing the nomination paper. It would give him great pleasure to propose a great many more Scotchmen as members.

Mr. Schacht congratulated the President on the success of his endeavours.

The President said during his visit to Edinburgh, last week, he had endeavoured to impress on their Scotch friends that the desire of the Society was to make a strong pharmaceutical body for the whole kingdom, at the same time to make all allowances for geographical difficulties which might exist in the North. If the Society had not been so well located in Edinburgh in former years as it ought to have been it was to some extent the fault of the Scottish members, because whenever any suggestion had been made with regard to improving the accommodation, it had always been cheerfully adopted by the Council of the Society. He felt sure the result of acquiring this building would be to bring in a large number of new Scottish members.

It was moved by the PRESIDENT and seconded by the VICE-PRESIDENT, and carried unanimously, that the house, No. 36, York Place, Edinburgh, be purchased on the terms and subject to the conditions mentioned by the President, and a committee appointed to consider and report what alterations should be made to fit the house for the Society's business.

THE MEDICAL ACTS AMENDMENT BILL.

The Secretary read the following correspondence with the Privy Council:—

Copy.

"Pharmaceutical Society of Great Britain,
"17, Bloomsbury Square, London, W.C.,
"*March* 17, 1884.

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

"*Medical Acts Amendment Bill.*

"Dear Sir,—On the 12th of April last, I ventured to call the attention of the Lord President to the provisions of the above Bill in so far as they relate to the preparation and revision of the British Pharmacopœia, and a memorial on the subject from the Council of this Society was subsequently addressed to the Privy Council.

"I now beg leave to inquire on behalf of the Council of the Pharmaceutical Society if it is the intention of the Lord President to include among the amendments, which I understand are to be moved in the Committee on the Bill in the House of Lords, one providing for the formation of a Pharmacopœia Committee including pharmaceutical chemists, as well as medical practioners.

"I am, dear sir, your obedient servant,
(Signed) "M. CARTEIGHE.
"*President.*"

Copy.

"Privy Council Office, Whitehall,
"19th *March*, 1884.

"Sir,—I have submitted to the Lord President of the Council your letter of the 17th inst. and I am to state, for the information of the Council of the Pharmaceutical Society that his Lordship regrets that he does not see his way to amend the Medical Acts Amendment Bill, in the manner suggested by you, by inserting a clause providing for the formation of a Pharmacopœia Committee including pharmaceutical chemists as well as medical practitioners.

"I am, sir, your obedient servant,
(Signed) "C. L. PEEL."

The PRESIDENT said the further amendments which had been introduced were simply with regard to the proportional representation of corporations as against universities on the Medical Council. He understood the Bill was to be read a third time in the House of Lords on Thursday.

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

"That this Council observes that the Medical Acts Amendment Bill, now in the House of Lords, contains no provision by which the Pharmaceutical Society or British pharmacists shall be officially recognized and empowered to prepare and revise the future editions of the British Pharmacopœia, and recommends that the Law and Parliamentary Committee be authorized to take such steps as they may think fit to remedy this omission."

He said he was aware of the unsatisfactory reply which the President had received from the Privy Council, but there was one word in it which gave him a little encouragement, viz., the word "regret." If there were a sense of regret in the department that the opportunity was not quite suitable for the insertion of the amendment in the Bill to meet the views of the Society and pharmacists generally, he hoped that in the Commons there would be an opportunity of satisfying that regret upon the part of the Lord President. They must all feel regret that the efforts of the Society last year and the support which they received had not been recognized. He believed the case of pharmacists was perfect in so far as they had a claim on the Government at this time when it was about to legislate with respect to future Pharmacopœias, and he hoped they would be able—not to use sufficient pressure, for he did not like that word—but to show the House of Commons that they had a just claim on the Government, and were entitled to be legislated for in respect of the Pharmacopœia. They did not ask for any pecuniary benefit, they simply asked for this recognition in the interest of pharmacy itself. Their claim was in no respect antagonistic to the medical profession, and in moving this resolution he felt sure that if members of Parliament understood what was wanted they were sufficiently reasonable to meet them in a proper way.

Mr. SYMES, in seconding the motion, said it would not be necessary to occupy time by putting forward any argument in favour of the principle which the members of the Council had already recognized. They all felt the importance of this matter and had previously taken such steps as they thought were desirable to support the position they maintained. Unfortunately the Bill did not reach a sufficiently advanced stage in the House of Commons last session, or undoubtedly they would have accomplished what they desired. He feared the word "regret," which had been alluded to, was merely a figure or speech.

Mr. BOTTLE supported the motion.

Mr. WILLIAMS asked how far this resolution would give power to the Committee to proceed. Would it be authorized to issue petitions, etc., as was done last year?

The PRESIDENT said he certainly understood so.

The VICE-PRESIDENT said he presumed that, apart from any agitation, an endeavour would be made to get a clause inserted in the Bill when it reached the House of Commons.

Mr. HAMPSON said the object of the resolution was to place the matter in the hands of the Committee, which would of course make the best use of its time, so that when the Bill came to the House of Commons some member should move an amendment on the lines desired.

Mr. YOUNG thought everyone would accede to the proposition.

Mr. GREENISH also supported the motion, but said the matter had been so well thrashed out that it was not necessary to occupy time by repeating the old arguments over and over again. It was perhaps to be regretted that steps had not been taken earlier to remedy the matter in the House of Lords, but now the Bill was coming to the House of Commons, every possible step should be taken to get a suitable amendment inserted. If it were not done now another twenty years would elapse before a similar opportunity would occur, and he trusted every member of the Council would throw his whole heart into the matter, and that every effort would be made to carry out the principle of the resolution.

Mr. RICHARDSON also supported the motion.

Mr. BORLAND suggested that on the previous occasion the petition which had been prepared stated that it was on behalf of pharmacists and medical practitioners, and he thought it a very important point that medical men should be asked as far as possible to give their aid and countenance to the movement. Pharmacists did not aim at interfering with the introduction of any medicine into the Pharmacopœia. Those matters would be left entirely to the medical profession. It was only with reference to the practical part of pharmaceutical work that they aspired to have any voice in the question. He might repeat what he had formerly said, that the various members of Parliament with whom he had conversed on the subject gave their cordial support to the movement.

The PRESIDENT said no doubt Mr. Borland's remarks would be fully borne out, and that members of the medical profession would in large numbers support the proposition. With regard to what Mr. Greenish had said he might state that on his own responsibility, after consulting one or two other members, he had thought it better not to take any steps in the House of Lords, but to wait until the Bill had been introduced into the Commons before moving any further.

The motion was then put and carried unanimously.

THE CONVERSAZIONE.

The PRESIDENT said a letter had been received from the authorities of South Kensington, giving permission for the use of the Museum on May 21 for the annual Conversazione.

PATENT MEDICINES CONTAINING POISON.

The SECRETARY read a letter which had been received from the Halifax Chemists' Association, containing a resolution which had been passed on the subject of misadventures arising from the use of patent medicines containing poisons, and suggesting the urgency of new legislation, whereby the presence of such poisons should always be indicated by the makers thereof, and the sale of articles containing them restricted to those who alone were qualified by training and education to deal therein.

A communication on the same subject was also read from the Society's Local Secretary at Sheffield.

ERRATUM.—At page 724 the name of "Edward Peck, Ely," published in the list of "Apprentices or Students," should have appeared in the list of "Associates."

EVENING MEETING.

Wednesday, April 2, 1884.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The last Evening Meeting of the Session was held on Wednesday, April 2. The minutes of the preceeding meeting having been read and confirmed, a paper was read on—

AQUEOUS EXTRACTION OF CINCHONA BARK.

BY PROFESSOR REDWOOD.

The paper is printed on p. 797.

The PRESIDENT, in inviting a discussion, suggested that it should be confined exclusively to the subject of liquid extract of cinchona. He would only say, in passing, that the Professor had very ingeniously dropped his old friend and taken to the new one. He should be glad if he had thrown his first love over with something like courage. Possibly there were some gentlemen present who might have something to say for the so-called liquid extract of cinchona which now existed in the Pharmacopœia. With all due respect to the Professor, he must say that he had weakened the force of his argument by the first two paragraphs of his paper, for, in one place he referred to the value of the existing preparation, and then he stated in so many words that practically it was not very valuable.

Mr. GILES requested that before the discussion commenced Professor Redwood would state what he meant by quinovin.

Professor REDWOOD said that he found that the term was very generally used to represent a bitter amorphous extractive matter which was capable of being taken out from cinchona barks, and which after concentration was precipitated by dilution.

Dr. PAUL said that he had listened to the paper with very great surprise, on account of the remarkable discrepancy between the statements contained in it and the position which Professor Redwood took up with regard to the liquid extract of cinchona on a previous occasion. About a year ago he (Dr. Paul) brought before the meeting some data which led him to conclude that the liquid extract of cinchona was not altogether what it was commonly believed to be, or what he believed such a preparation ought to be in regard to the drug from which it was prepared. One objection which he raised against the liquid extract of the Pharmacopœia was its invariable deficiency in the amount of alkaloids which it ought to contain, and that therefore the recommendations which were given of it were misleading to medical men. On that occasion Professor Redwood defended the preparation and the method of preparing it, and he characterized the objection that it did not contain the medicinal constituents of the bark as a very weak objection. The present paper, however, appeared to be a perfect recantation of the position which Professor Redwood previously took up. He now said that there was a strong ground of objection to the official mode of preparing liquor cinchonæ. That was precisely what he (Dr. Paul) had said a year ago. Indeed, Professor Redwood's present statement appeared to be a confession which admitted all the charges which he (Dr. Paul) made against the preparation and the process by which it was prepared. The Professor might, however, have been somewhat more candid in his confession than he had been. In consequence of the vigorous defence which Professor Redwood made on the last occasion, he (Dr. Paul) was discouraged from following out the matter and had remained passive ever since. His objections to the official process were not received with favour, and there did not seem any prospect of a proposed substitute being better received; therefore when Professor Redwood spoke of the difficulty which he had had to get his friends to undertake the investigation of the subject it must be remembered that the difficulty was somewhat of his own creating. In commenting upon the chief objection to the liquor cinchonæ, that it did not contain all the medicinal constituents of bark, Professor Redwood instanced the infusion of camomile and asked who in his senses would think of objecting to that infusion because it did not fully represent all that was active in the camomile flower. It was remarkable that, after such a brief lapse of time, he should now come forward and abandon his former position and recommend the present preparation, because it fully represented the medicinal efficacy of the bark. It could not be supposed that in this short space of time the Professor had taken leave of his senses, and yet he now came with a recommendation which only a year ago he characterized as senseless. Then as to the material from which the new preparation was to be made, they were told that it was red bark. But what red bark? Certainly not the red bark of South America, which, however valuable it might be for making tooth powder, had very little febrifuge value, and would not serve for making the liquid extract. He apprehended that the bark used was the Indian red bark, which a year ago he was told was so utterly outside the pale of official pharmaceutical recognition that he was making an unwarrantable assumption in presuming to bring forward experiments made with that bark to show that the process in the Pharmacopœia was useless. His experience of the red bark of India, notwithstanding the favour with which it was regarded by some persons, was that it was about the worst bark which could possibly be used. It contained much objectionable material, which resembled extract of kino more than anything else, and he should judge that it was about the most unsuitable of any for pharmaceutical purposes. There was plenty of cinchona bark of the true calisaya or officinalis type, which he regarded as preferable, and which possessed the advantage of having very little of the red offensive looking and nauseous material which was precipitated by water; such bark contained a large percentage of alkaloid in which quinine preponderated. They were told at the last discussion that the reason that he obtained unfavourable results was that he used the Indian bark, which was a material not ordered in the Pharmacopœia. He (Dr. Paul) took it that in the lapse of time Professor Redwood had recognized the validity of the objections which he (Dr. Paul) raised on the former occasion, and that he had now sought to devise a process by which those objections could be avoided. As to the process itself, it consisted in treating Indian *Succirubra* bark, he supposed, not with water, but with dilute acid. He could not accept the representation that this was an aqueous treatment, seeing hydrochloric acid was employed. He should like to see some data which would enable them to judge how far the preparation, made with hydrochloric acid, really did represent the bark in every respect. That he believed to be the chief point about the whole of the preparations of bark. A great deal had been said about the relative efficacy of different preparations and medical opinions with regard to the water preparations had been alluded to. No doubt those opinions were deserving of respect, although they were not altogether intelligible in the present state of our knowledge. It appeared that the very strong predilection amongst medical men in favour of the decoction was due, not to the constituents which it contained, but to the manner in which the constituents were presented to the stomach. In all kinds of cinchona bark, he believed, the principal part of the alkaloids was in combination with cinchotannic acid, and in that form of combination the alkaloids were very sparingly soluble in water. The consequence was that the infusion which was made with cold water was the weakest of any; the decoction was stronger, but though the solubility of the cinchotannates was greater in hot water than in cold, a large quantity of cinchotannate was deposited when the water cooled. What remained was in the same state of combination as in the bark itself, and that, he believed, was one of the reasons why the decoction was preferred to any other preparation. With regard to the liquid extract, he thought that the same condition ought to be maintained, and that an attempt should be made to avoid the elimination of the cinchotannic acid, and its decomposition, which took place very readily alkaloids in the state in which they existed in the bark. when it was liberated, so as to obtain a solution of the Professor Redwood had spoken of certain "worthless" constituents being eliminated. He (Dr. Paul) failed to see on what authority Professor Redwood condemned those constituents, or why he assumed that the alkaloids contained in his finished preparation were in the state in which it was desirable they should exist. This must be left for further inquiry. His (Dr. Paul's) own opinion was that the use of hydrochloric acid in preparing liquid extract was decidedly objectionable. Professor Redwood had stated that there was nothing in the preparation made by the process which he had now described which was not freely soluble in water. Consequently there was no cinchotannate of the alkaloid, and it might be inferred that this had been decomposed. This was in fact shown by the absence of turbidity on diluting the new preparation with water. The cinchotannate was, however, precisely the constituent which it was desirable to retain in a liquid extract. As to the exhaustion of the bark, there were no data showing that the new process was efficient. He was inclined to doubt whether treatment with weak acid would extract the whole of the alkaloids. The objections which he urged to the process were chiefly made on chemical grounds. He would leave the pharmaceutical part of the discussion to others who were more competent to deal with it.

Mr. Giles said that he thought that it was perfectly immaterial whether Professor Redwood had changed his opinion or not, but he should like to say a word for the much abused old liquid extract. Some time ago having occasion to examine liquid extract of cinchona he obtained specimens of all the preparations known to the market and amongst them, two samples of the Pharmacopœia liquid extract, one from a highly respected retail house, and the other from a manufacturing firm. The former contained 1·498 per cent. and the latter 1·860 per cent. of basic alkaloid. Pharmacopœia Calisaya bark ought to contain 2 per cent. of basic alkaloid; and if those extracts which he examined were made from Pharmacopœia Calisaya they showed a very good result, for they contained nearly all the alkaloids that ought to have been present in the bark. He also examined some extracts which were very much advertised as being superior preparations. One of these contained 1·495 per cent. of the alkaloids, and this was by far the highest percentage among those much advertised preparations. Battley's preparation gave a higher percentage, but for certain reasons he did not include it in the category. Hence, having regard to the lights which existed fourteen years ago, when the Pharmacopœia was compiled, the old Pharmacopœia preparation was not so disreputable. His experience was that medical men had very great faith in the old liquid extract when it was properly prepared. He believed that the reason was that the bark contained constituents of very great value, which were not alkaloids. What was wanted was a preparation of bark. If simply the active principles were required the alkaloids themselves could be used. He was very suspicious when he heard his friend, Professor Redwood, proposing to turn out what he called "quinovin." It was a dangerous thing to begin turning out anything, and he did not see the necessity for it. With regard to the mode of preparation, he was very suspicious about the direction to macerate at a temperature of 180° F. His experience was that no good was to be got from a high temperature. Another part of the process given in the paper consisted in adding distilled water to the concentrated percolate and stirring together while a precipitate was forming. But he did not see why there should be any precipitate formed at all. He had evaporated large quantities down to a solid extract, which he found perfectly soluble. It was true that he did not use a temperature of 180° and that the evaporation was performed *in vacuo*. He questioned whether the process of precipitating by soda in the manner directed for estimating the percentage of alkaloid in the solid extract would be found to be reliable. He thought the precipitate so obtained would be likely to consist largely of cinchotannate and would give too high a result; but that was a detail which might be amended. His impression was that they knew very little about bark, and that it was a rash thing to say what part of it had a medicinal value and what part of it had not. He held that all the surroundings of the alkaloids were important, and that the real object in making an extract was to get out all that was soluble and could be retained in the soluble condition. It was an easy thing for the Professor to cut the Gordian knot, by precipitating some of the material and filtering it out if he could not keep it in solution, and thus to obtain a soluble residuum. A soluble preparation might always be obtained in that way, but he did not think that that was a fair way of overcoming the difficulty. The Professor said, "The small quantity of hydrochloric acid used in the process is sufficient to ensure the entire removal of the alkaloids from barks of average and even more than average quality." He doubted that statement entirely. He did not know whether Professor Redwood had examined the marcs afterwards; but he (Mr. Giles) had often found 1 per cent. of alkaloids left in a bark containing originally 7 or 8 per cent., although hydrochloric acid was used and the percolation was conducted precisely as directed in the present paper.

Professor Redwood said that he was prepared to show that there were no alkaloids left in the liquid.

Mr. Giles said that the recognition of the use of hydrochloric acid was an important advance in the process. Unless an acid was used there would be a waste of alkaloid. With all due respect to Dr. Paul, he believed that the hydrochloric acid dissolved the cinchotannates of the alkaloids as cinchotannates. He knew that, having dissolved them out, they could be got back again as cinchotannates, though that did not show that they had not undergone a change in the meantime.

Mr. HOLMES said that he had tasted the extract on the table, and he found that the astringency had not been destroyed by the hydrochloric acid. He believed that hydrochloric acid was always present in the gastric juice, and therefore if the preparation was not submitted to the action of hydrochloric acid before it entered the stomach, it certainly was afterwards.

Mr. DUNSTAN said that he should think it extremely probable that the hydrochloric acid decomposed the cinchotannates, forming cinchotannic acid and chlorides of the alkaloids. He supposed that when Mr. Giles said that he could get back the cinchotannates, he meant by the addition of ammonia.

Mr. GILES said that he got them back by treating with acetate of soda.

Mr. DUNSTAN, resuming, said that that amounted to the same thing. Assuming that they could not get the cinchotannates out by water alone, the next best thing was to get out the cinchotannic acid and the alkaloid separately. That seemed to be what Professor Redwood did. He was struck with one point in connection with what Professor Redwood supposed to be the necessity of making a solid extract of cinchona. It seemed to him that a standard liquid extract could more easily be got by estimating the alkaloid in the strong solution, and then diluting it to the requisite extent. He supposed that it was a troublesome operation to evaporate the solution to dryness. On the other hand, if it was thought desirable to have a soluble solid extract in medicine it seemed unnecessary, if this were standardized, to have a separate liquid extract. During the reading of the paper he recollected very forcibly a remark made by Professor Huxley, which was that a scientific man should be strangled when he arrived at the age of fifty, for he then became an obstacle to progress. Professor Redwood, however, was a proof to the contrary, for he was now taking a decided step in the direction of progress in advocating a standard liquid extract which contained a specific amount of alkaloid.

Professor BENTLEY said that he imagined that the great advantage of using succirubra bark was, first, that it contained a good amount of alkaloids; secondly, that it was not very liable to vary; and thirdly, that a regular supply could be obtained. And in addition to these advantages it was a bark which could be readily recognized, and it could be generally procured free from any serious adulteration. Those were very important considerations in the selection of a bark for general use. succirubra had high authority for its use, for Dr. Flückiger recommended it some years ago, although he said that in certain respects it was not equal to some other barks. It was the sole bark recognized in the German Pharmacopœia, and it had been introduced into the Pharmacopœia of the United States. It was also one of the barks mentioned in the new Paris Codex. Mr. Holmes had also ably advocated the use of the red bark, and therefore it did not come before the meeting as something which was unknown. He did not altogether agree with his colleague with regard to the turning out of certain substances. Bark contained many constituents, and it was not known how one substance might modify the action of another. He was speaking exclusively of Succirubra bark, which was obtained from plants cultivated in India and elsewhere.

Mr. WALTER HILLS, referring to the statement in the paper that the author had had some difficulty in persuading his pharmaceutical friends to publish their modes of preparation, said that, after that discussion, and after the change which had been made, they might hope that those who had worked at the subject would make known some of the results of their work.

Mr. TANNER said that he was very pleased to find Professor Redwood advocating a liquid extract representing a less amount of bark than the Pharmacopœia did. In the Pharmacopœia preparations, four ounces of bark were used, and that on all hands was shown to be an unnecessary concentration. With regard to Mr. Giles's remarks about the assay of certain samples of liquid extract, he wished to ask Mr. Giles whether he took into account the fact that the Pharmacopœia used four ounces.

Mr. GILES said that he had not done so. He had overlooked that circumstance when making the comparison, which should have been confined to the relative alkaloidal strength of the pharmacopœial and other liquid extracts.

Mr. HADFIELD said that the method by which Professor Redwood had got at the percentages of the alkaloids contained in the liquid extract seemed to him to be rather crude. He thought that a better result would be obtained from the solid extract of which Professor Redwood had spoken, and that the alkaloids of the solid extract would be better represented by previously obtaining an analysis of the bark. Of course this method would involve more trouble.

Dr. PAUL said that in a case of perfect exhaustion the quantity of quinine which ought to be contained in a fluid extract made from a two per cent. bark,—the minimum laid down in the Pharmacopœia—would be 35 grains in the fluid ounce. In the case of ten samples which he examined a year ago, however, the total alkaloids only ranged from 2 to 10 grains in the fluid ounce, and then the greater part was alkaloid other than quinine.

Professor REDWOOD, in reply, said that his object in taking up the subject before the meeting was to elicit from other people the best means of producing a preparation of bark which had been much extolled by medical men, and most severely criticized and condemned by pharmaceutical speakers in that room. He certainly felt that it would be more becoming on the part of those who had so strongly criticized the liquid extract of bark if they had indicated in what way a preparation having a similar object could be more satisfactorily produced. He had failed to induce anybody to take the matter up. He had been pleased to find that, in the present discussion, the criticisms had been rather criticisms of his conduct than criticisms of his paper. He had desired to ascertain the opinion of competent pharmacists as to the process which he had suggested, but he was told that he stood in a false position. He gathered that he had been looked upon as the author of the Pharmacopœia preparation, and he had been asked how he could come and condemn it. The origin of that preparation was well known, and he was not aware that it was at all inconsistent to hold by it until a better was known. That was precisely what he had endeavoured to do on the former occasion. He certainly at that time took exception to Dr. Paul's paper, because there were too many assumptions in it, and it criticized a preparation that was not the Pharmacopœia preparation at all. Years ago, when he occupied the position which was now held by Dr. Paul, nearly all the barks which came into the London market were regularly analysed by him and reported upon, and therefore he could not fail to be perfectly familiar with the chemistry of the cinchona barks. But all that he had contended for was that in the absence of any better preparation they were justified in holding to that of the Pharmacopœia. Mr. Giles had very fairly commented upon the process described in the paper, but he (Professor Redwood) did not think that Mr. Giles had in any respect damaged his position or shaken his conclusions. Mr. Giles had not shown a better way by which the valuable constituents of cinchona bark could be taken out; and he (Professor Redwood) gathered from Mr. Giles's statement that his method was the right one. Mr. Giles's strongest objection was that the process described excluded from the finished preparation something which he thought ought to be retained. Upon that point he (Professor Redwood) was at issue with him. He did not think it desirable to leave all the extractive matter in the finished preparation. What he did consider desirable was to have a preparation which would dilute with water and form a clear liquid, possessing the astringency and the aromatic flavour of good bark. He had obtained this, and he had turned out the red cinchonic and what he had termed quinovin, a body which Mr. Howard designated as a nauseous bitter which was highly objectionable in the administration of the bark. The liquid extract of the Pharmacopœia and other extracts which professed to resemble it, and even that which was ordered in the United States Pharmacopœia, all possessed the grave defect of throwing down a copious precipitate of a nauseous disagreeable bitter when they were diluted, and this was a substance which he conceived to interfere with the efficacy of the medicine. Mr. Dunstan had made a very proper suggestion with reference to the preparation of a dry extract as well as the liquid extract. He (Professor Redwood) had admitted in the paper that perhaps most producers of the liquid extract would not take the trouble of getting the dry extract first. It had been suggested to him that the dry extract would be found to be highly hygroscopic, and very difficult of preservation. He had endeavoured to satisfy himself on that point, and he had left some of the solid extract exposed in a dish in his room for a week. The test to which it had been subjected was an exceedingly severe one. He admitted that it attracted moisture and softened, but its hygroscopic character was not greater than would be expected in a dry extract of that description. He looked upon this preparation as one which would one day admit of use in medicine. An infusion or decoction would be better made from such a dry extract than by the ordinary mode, but there was a little difficulty in making a standardized dry extract of definite strength. Experiments would have to be made on that point, but he had been anxious to bring forward his present preparation before the meetings of the session terminated, in order that it might be criticized and tested by good pharmacists. He had put himself in communication with such men as merchants who were dealing with these barks, and the opinion which they had uniformly expressed was that succirubra bark would be the bark of the future, as far as application in pharmacy was concerned. It was not the object of his paper to indicate what ought to be the characters of the succirubra bark which was selected for use. That was a perfectly distinct question, in which he should look to his colleague (Professor Bentley) to take a leading part. Mr. Howard had told him that there was an abundance of succirubra bark which contained more than 10 per cent. of the mixed alkaloids. In his paper he had put out of account the low class barks; but, taking the Indian succirubra bark, he maintained that the process which he had given was a process which was applicable to any such bark, and that by means of it they could get a valuable and suitable preparation for use in medicine. He had not yet been able to get samples of all the various qualities of succirubra bark. He was desirous of taking a low class, a medium, and a high class, and ascertaining whether there was any fixed relationship between the alkaloidal strength and the amount of extractive matter, or what he might call the extractive strength, of the different qualities. He wished to ascertain whether the cinchotannic acid, and the fine aroma and flavour which he regarded as one of the most valuable medicinal constituents of the bark, bore any fixed relationship to the alkaloids which were present, in the same way that, according to Mr. Dunstan's showing, the extractive matter of nux vomica bore a uniform relationship to the alkaloids contained in the drug. This was one of the points which would have to be determined before an extract of this description could be standardized. Mr. Giles had thrown out a doubt whether the small quantity of hydrochloric acid which was used was sufficient to exhaust the bark. He could vouch for the fact that the liquid which came off at the end of the percolation gave not a trace of precipitate of any kind upon the addition of an excess of caustic soda, but remained perfectly clear. He therefore contended that the whole of the alkaloids were taken out. He might further state that after having exhausted the bark and evaporated the percolate down to a low extent he got a precipitate upon adding water. Mr. Giles had said that he need not get a precipitate. He should like Mr. Giles to explain how it could be avoided. Some barks gave a precipitate like thick mud, while other qualities gave very little; but, whatever bark was used, he held that dilution with water and the throwing down of such precipitate as might be formed were desirable, and that this method gave a result which was in every way superior to that which was obtained when the precipitate was left in the preparation.

The President said that the Professor had been wonderfully strong in reply, as he always was. It was almost a greater treat to hear him reply to than to hear him read a paper, for the reply contained a fire which the paper often lacked. He must confess that his reply was strong, except in one respect. When he told them, with the dignity of a professor, that because he found no alkaloid in the percolate, the bark was exhausted, he must forgive him (the President) for saying that the statement was extremely weak. An analysis of the bark ought to be made before they could accept the statement. Perhaps the Professor would modify his statement upon that point. He must congratulate the Professor upon the active way in which he was able to deal both with friends and with antagonists. He concluded by conveying the cordial thanks of the meeting to the Professor.

The following paper was read:—

The Approximate Analysis of the Seeds of Amomum Melegueta.

by John C. Thresh, D.Sc.

The paper is printed on p. 798.

Mr. Holmes then called attention to the recent additions to the Museum. He said that several of the chemical products had been presented by students who were in the Laboratory. Among these specimens were some fine crystals of phosphoric acid presented by Mr. Huskisson. The majority of the specimens on the table were a small proportion of a large collection of the materia medica of Brazil, which had been presented by Dr. Domingo Parodi, through Mr. W. B. Cranwell. This collection comprised nearly all the medicinal products of Brazil and the neighbouring countries. There was also a collection of medical plants recently presented by Mr. Thomas Hanbury, which had been overlooked when the herbarium of the late Daniel Hanbury was given to the Society a year or two ago.

The President said that the Council would in due course pass a vote of thanks to those donors, who were helping to make the Museum of the Society probably the finest in the world.

The meeting was adjourned until the first Wednesday in October.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The eleventh meeting of the session was held in the Pharmaceutical Society's Rooms, 119a, George Street, on Wednesday evening, March 26, at 9.15. Mr. C. F. Henry in the chair. There was a large attendance.

The minutes of the former meeting having been read and confirmed, the President, in intimating with regret that the Secretary had tendered his resignation, expressed the great ability with which Mr. Crowden had filled his office.

Mr. MacEwan gave in the Prize Committee's report on the Ainslie Pharmacy Prize Competition, which showed that all the candidates had arrived at a high state of excellence. The winner of the prize was Mr. Thomas Miller, while an extra prize offered by Mr. W. Aitken was carried off by Mr. A. R. Bennet. Mr. Ainslie, who presented the prizes, addressed words of encouragement and advice to the candidates.

On the call of the Chairman, Mr. W. S. Turnbull read a paper on "Elementary Botany," in which the essayist, after inculcating the necessity of practical work, proceeded to describe the structure and development of cells, vessels, roots, stems and leaves, using a series of well-executed diagrams with good effect, and concluded by drawing attention to the microscopic specimens on the table.

The President, remarking on the concise and lucid paper, was sure that it would serve its object as a help to those preparing for examination. He moved a hearty vote of thanks to Mr. Turnbull. Mr. Aitken seconded, and the motion was unanimously carried.

A discussion followed, taken part in by Messrs. Boa, Hill, MacEwan, Pirie, Robertson and Stephenson.

Afterwards queries were submitted and replied to.

Some further business having been disposed of, the meeting adjourned.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

The Anniversary Meeting was held on Monday, March 31.

The President, Dr. W. H. Perkin, F.R.S., read his Annual Report. The number of Fellows at the last Anniversary was 1247; the present number is 1324, or an increase during the year of 77. The loss sustained by death has been exceptionally great, the following having died during the past twelve months:—Messrs. R. R. F. Davey, W. Grant, W. Griffin, J. Hogarth, G. M. Hopwood, E. Hunt, C. H. Hutchinson, W. A. Peake, T. Pearsall, W. Plunkett, G. B. Robertson, F. Slinger, J. Hill Smith, W. Spottiswoode, J. T. Way, J. Young, and Sir C. W. Siemens. The rooms of the Society have been redecorated. Many additions have been made to the library, and it is hoped that the new catalogue will be completed by the end of the session. The collection of autotype portraits of past Presidents is almost complete, and is on view in the Council room.

The President then handed the Longstaff medal to Mr. O'Sullivan, as the Fellow who, in the opinion of the Council, had done most to promote chemical science by research during the last three years. Sixty-seven papers have been read before the Society since the last anniversary.

The President then proceeded to refer briefly to some of the most important advances in chemical science during the year. The numerous determinations and recalculations of atomic weights by Clarke, Lothar Meyer, Brauner, Thorpe, Dewar and Scott, etc.; the use of boiling oxygen and ethylene as refrigerating media; the freezing of alcohol at $-130°$; the use of hydroxylamine as a reagent in organic chemistry by Victor Meyer and his pupils; the improvements in the preparation of this substance by Divers, etc.; the numerous researches of Baeyer on the constitution of indigo, which may be represented—

$$\begin{array}{cccc} C_6H_4 - CO & & CO - C_6H_4 \\ | \quad\quad | & & | \quad\quad | \\ HN - C & = & C - NH. \end{array}$$

The President remarked that although there are now several processes by which this colouring matter can be manufactured, it cannot as yet be produced at a sufficiently low price to compete with the natural product. The work of Lewkowitsch on mandelic acid, of Hofmann on pentamethyl anilin, and of Victor Meyer on thiophene, etc, were also briefly described.

The address concluded with some considerations as to the influence the increasing number of laboratories and the greater facilities for the study of chemistry have had on the development of chemical science in this country.

The first thing that attracts attention is the startling and anomalous fact that the number of papers read before the Society is declining year by year; in 1880–1 it was 113; in 1881–2, 87; in 1882–3, 70; and last year it was 67. The work of our laboratories at the universities, colleges and hospitals seems to consist mainly in studying the ordinary course of qualitative and quantitative analysis and in attending one or two courses of lectures. Such an education is insufficient, it is only a preliminary part of the training. The subsequent prosecution of scientific research under proper supervision calls out all the faculties of the student, requiring independent thought, and gives an insight and vivid interest in the science which nothing else can do. In Germany the degree of Doctor of Philosophy has undoubtedly done much, as it necessitates the prosecution of original work, and now that degrees are so highly thought of in this country (though why a chemist with one of our ordinary degrees should be preferred to one who has fully given his mind to his science, and, therefore has not such a degree, it is difficult to understand); it is believed that if something analogous to the Ph.D. degree could be inaugurated in this country it would help the further advance of chemical science in this country. It is said that students cannot be induced to stay longer than is necessary to go through the ordinary course of analysis, and can this be wondered at when they do not see anything else going on of sufficient interest to make them feel that it would be a great advantage for them to stay? Would it be the case if higher work were being enthusiastically carried on? The fact that many of our students leave this country for Germany, where research is carried on with so much zeal, is a sufficient answer to this question. In conclusion, the President expressed a hope that at the Central Institute of the City and Guilds of London chemists would be trained in such a way as not only to carry out existing processes, but also to advance the chemical industries of the country by suggesting improvements and new processes, so that these industries might flourish and at least keep abreast of those on the continent.

Dr. Gladstone said that it was his agreeable task to propose a vote of thanks to the President, and at the same time to move that his address, which had been so enthusiastically received, be printed.

The vote was seconded by Mr. Howard, and carried unanimously.

The Treasurer then read his report. The total income of the Society was £4732 16*s.* 4*d.* The expenses, including the purchase of £300 stock, amounted to £3028 1*s.* 9*d.*, leaving a balance in the bank of £1704 14*s.* 7*d.* The balance was larger than had been anticipated, because an unusual number of Fellows elected during the year had paid life compositions, and because the new catalogue had not yet been completed. The principal items in the expenditure are:—Journal, £1591; library, £241; redecoration of rooms, £294; house expenses, £185; commission, £145. The assets of the Society amount to £9792 14*s.* 7*d.* As to the research fund, receipts amounted to £431; grants, £95; balance, £336. Assets, £4836 3*s.* 3*d.*

Votes of thanks were proposed to the Treasurer, the Auditors, the Officers and Council, and the Editor, Sub-Editor, and Abstractors.

After a ballot, the Scrutineers, Messrs. Greenaway and Williams declared the following officers and Council duly elected:—President, W. H. Perkin, Ph.D., F.R.S.; Vice-Presidents, Sir F. A. Abel, Warren De La Rue, E. Frankland, J. H. Gilbert, J. H. Gladstone, A. W. Hofmann, W. Odling, Sir Lyon Playfair, H. E. Roscoe,

A. W. Williamson, P. Griess, G. D. Liveing, E. Schunck, T. E. Thorpe, A. Voelcker, W. Weldon; Secretaries, H. E. Armstrong, J. Millar Thomson; Foreign Secretary, H. Müller; Treasurer, W. J. Russell; Members of Council, E. Atkinson, H. T. Brown, T. Carnelly, M. Carteighe, R. J. Friswell, W. R. E. Hodgkinson, D. Howard, F. R. Japp, R. Meldola, R. Messel, C. O'Sullivan, C. Schorlemmer.

SOCIETY OF ARTS.

Alloys Used for Coinage.

The third of the series of Cantor lectures by Professor W. Chandler Roberts was delivered on Monday the 31st ult., and treated almost exclusively of the methods by which the accuracy of weight and fineness of the alloys were ensured. A method used extensively in the middle ages, and up till quite recently in the Royal Mint, consisted of drawing the alloy across a piece of fine basaltic rock, termed a touchstone; the streak produced was compared with streaks of alloys of known composition, and thus the approximate composition of the alloy obtained. Another method more largely used than supposed is that suggested by Archimedes, its application being based on observations on the different densities of alloys. The principal electrical test lies in the amount of electromotive power generated by the alloy when placed in a corrosive fluid as compared with the amount generated by an alloy of known composition subjected to the same action, the electromotive power in each case being gauged by a galvanometer. Professor Hughes's induction balance is also sometimes employed to test the inductive properties of the alloy. Almost the only optical instrument used for the assay of alloys is the spectroscope, but the results of experiments obtained by this method have been found more delicate than utilizable. The lecturer then gave a detailed description of the chemical method of assay used at the present time in the Royal Mint, illustrating this part of his lecture with experiments. He mentioned the fact that when English standard silver is heated in air a light grey coating is formed, when the French standard silver is experimented upon a darker grey is obtained, and if a base alloy be taken the coat becomes black. This is due to the oxidation of the baser metals in the alloy. Advantage is taken of this difference in behaviour of the metals in the operation known as "cupellation." The alloy is strongly heated in a porous crucible termed a cupella; the litharge formed flows into the pores of the cupella, carrying with it all the baser metals in the alloy, and the globule of metal remaining at the bottom of the cupella consists of a mixture of gold and silver. This button of metal is hammered and then rolled into an elongated form, and afterwards boiled with nitric acid until all the silver is dissolved. The remaining gold is now in such a fragile form that the slightest touch will reduce it to powder; it is therefore hardened by slightly heating it in the furnace in order to enable it to be handled. The amount of silver dissolved by the nitric acid is determined by titration with a standard solution of common salt. The silver may exist in the alloy in such a small quantity that the nitric acid will not act upon it; in this case about three times the amount of silver is added to it, when the nitric acid not only readily acts upon the added silver, but also upon the silver previously existing in the alloy. Though the results of these experiments would be theoretically correct, it is found that a small quantity of gold and silver, especially the latter, is unaccounted for. The silver may be lost by flowing away with the litharge into the cupella, and also by a slight volatilization. In dissolving the silver with nitric acid it is also found practically impossible to separate the whole of the silver from the gold. Gold may also be lost in the process of cupellation, but the slight admixture of silver with it after having been boiled with nitric acid causes the alloy to apparently have a larger percentage of gold than is really the case. To avoid these slight errors, pieces of alloy of known composition, termed "checks," are submitted to both operations side by side with the alloy to be assayed, and from comparison with the known errors in the composition of these "checks" the composition of the alloy is calculated. The amount of fluctuation allowed between the composition of the alloys, known under the name of "remedies," has been gradually reduced since 1279, the "remedy" of gold in an alloy being now 0·2 per cent., whilst silver is allowed 0·4 per cent. Professor Roberts remarked that it was worthy of note that the Arabian alchemist, Geber, not only gives an accurate description of the process of cupellation as employed by himself, but also describes of what materials and in what manner the cupella itself is made, which method remains at present unaltered. The method proposed by Gay-Lussac for the assay of alloys is thought practically useless, and is only used as a means of verification.

Parliamentary and Law Proceedings.

Suicide by Prussic Acid.

An inquest was opened at Southampton on Friday, March 28, before the Borough Coroner, Mr. William Coxwell, concerning the death of Henry William Collis, aged 19 years, supposed to have committed suicide by taking prussic acid.

Mr. H. W. Collis, sen., deceased's father, said he was told his son was in a fit and went to him, finding him about fifty yards from his house. He appeared to witness to be very much intoxicated, and with assistance he was brought home. Still believing him to be intoxicated, from the very strong smell of beer about him, he laid him on the hearthrug, and put a pillow under his head. He was with him about ten minutes, and then left him alone. After about twenty-five minutes he found his son very warm, the perspiration standing on his forehead; heavy breathing had ceased, and he was breathing very little. Witness being uneasy about him felt his pulse, and finding it was not strong enough for a strong man, he felt in the region of his heart, but could feel no pulsation there. Witness took up his coat to lay over him to keep him warm, when a bottle fell out of it, or he saw it, marked "Poison"—that produced was the same. Directly he caught sight of this he ran to Dr. Archer's, but he not being at home he hurried to the shop of Mr. Gibson, the chemist, whose label was on the bottle, and from what he told him he went to Dr. Palk, who came directly, and pronounced him dead. Questioned as to the state of his son's mind, Mr. Collis said he never knew a more cheerful lad, and he was not aware that his mind was affected in any way.

James Edward Gibson, chemist, of 34, Above Bar, stated that on Thursday morning, between nine and ten o'clock, deceased came to his shop and wished witness to go to his father's to poison a dog for him; but witness told him that being single-handed he could not leave his shop. Deceased said he was very sorry, for the dog had met with an accident the previous night. Deceased then asked if witness would let him have the poison to take up to his father, saying that he was in a hurry to get away by an early train and the dog was suffering, and he wished to get rid of the animal before he went away, and knowing him, and his father also, witness let him have the poison, subject to the precautions prescribed by the Act, viz., labelling the bottle "Poison" and getting deceased to sign for it on the record, giving the date, quantity, and purpose for which it was required. The Act further required that if the purchaser was not known there was to be a witness introducing him, but knowing the deceased personally this was not required here. He served him with two drachms of prussic acid, deceased suggesting a larger bottle as more convenient to administer to the dog. Witness produced his book containing the signature of the deceased, whom he had known two or three months, but his father a longer period. Deceased was quite rational and collected. He knew the deceased not perhaps personally, but as the son of Mr. Collis, and he had spoken to him. He considered his knowledge of deceased sufficient to fully warrant him under the Act in serving him with the acid.

By Mr. Killby, solicitor, who had watched the case in the interest of the witness: He believed deceased's story as to the purpose to which he intended to apply the poison, for it was a most plausible one, and witness considered he had faithfully carried out the requirements of the Act.

Dr. Henry Palk stated that he was called to see the deceased at his father's residence in Portland Terrace, and found him in the front room, on the hearthrug, quite recently dead. He made a superficial examination and found the face and neck very livid, the hands and nails likewise, the pupils dilated, and the muscles very flaccid. Mr. Collis handed him the bottle produced, which, though empty, still smelt strongly of prussic acid, and all the symptoms were concurrent with deceased having died from this poison, though without a *post-mortem* examination he could not say positively that this was the case. If deceased took all the prussic acid that was sold to him his death would have ensued in a few minutes, and he could not understand, if such was the case, how he lingered so long alive in the house. A very much smaller quantity than deceased bought would have been fatal; twenty drops would have killed him, and he bought six times that quantity, and his death would have been instantaneous almost had he imbibed the whole amount —he could not have lived over ten minutes, and probably it would not have been more than three or four minutes.

The Coroner said, after the evidence, seeing the doctor could not state positively the cause of death, he thought it would be necessary to adjourn the inquiry and have a *post-mortem* examination of the body made, and the inquiry was subsequently adjourned.

At the adjourned inquest,—

Dr. Henry Palk stated that upon opening the body the odour of prussic acid was most overpowering. He examined the heart and lungs, and found them healthy, but the veins gorged with fluid, dark-coloured, blood. This would be consistent with poisoning by prussic acid. He examined the stomach and found it contained a quantity of undigested food; the mucous membrane was somewhat congested. He took away a portion of the stomach and its contents, and had since analysed both, and found undoubted proofs of the presence of prussic acid, and he had no doubt at all that death arose from poisoning by taking prussic acid.

Mr. Gibson, the chemist who sold the acid, stated, in reply to the Coroner, that he was registered as a chemist in 1879. The Coroner, referring to the official Register of Chemists and Druggists, which he said was sent to him by the Secretary of State, and was supposed to contain a complete record of the certificated members of the trade, remarked that he could not see his name in the Southampton list; but Mr. Gibson said he was registered at Middlesborough-on-Tees, and he pointed to the record as giving his name there.

The Coroner asked Mr Gibson if he did not consider it his place to see that his name in the book was transferred to Southampton now that he lived there; but he replied that that was for the local secretary who assisted in compiling the book to look to. He had his certificate, not with him, but at his shop.

After the jury had consulted in private, the Coroner announced that the jury had arrived at a verdict that the deceased while of unsound mind killed himself by taking prussic acid. The Coroner added that the jury hoped that Mr. Gibson would be more careful in future in selling poison at his establishment without witnesses, a remark against which one of the jurors protested.—*Hampshire Independent.*

Correspondence.

Tincture of Hyoscyamus.

Sir,—Allow me to say that I do not consider there is a particle of evidence in Mr. Gilmour's paper to show that proof spirit is a better menstruum than rectified spirit for tincture of henbane. To compare the values of tinctures by their colours, amounts of extractive, and turbidity-giving property is quite valueless; when we know, as in this case, the active principle happens to be a colourless alkaloid. What is wanted is a determination of their alkaloidal values, and I suggest Mr. Gilmour's attention to this.

Another matter I would refer to is that Mr. Gilmour did not find his three weeks' old tincture had become acid, as I suggested it would do. My experience on this point is quite the contrary. I have before me samples of three tinctures of henbane, not an hour made; all are distinctly acid. I have another sample three weeks old; its acidity is most marked. I have purchased four other samples; all are acid. I may state generally that dried leaves give soluble matters having acid reactions.

With reference to annual and biennial henbanes, I regret with Mr. Gilmour that we have no means, seeing the broken state in which the annual is sold, of identifying it; but apart from this, what is most needed is accurate experiments on the comparative values of the two sorts; at present their reputations seem to rest almost solely on prejudice instead of scientific evidence.

University College Hospital, A. W. Gerrard.
London, W.C.

Pharmaceutical Apparatus.

Sir,—I have read with great pleasure the notes on pharmaceutical apparatus by Dr. Charles Symes, and I admire the simplicity and convenience of the arrangements figured. I have myself had to work with large and cumbersome apparatus where the skill of the man in connection with the pan was strikingly exemplified. I have to confess that modern ingenuity is in advance of ancient experience.

Yet I congratulate Dr. Symes on having had the courage to retain the form of still head which has been in use for centuries, and the pattern of which may be seen in Egyptian sculpture. It may be specially trusted in large operations and in the case of highly volatile preparations. When there might be a danger of overdrawing, the shape itself is an additional safeguard.

I base these remarks on two circumstances. First, that in continuous distillation during the season, we were uniformly successful with this shape, and not so with others. Secondly, when a few years ago small private stills of from two to four gallons capacity were introduced into several London families, no other shape was found equally safe or advantageous in domestic employment; that is, in inexperienced hands.

11, *St. Stephen's Avenue,* Joseph Ince.
Shepherd's Bush, W.

A Reader of the Graphic.—Probably a misprint for Mindererus spirit.

Xenophon.—The second line in the prescription is probably intended to be explanatory of the first. A form for "Chloroformum Belladonnæ" is given in Squire's 'Companion.'

J. C. Lloyd. — (1). The Throat Hospital formula for London Paste is "Caustic soda, unslaked lime, equal parts. Reduce to a fine powder in a warm mortar and mix intimately. Keep in well-closed bottles, and when required for use take as much as is sufficient and make into a paste with water." (2.) Probably, if the preparation is made by what is known as Fothergill's process.

Joe.—If you mean the "gelatine" material frequently used for the purpose, information respecting it may be found by referring to the indices of this Journal; but it will be well to bear in mind that is it claimed to be protected by a patent.

J. C. Wiggin.—A note on the use of caustic strontia in the sugar manufacture will be found in the *Pharmaceutical Journal* for Sept. 30, 1882, p. 263.

Communications, Letters, etc., have been received from Messrs. Schimmel, Wilkinson, Samuel, Cracknell, Grimwade, Dott, Elborne, Strachan, Antiseptic, Pharmacist, Apprentice, Amicus.

SPIRITUS ÆTHERIS NITROSI: COMPOSITION IN RELATION TO DETERIORATION.*

BY PETER MACEWAN.

"What this spirit is," says Professor Redwood,† "has hitherto eluded investigations; it contains nitrite of ethyl, aldehyde, and probably other compounds, but in what proportion it is extremely difficult to indicate, all that we can say is that it always contains the same proportion of the same ingredients."

Recognizing fully the difficulty here alluded to, it is with some hesitancy that I approach the subject, for though Professor Redwood made this statement about six years ago little has been done to increase our knowledge of the complex mixture, spiritus ætheris nitrosi. True, pharmaceutical literature published since then shows that it does not "always contain the same proportion of the same ingredients," and the reason why was very clearly shown in the discussion which followed Mr. Abraham's paper at the Southport meeting of the Pharmaceutical Conference. This paper is not intended to add to our knowledge of the composition; I can only consider it as a preliminary statement of the work which I have been enabled to do in the subject. Without entering, therefore, into the question of the "other compounds," I meanwhile propose to discuss the composition as related to deterioration; that is, the existence in the spirit of ethyl nitrite and aldehyde and the influence they exert in causing deterioration. Taking the official spirit as our standard we find that opinion is fairly agreed as to ethyl nitrite and aldehyde being always present in it. Their presence can very readily be demonstrated, as by the tests which I show you.

Proportion of Ethyl Nitrite in the Spirit.—Were all the nitric acid ordered in the official process reacting with the alcohol *to form only ethyl nitrite* ($C_2H_5NO_2$), we should expect to find somewhat over 6·5 per cent. in the finished spirit; but in practice we find that the theoretical yield is not obtained, and only with extreme care can we obtain a product containing 4 per cent. of ethyl nitrite. There is really no authoritative standard to go upon,—the Pharmacopœia tests being empirical, —but Dr. Dupré, in a paper‡ read before the Society of Public Analysts, stated that spirit containing 3 per cent. of ethyl nitrite fairly represented the B.P. preparation. This percentage is a fair one, and as Dr. Dupré's work has been the "guiding star" of public analysts, we may accept his standard, especially since the experience of practical pharmacists sufficiently justifies it. Mr. Symons having so recently shown (*Pharm. Journ.*, Oct. 13, 1883) the quality of commercial spt. æther. nit., I have not attempted the collection of similar information. It was necessary, however, to determine the amount of ethyl nitrite present as deterioration proceeded, and for this purpose Eykman's method was adopted, others having proved uncertain. It will be seen from the table which I give further on that as high as 3·54 per cent. of ethyl nitrite was found, free nitrous acid not being included in the percentage.

The Aldehyde Content.—Aldehyde has generally been looked upon as an unavoidable contamination, and one of the objects aimed at by Professor Redwood in devising the official process was to minimize the yield of this compound. The percentage of it present in the spirit is variable, and as it is closely associated with ethyl nitrite in deterioration, I shall consider it in the paragraph on *development of acidity*. In the distillate of the Pharmacopœia process I have not found higher than 2 per cent. It may be stated that the method of estimation adopted was that devised by Dr. Thresh,* which is based on the formation of aldehyde resin with excess of caustic soda solution, the coloured solution formed being diluted to the tint of a standard aldehyde resin solution, and compared as in nesslerizing. From 5 to 10 c.c. of the spirit may be used. The method gives fairly constant results, and though they may be approximate, still they are much more constant than those given by Mr. Rimmington's method,† which depends on oxidation of the aldehyde with hydroxyl solution and subsequent titration with standard alkali. The weakness here is that the acidity produced depends on more than aldehyde.

These two bodies, ethyl nitrite and aldehyde, are the leading factors in determining the deterioration of spiritus ætheris nitrosi, another being their solvent, rectified spirit, a mixture of alcohol and water. The decomposition which results in the mixture of these three bodies is attended by at least three marked changes which can be physically and chemically determined:—

1st. Increase of specific gravity.

2nd. Diminution of the volume of ethereal liquid separated by saturated chloride of calcium solution.

3rd. Development of acidity.

The extent of these changes we shall consider in their order.

Increase of Specific Gravity.—In the following table I give results of observations. I. to V. are B.P. spirit made by myself or procured as such. VI. is spirit answering B.P. tests raised to ·850 with water, and VII. is the ·850 of London Pharmacopœia.

	Made.	When examined.	Sp.gr. 50° F.
I.	Not known.	May, 1883.	·848
I.	Not known.	March, 1884.	·853
II.	Not known.	May, 1883.	·852
II.	Not known.	March, 1884.	·8576
III.	Nov., 1883.	March, 1884.	·852
IV.	Received Nov., 1883.	March, 1884.	·8516
V.	Feb. 14, 1884.	Feb. 14, 1884.	·846
"	"	Feb. 21, 1884.	·850
"	"	March 7, 1884.	·8516
VI.	Feb. 15, 1884.	March 7, 1884.	·8536
VII.	Received Nov., 1883.	Feb. 14, 1884.	·856
"	"	March 7, 1884.	·859

Diminution of Separation Volume.—In this I give the result of examination of two specimens of the B.P. spirit kept under different conditions,—α in a well stoppered and almost full bottle, which was opened frequently, and β kept in a badly stoppered bottle, half full, and between the second and third observations the stopper was accidentally left out over a night.

α. February 14.	2 p. c.		β. February 14.	2 p. c.
February 21.	1·75 p. c.		February 18.	1·33 p. c.
March 7.	1·33 p. c.		February 21.	Nil.

* Read at an Evening Meeting of the North British Branch of the Pharmaceutical Society, March 19, 1884.

† *Pharm. Journ.*, [3], viii., 377.

‡ *Pharm. Journ.*, [3], x., 93.

* *Pharm. Journ.*, [3], ix., 409.

† *Pharm. Journ.*, [3], x., 41.

It will be convenient to reserve remarks on these observations until we consider—

The Development of Acidity.—The free acids existing in the spirit are acetic and nitrous acids. It has been stated that nitric acid is also present, but the ordinary methods for determining the existence of nitric acid in presence of the nitrous, are inapplicable in this case. It is questionable, however, if nitric acid can exist as such in presence of the readily oxidizable constituents of the spirit. I have, therefore, calculated the inorganic acid as nitrous acid (HNO_2).

The free acids were determined volumetrically,* semi-normal solution of soda was used, methyl orange being taken to indicate nitrous acid and phenolphthalein to indicate total acidity. The method is certainly not free from objection, the sources of error being (1) decomposition—that is, further acidity—of the spirit during the estimation, and (2) decomposition of the methyl orange by free nitrous acid. The first error can be limited by rapid manipulation, use of undiluted spirit and a small flask. The second is not so rapid in its action as to preclude indication, and by using the methyl orange externally as well as internally, the error is minimized. In the method we take 10 c.c. of the spirit, which is put into a 50 c.c. flask, in which a drop of phenolphthalein has previously been put, then two or three drops of methyl orange solution are put in. Before the estimation is commenced several spots of methyl orange solution are placed on a white plate, and a glass rod should be at hand. The standard solution is quickly, but carefully dropped into the flask, and as soon as the red colour of the methyl orange begins to fade, the glass rod should be dipped in and brought into contact with a methyl orange spot on the plate. If the spot assume a strong pink colour, we have an indication that the nitrous acid is not quite neutralized, so the addition of standard solution is continued until the methyl orange spot becomes but feebly pink. The volume of standard solution used is noted, and the titration continued until the phenolphthalein indicates alkalinity. The first portion used is calculated for nitrous acid and the second for acetic acid.

In the following table the results of several observations are given in percentages, the proportion of ethyl nitrite and aldehyde (as far as determined) being also given. I. to IV. are B.P. spirit (α and β of the separation paragraph are II. and III.); VII. is B.P. raised to ·850, and the others are the ·850 of Lond. Phar.

	Date or age.	HNO_2.	$HC_2H_3O_2$.	$C_2H_5NO_2$.	C_2H_4O.
I.	May, 1883 .	0·47	1·20	0·87	0·80
I.	March, 1883 .	0·773	0·329	0·095	2·50
II.	One week . .	0·215	0·206	3·54	0·85
,,	Two weeks .	0·257	0·247	—	0 95
,,	Three weeks .	0·274	0·349	3·14	—
III.	Two days . .	—	—	2·01	0·80
,,	Four days .	0·24	0·216	—	1·14
,,	One week .	0 322	0·246	1·24	2·00
IV.	One month .	0·247	0·411	1·93	1·67
V.	Four months	0·161	0·288	3·53	1·5
VI.	Four months	0·352	0·494	1·64	1·426
VII.	Four months	0·418	0·206	0·92	2·5
VIII.	Four months	0·194	0·247	0·22	0·2
IX.	As received .	0·188	0·42	—	—

* In Mr. Rimmington's method the spirit is unduly exposed to atmospheric influence and the action of water.

Having before us these tabulated results of the effect of deterioration on the specific gravity, separation volume, and acidity of the spirit, we may now discuss the causes of decomposition and deterioration.

Ethyl nitrite, it is well known, is a very volatile fluid, and if the spirit be stored in imperfectly closed bottles, considerable loss will result from evaporation. But this does not account for the specific gravity, for since ethyl nitrite is of greater density than spt. æther. nit., the loss by evaporation would tend to decrease rather than increase the density of the spirit. Although Dr. Dupré has stated (see paper quoted) that the acidity of the official spirit is not due to decomposition of ethyl nitrite, yet all pharmacists who have studied this subject have recognized the text-book statement, that the water contained in the rectified spirit used in the preparation reacts with the ethyl nitrite to form alcohol and nitrous acid. A further change takes place, in which acetic acid is one of the products, and since the aqueous solutions of these acids are supernormal, they will tend to increase the specific gravity, and as ethyl nitrite disappears in their formation, the separation volume necessarily decreases. Independent of the reaction between water and ethyl nitrite another reaction takes place, in which acetic acid is formed. What is this reaction? Oxidation of aldehyde, is a natural reply, and to this oxidation the formation has generally been attributed. But it will be observed from the acidity table that aldehyde is an *increasing* rather than *decreasing factor*, as we should in these circumstances expect. This is particularly observable in the case of III., which decomposed rapidly. Without denying that the formation of acetic acid is due in part to oxidation of aldehyde, it must be admitted that another explanation is required. Rapid decomposition is the result of atmospheric influence, and is analogous to the observed fact that the spirit decomposes much more rapidly in partially filled bottles than in full bottles. This observation leads us to infer that part, at least, of the acetic acid is due to oxidation of ethyl nitrite. This oxidation might be expressed in one formula, in which acetic and nitrous acids are formed:—

$$C_2H_5NO_2 + O_2 = HC_2H_3O_2 + HNO_2.$$

We may also express this in two stages; in the first we have aldehyde and nitrous acid formed:—

$$C_2H_5NO_2 + O = C_2H_4O + HNO_2.$$

In the second the aldehyde is oxidized to acetic acid:—

$$C_2H_4O + O = HC_2H_3O_2.$$

It should be further noted that in spite of the greatest care a little nitrous fumes pass over with the distillate in the course of preparation; this admixture, though minute, is sufficient to act as a nucleus, and hence another cause of decomposition under the best conditions for preservation. The effect of water in influencing decomposition is well seen in the case of VII., which contains additional water. The disappearance of acetic acid in the case of I. is probably due to combination between the ethyl radical and it, acetic ether being formed.

Increase in aldehyde may be due to such a reaction as that expressed in the first stage of the formula given, effected either by direct oxidation or by the action of nitrogen acids upon ethyl compounds. An explanation which is not without interest, though purely suggestive, is that it is due to depolymerization of paraldehyde. You are aware that Mr. Williams stated at Southport that he had a strong suspicion that sweet spirit of nitre contains paraldehyde, which he says is formed during the ordinary process adopted in making the spirit. Well, assuming that paraldehyde (boiling at 124° C.) is capable of passing over with the distillate between 70° and 80° C., we would expect that the action of nascent nitrous acid would be to resolve it into aldehyde, and hence an increase. I show you some "pure paraldehyde" which has been so treated and you will notice that the pleasant odour of paraldehyde has been replaced by the pungency of aldehyde, and it gives the aldehyde resin reaction, whereas the untreated paraldehyde does not.* If I have the opportunity of making a further communication on this subject, I shall return to this question of the increase of aldehyde.

In conclusion I may be allowed a few remarks on the relation which these results have to everyday pharmacy. I have been partly led to make this communication from the continually reiterated statement that "spt. æther. nit., B.P., is quite unfit for use," and that "the ·850 spirit keeps much better;" the inference being that the latter is the better preparation. If any proof to the contrary is required we have it in Mr. Symons's paper, in which he gives the result of analysis of six samples of the ·850 article, only two of which indicated over 1 per cent. of ethyl nitrite and two were under 0·4 per cent.,—these percentages including free acid. In the course of this paper results of experiments with the ·850 spirit are given, and it will be seen that it is subject to increase of density and acidification,—of course, this spirit never gives a separation. Now, the arguments used against the official spirit are, 1st, that the public will not have it, and 2nd, that its acidity renders it unfit for dispensing. The first argument is certainly serious looking, but a number of pharmacists tell me that they never have kept anything but the official spirit, and their experience is that after a series of explanations to their customers they will have nothing else, which is a very wise decision on the part of the customers. To discard the spirit on account of the second argument is of course absurd, for we are legally required to use only the official spirit in compounding physicians' prescriptions. Practically, however, the objection is merely one of degree. In the common ·850 spirit, the acidity is less, because the ethyl nitrite content is extremely small; if pharmacists, therefore, prefer to keep this spirit on account of a vague idea that it is a "better keeping" one, they assume a very serious responsibility. The proportion of ethyl nitrite in the official spirit might no doubt be judiciously decreased and fixed, but even though it were fixed at 2 per cent., it is evident that the objection would only be lessened and not removed. It is, therefore, left to the pharmacist to control deterioration by careful storage of his stock. Hydrocyanic acid is kept in small phials, so that *it* may not deteriorate; so might we keep spt. æther. nit. in proportionately smaller bottles than at present, with equal care. The shop round need not be of the largest series or nearest the shop window, and stored stock should certainly not be kept in partially filled Winchesters, nor need we lay in a stock which will serve the better part of the solar year.

* On this point see abstract of article by A. P. N. Franchimont, *Journ. Chem. Soc.*, xliv., 453.

For the purposes of this investigation, Messrs. J. F. Macfarlan and Co. have liberally supplied me with spt. æther. nit., B.P., and other material, for which I desire to thank them. My thanks are also due to Mr. Dott for much technical information.

[*The discussion on this and the following paper is printed at p.* 825.]

SPIRIT OF NITROUS ETHER.*

BY D. B. DOTT, F.R.S.E.

In this paper on sweet spirit of nitre I have no intention of taking up the slippery subject of its composition and transformations, which Mr. MacEwan has been bold enough to tackle; but am only desirous of discussing the characters and tests of this important preparation. Before doing so, however, it is necessary to refer briefly to what is known of its composition, in order that we may decide what tests it ought to answer. To fix exactly the composition of sweet spirit of nitre is doubtless a problem beyond the attainments of chemical analysis, but there is no reason why we should not have a better knowledge of its chemistry than we at present possess. We may safely say that ethyl nitrite, acetic aldehyde, nitrous and acetic acids, and ethyl acetate, are normal constituents of spiritus ætheris nitrosi. It has been almost universally recognized that the value of the preparation depends on the presence of the nitrite, though this has been doubted by a few writers. Among these is Mr. Abraham, of Liverpool, who believes the aldehyde to be the active ingredient. According to this view the aldehyde is oxidized to acetic acid, which forms acetates with the alkalies of the blood, whereupon the physiological effects are manifested. If I rightly follow this train of reasoning, it would appear that one may as well swallow a little vinegar as take a dose of sweet spirit of nitre. Not being a pharmacologist, I wrote to Professor Matthew Hay, of Aberdeen, on the matter, and have received from him a very interesting letter, from which I cannot do better than quote a few sentences.

"With regard to aldehyde, I cannot at the present moment recall having seen any notice of its physiogical action. I rather think it has not to any extent been investigated. But although that is probably so, I am fairly certain, judging from its chemical relationship to alcohol and the ethers, that in action it will differ to no great extent from these."

"With regard to the sweet spirit of nitre, my opinion is this, that its most active ingredient ought to be the nitrite of ethyl, which it is believed to contain, to, I think, the extent of 2 per cent. But so far as my observation carries me, nitrite of ethyl is present in very variable quantity in the ordinary spirit of nitrous ether, and is sometimes hardly to be detected at all. The nitrite is very active even in very small quantity; and, I believe that if a preparation of spirit. æth. nit. could be obtained containing a constant proportion of nitrite of ethyl, it would be a great gain to practical pharmacy and to therapeutics. The unreliability of the common forms of it has, I believe, led largely in recent years to its disuse."

"Murrell states that nitroglycerine is powerfully diuretic, and I have shown that nitroglycerine is

* Read at an Evening Meeting of the North British Branch of the Pharmaceutical Society, March 19, 1884.

decomposed into nitrite in blood, hence its physiological action—hence diuresis."

I am glad to have my own opinion confirmed by so eminent an authority. We may, therefore, conclude that the right means of estimating a sample of spirits of nitre is to determine the amount of nitrous ether, or rather, of nitrous acid, which it contains. I am far from denying that the medicinal value of the spirit may be materially enhanced by the aldehyde and acetic ether, but these must be regarded as quite subordinate. Besides, it is difficult to estimate their amount.

Let us now consider, one by one, the tests of the British Pharmacopœia. Firstly, we have the specific gravity, which is given as ·845, at 60° F. This is really only a safeguard against admixture with water, though there is a delusion, still to some extent prevalent, that the ·850 must be a better article than the ·845. Doubtless this has arisen from the fact that nitrous ether has a greater density than rectified spirit. It has therefore been supposed that a preparation rich in nitrous ether will have a high specific gravity, but this is a mistake; for it is easy to prepare a spirit fully up to the Pharmacopœia requirements with a specific gravity even less than ·845. According to our experience a high specific gravity just means so much the more water, and if one fact regarding spirit of nitre has been proved more conclusively than another, it is, that water encourages the decomposition of the ether. Whence it is manifest that the specific gravity ought to be kept as low as possible consistent with the due proportion of ethyl nitrite.

Secondly, "it effervesces feebly or not at all when shaken with a little bicarbonate of potash." Not much can be said against this test, though it is perhaps a little indefinite. It might be better to have a limit fixed to the amount of free acid, the same to be determined by standard alkali—but this is doubtful.

Thirdly, "if it be agitated with twice its volume of saturated solution of chloride of calcium in a closed tube, 2 per cent. of its original volume will separate in the form of nitrous ether and rise to the surface of the mixture." This test has given rise to much controversy. It belongs to the class of inaccurate empirical tests, which are always unsatisfactory, though sometimes tolerable when nothing better can be obtained. Chemists have all recognized that the "ethereal fluid," which separates under the above circumstances, is not ethyl nitrite, but a solution of the same, of variable strength. It is probably just as well that it is so, especially when the testing is performed on a warm summer day. Judging from some estimations which I made by the method subsequently described, this etheric fluid would seem to contain from 50 per cent. to 60 per cent. of nitrous ether. Professor Attfield* says that it contains less than half its bulk of ethyl nitrite. Professor Redwood† is responsible for the generally accepted belief that 2 per cent. of separation indicates 10 per cent. of ether. If made regarding the "ethereal fluid," which actually separates, the statement may be fairly correct, but it is quite untrue if applied to a 10 per cent. solution of ethyl nitrite in spirit. Such a solution will separate more than half its contained ether when agitated with solution of calcium chloride. I have tried many experiments with this test, but it would be superfluous to detail them. Suffice it to say that there are three main factors which determine the amount separated:—

1st. The composition of the spirit.

2nd. The temperature.

3rd. The dimensions of the tube.

Regarding the first of these I would only remark that if the spirit is watery it will give a better result, *cæteris paribus*, than one containing less water. It will readily be understood that with a compound having so low a boiling point, and so high a vapour pressure at ordinary temperatures as nitrous ether, the proportion separated by chloride of calcium solution must be much affected by the second and third of these causes; *e.g.*, 15 c.c. of spiritus ætheris nitrosi at 48° F., shaken up with two vols. solution of calcic chloride at same temp., gave a separation of 0·4 c.c. When the experiment was repeated with the spiritus and chloride solution at the temp. of 68° F., separation of only 0·2 c.c. was obtained. By using a capacious tube in one case, and in another a small tube which the mixture nearly filled, results almost as variable were observed. It may here be noted that the "ethereal fluid" takes some time to separate, the process being seldom complete in less than half an hour. The greatest objection to this test is, however, the well-known fact that a genuine preparation will after a certain time, and while still retaining its medicinal virtues, fail to give any separated "ether" when agitated with solution of chloride of calcium. Taking all the facts into consideration, I am clearly of opinion that this separation test ought to be abolished.

What we require is a test which shall show at least approximately the value of the preparation, by means of reagents and apparatus at the disposal of every pharmacist. This must be done by estimating the nitrous acid, whether it exists as such or potentially. There does not appear to be any reason for making a separate determination of the percentage of uncombined nitrous acid, which no doubt contributes its share to the physiological action of the substance. Of the many methods which have been proposed for the purpose of this estimation, probably the best is that devised by Professor Eykman, of Tokio. Not that I regard his process as perfect, because I believe it gives results distinctly under the truth, and of course it includes the nitric acid should any be present. The fatal objection to Eykman's process as a pharmacopœial test is the elaborate apparatus and nicety of manipulation required. It is, in short, better adapted for the laboratory of the analyst than for the pharmacy; and as all the official tests ought to be as simple as possible, we must endeavour to find an easier method. I have tried a great number of experiments with this object, and have to confess that the result after all is not a complete success. The old method of saponifying with caustic soda, and after evaporation of the alcohol, titrating with permanganate, was found to yield very variable results. This is not surprising considering the facility with which potassic permanganate is reduced, and the certainty that there are organic compounds present after evaporation even to dryness. Oxidation of ferrous sulphate was next tried, but from the difficulty of estimating the excess of ferrous salt in the presence of alcohol, and from other causes, the process proved abortive. Volumetric solution of urea was then

* *Pharm. Journ.*, [3], viii., 378.
† *Pharm. Journ.*, [2], viii., 508.

employed, iodized starch solution being used to indicate the end of the reaction, but this plan proved entirely unsuccessful, chiefly on account of the impossibility of observing a definite end-point. Possibly, however, the urea method might be made available by measuring the N, or weighing the CO_2 evolved; that is to say if the reaction goes as it ought. $CON_2H_4 + 2HNO_2 = CO_2 + N_4 + 3H_2O$.

The nitrous ether might possibly be estimated by reduction with hydric sulphide, but I have not had time to thoroughly examine this reaction. The few experiments I have been able to perform with it did not yield promising results.

After innumerable experiments I have been compelled to return to the method which suggested itself to me first of all, viz., the liberation of iodine from potassic iodide, and titration of the iodine with sodium thiosulphate. The only mention I have seen of the use of potassium iodide as a means of estimating spiritus ætheris nitrosi, is reported in the *Pharmaceutical Journal.** In the discussion after the reading of Dr. Dupré's paper, Mr. Hehner suggested the use of iodide of potassium added directly, with addition of acetic acid, which was thought a good idea. The process is so obvious, that it has probably often been tried and abandoned, which would not be surprising, as without particular precautions it yields results which have no resemblance to the truth. In endeavouring to put this test into practical form, I very soon found that the only way of arriving at right results was to work with a solution of ethyl nitrite of known strength; at least in the first place. We therefore purified some of the nitrite by a method similar to that described by Mr. Williams.† At 60° F. it had a specific gravity of ·901 (or thereby). Mr. Willliams gives the gravity as ·937, but states no temperature. At all events, though it was not analysed, I am confident that it must have been very nearly pure. Ten c.c. were diluted to 100 c.c. with "absolute" alcohol, and this solution was used in the following experiments.

(1). 5 c.c. = 0·45 gram $C_2H_5NO_2$ added to an aqueous solution of 20 grs. potassium iodide, 1 drm. dilute sulphuric acid then mixed therewith, and after half an hour standard thiosulphate run in. Required 28·0 c.c. = 0·21 gram $C_2H_5NO_2$. This low result was caused by loss of ether, which is thrown to the surface of the saline solution. It is hence evident that some solvent must be used to retain the ether.

(2). In this case the same quantities were used, but before the addition of the ethereal solution, 1 fl. oz. rectified spirit was mixed in. The solution was allowed to stand ten minutes before running in the thiosulphate. Required 113·5 c.c. = 0·851 gram $C_2H_5NO_2$. This high indication was caused by the nitric oxide which must be completely removed before the titration. It is essential that the NO be got rid of not only from the alcoholic solution but also from the atmosphere in the containing vessel, as otherwise by uniting with the oxygen to form higher oxides, and these in turn reacting with the water to form nitrous acid, an additional quantity of iodine is liberated. Using the same proportions as just mentioned, but employing a large flask and diligently agitating during the addition of the thiosulphate solution, nearly 300 c.c. were used before decolorizing.

* [3], x., 93.
† *Pharm. Journ.*, [3], viii., 442.

(3). In this experiment the same quantities were used as in (2) but acetic acid instead of sulphuric, the solution being allowed to stand one hour. Required of thiosulphate 21·6 c.c. = 0·162 gram $C_2H_5NO_2$, which is far too low. Acetic acid, as suggested by Hehner, will, therefore, not do.

(4). Several experiments were tried, passing carbonic anhydride into the test solution contained in a flask. The gas was passed in before addition of the acid, and the stream continued until the completion of the titration. In other cases the CO_2 was passed only into the air space above the liquid. In all these instances the results obtained were too low and very variable, possibly on account of the gas carrying away some of the ether.

It would be tedious to describe the different devices that have been tried, to ensure, if possible, an accurate result. Suffice it to say, that as an inference from numerous experiments, the following method was adopted as the best:—Let 1 gram of iodide of potassium be dissolved in 10 c.c. of water. Then add 20 c.c. of rectified spirit, and to the solution so obtained add 5 c.c. of the spirit to be tested. Now pour in 5 c.c. dilute sulphuric acid, and allow to stand for an hour, then titrate with standard thiosulphate.

The operation is best conducted in an eight ounce porcelain basin. The following are some of the results obtained:—

(5 *c.c. used in each case.*)	$\frac{1}{10}$ $Na_2S_2O_3$ solution.		$EtNO_2$ grams.		$EtNO_2$ (vol.) per cent.
(*a.*) 10 per cent. (vol.) soultion in alcohol	59·5 c.c.	=	·446	=	9·91
(*a.*) 10 per cent. (vol.) solution in alcohol	59.8 c.c.	=	·448	=	9·96
(*a.*) 10 per cent. (vol.) solution in alcohol	60·0 c.c.	=	·450	=	10·00
(*b.*) Sple. sp. æth. nit. (recent)	26·5 c.c.	=	·198	=	4·41
(*b.*) Sple. sp. æth. nit. (recent)	26·8 c.c.	=	·201	=	4·46
(*c.*) Sple. sp. æth. nit. (four months)	23·5 c.c.	=	·176	=	3·91
(*c.*) Sple. sp. æth. nit. (four months)	24·0 c.c.	=	·180	=	4·00

Although formerly indicated, it may again be noted that the total nitrous acid is given as ethyl nitrite. The older sample contained much more free acid than the fresh one. The method employed is evidently only approximate, but it may serve until something better is devised. It has, at any rate, the advantage of requiring only such apparatus and reagents as are in common use.

Before concluding, I would venture to express a hope that the compilers of the next Pharmacopœia will fix a fair standard of purity for spirit of nitrous ether, so that no departure therefrom will be allowed. We sometimes hear the fallacy propounded, that an inferior preparation must be excused, because, at some time or other, it has been produced by the official process. This is an entire mistake. Not only must the official process be followed, but it must be so conducted as to produce a right result, and the product must be so preserved as to be of proper strength when required for use. Yet, as the Pharmacopœia requires of pharmacists preparations of a certain degree of purity, so pharmacists require of the Pharmacopœia processes and tests which are reasonable.

THAPSIA RESIN.*

BY F. CANZONERI.

The root of *Thapsia Garganica*, a plant known for its vesicating properties, yields to boiling alcohol a white amorphous waxy substance, slightly soluble in ether and carbon bisulphide, and melting, after purification, at 90°. This substance, however, forms but a small part of the thapsia root. More abundant and important constituents are obtained by treating the dried and chopped root in a percolator with ether, whereby a yellow solution is obtained, which, on distilling off the ether, yields an amber-coloured syrupy resin possessing strong vesicating properties. This acid dissolves in strong aqueous potash at ordinary temperatures and in dilute potash when heated—in both cases with great rise of temperature,—and on neutralizing the resulting solution with hydrochloric acid, a yellow curdy precipitate is formed, having an unpleasant odour, and consisting of a mixture of liquid and solid ethers and fatty acids, together with resinous substances. From this mixture of products, the author has obtained: (1.) An octoic or caprylic acid, $C_8H_{16}O_2$; (2) a new acid of the series $C_nH_{2n-2}O_4$, which he designates as thapsic acid; (3) a non-azotized neutral vesicating substance.

This last constituent was obtained in very small quantity only, and in some preparations was altogether absent; it is moreover very difficult to purify from resinous substances and wax, by which it is generally accompanied. It dissolves in hot alcohol, and separates on cooling in shining needles melting at 87°; also in ether and in carbon bisulphide; all its solutions possess vesicating properties. Heated with strong potash-lye, it dissolves partially and is precipitated in the crystalline state on diluting the solution with water. It is not altered by boiling with strong acids. Heated on platinum foil, it burns away without residue, emitting a pleasant odour.

Thapsic acid, $C_{16}H_{30}O_4$, is obtained by pressing between paper the curdy precipitate formed on adding hydrochloric acid to the solution of the resin in aqueous potash, and crystallizing it several times from boiling alcohol with addition of animal charcoal. It forms white shining scales melting at 123° to 124°, nearly insoluble in water, benzene, and carbon bisulphide, soluble in alcohol, less soluble in ether. When strongly heated, it distils without alteration; ignited on platinum foil, it burns with an odour of burnt wax. It is but slowly attacked by bromine or by strong nitric acid. It is a bibasic acid. Its *potassium salt*, $C_{16}H_{28}O_4K_2$, forms shining anhydrous prisms. The *barium salt*, $C_{16}H_{28}O_4Ba$, obtained by precipitation from the potassium salt, is a white amorphous powder insoluble in water and very slightly soluble in boiling alcohol. The *silver salt*, $C_{16}H_{28}O_4Ag_2$, is a white insoluble precipitate which blackens when heated or exposed to light.

Thapsic acid dissolves at boiling heat in aqueous ammonia, and the solution on cooling deposits a crystalline substance probably consisting of the corresponding amide. The acid heated with aniline at 170° to 180° in sealed tubes, is converted into the anilide,

$$C_{16}H_{28}O_2(NHPhen)_2,$$

which forms a white crystalline powder melting at 162° to 163°, and acquiring a faint violet colour when exposed to the air.

The barium salt of thapsic acid distilled at a moderate heat with excess of barium hydroxide, yields a small quantity of hydrocarbons, saturated and non-saturated, having a musky odour, combining for the greater part with bromine, and forming a solid body which, when dried between bibulous paper and crystallized from alcohol, forms white needles melting at 73°.

Octoic or Caprylic Acid, $C_8H_{16}O_2$.—On distilling with steam the oily precipitate obtained by neutralizing with hydrochloric acid the potash-solution of the ethereal extract of the resin, after removal of potassium thapsate and dilution with water, there passes over a yellow transparent oil, lighter than water. On exhausting this oil with ether, drying the etheric solution with calcium chloride and distilling, the greater part goes over at 220° to 236°; and on fractioning this portion at intervals of 5°, three other fractions are obtained, the most abundant of which is a colourless liquid soluble in alcohol and ether, and solidifying when cooled with snow, in flexible laminæ melting at ordinary temperatures. The product thus obtained is shown by analysis to have the composition of an octoic acid, and in its melting and boiling points it agrees nearly with the octoic acid obtained by saponification of cocoanut oil, and by oxidation of the octyl alcohol from heracleum oil, melting at 16°, boiling at 236° to 237°, which agreement the author has further confirmed by examination of the sodium, barium and zinc salts.*

The author suggests that thapsic acid may be a *dioctoic acid*, $C_8H_{15}O_2.C_8H_{15}O_2 = 2C_8H_{16}O_2 - H_2$, formed from the octoic acid by slow oxidation in the body of the plant.

* From the *Gazzetta*, xiii., 514-521. Reprinted from the *Journal of the Chemical Society*, April, 1884.

* The author, in accordance with the view hitherto generally entertained, regards this acid as normal octoic acid, $CH_3(CH_2)_6COOH$, but recent investigations have shown that the primary octyl alcohol of heracleum oil is an iso-alcohol, $CHMe_2(CH_2)_4.CH_2OH$, and consequently that the acid obtained from it by oxidation must be an iso-acid, $CHMe_2(CH_2)_4.COOH$. (See Watts's 'Dictionary of Chemistry,' viii., 379.)

SPARTEINE.†

BY O. BERNHEIMER.

This base, $C_{15}H_{26}N_2$, was first obtained from *Spartium scoparium* by Stenhouse in 1881, who determined its composition, and was afterwards examined by Mills, who showed that it is a tertiary diamine. The sparteine examined by the author was prepared from *Spartium scoparium* by a slight modification of Stenhouse's method; it distilled to the last drop at 180-181° under a pressure of 20 mm. Its solution in alcohol at 96° has a specific rotatory power $[\alpha]_D = -14{\cdot}6$ for a concentration of 23·88 at 26°. It bears a heat of 200° without alteration, but becomes partially carbonized at higher temperatures; is not decomposed by heating in sealed tubes with hydrochloric acid. Bromine acts strongly on sparteine at ordinary temperatures, even when it is largely diluted with ether forming an undefined resinous mass.

On gradually adding 3 parts iodine dissolved in ether to an etheric solution of 1 part sparteine, the iodine is decolorized, and a black precipitate is formed, which when separated, washed with ether to remove free iodine, and dissolved in boiling alcohol, separates on cooling in beautiful green needles, having the composition $C_{15}H_{26}N_2I_3$. This compound is insoluble in cold water and alcohol, but dissolves readily in those liquids when heated; it is insoluble in ether, permanent in the air, and yields free sparteine when heated with potash.

Sparteine (as sulphate) oxidized with potassium permanganate yields a small quantity of a volatile acid, having the odour of the fatty acids, together with non-volatile acid having the composition of a *pyridinemonocarboxylic acid*, $C_5H_4N.COOH$; and on distilling a salt of this acid with lime, a volatile base is obtained having all the properties of pyridine. The author intends to continue his experiments as soon as he is in possession of a larger quantity of material.

† Preliminary notice. From *Gazzetta*, xiii., 451-454. Reprinted from the *Journal of the Chemical Society*, March, 1884.

The Pharmaceutical Journal.

SATURDAY, APRIL 12, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

PETER SQUIRE.

WHEN Death comes to some men to whom it is given to serve their fellows he overtakes them still busy, with their work uncompleted; others having finished their labour are found so entirely forgotten in their retirement that the news that they have passed away hardly excites more surprise than the discovery that they were alive so recently. But it was not so with PETER SQUIRE, whose death it is our painful duty to record this week. Although bearing the ripe burden of eighty-six years when he died, his name is still familiar as a household word among pharmacists, through the admirable *vade mecum* which he placed at their disposal and which he continued to supervise almost to the last, whilst three years have not elapsed since he took part in the discussions at the Fifth International Pharmaceutical Congress, of which he was elected a Vice-President, and contributed an able paper upon a subject that he had made his own, the equalization of the strength of preparations of potent drugs in the different pharmacopœias. Indeed it is difficult to realize that one who was so recently a real living influence among us could have been the colleague and contemporary of men who have receded so far into the past as WILLIAM ALLEN, RICHARD BATTLEY, JACOB BELL, CHARLES DINNEFORD, DANIEL BELL HANBURY, WILLIAM INCE, THOMAS MORSON, CHARLES JAMES PAYNE, JONATHAN PEREIRA, JOHN SAVORY, and many others that might be named. Keen of intellect, vigorous of habit, indefatigable in work, pungent in speech, a thoroughly capable business man and yet a pharmacist who has left his mark on both the practical and scientific aspects of his calling, PETER SQUIRE was a man of whom British pharmacists may well be proud; for it can hardly be hoped that they will more than occasionally be able to boast of men who are his equals.

Like many men who prove themselves eminently capable of looking after their own interest, and probably because they are so, Mr. SQUIRE found time to render signal services to others. As early as the year 1841 he joined in the struggle to place pharmacy on a proper footing in this country, having been a member of the sub-committee entrusted with the task of opposing the progress of the Bill of Mr. HAWES in Parliament, and which eventually drew up the proposition for the perpetuation of the temporary organization in the interests of chemists and druggists that resulted in the formation of the Pharmaceutical Society of Great Britain. As a member of this Committee, Mr. SQUIRE became a member of the Council of the newly-fledged Society. Afterwards when it was determined to carry out that part of the programme which associated examination with membership, and other bodies to which the Council was at first disposed to look for help in this direction declined to render it, his colleagues found in him an invaluable organizer of the first Board of Examiners. During twenty-seven years he was himself an active member of that Board, and when he retired from it in 1869 his colleagues placed on record their high appreciation of his valuable services in an address which they presented to him. Meanwhile he had been chosen in 1849 to preside over the Society he had assisted in forming, an honour that was repeated in 1861 and and in 1862, and during this latter term of office he took an active part in conjunction with the Secretary, Mr. ELIAS BREMRIDGE, in securing the insertion in a Juries Bill before Parliament of a provision for the exemption of pharmaceutical chemists from service. Mr. SQUIRE continued a member of the Council until 1870, when he declined further nomination, having helped to conduct the affairs of the Society during nearly thirty years.

Mr. SQUIRE's services to pharmacy were, however, by no means confined to the business of the Pharmaceutical Society. His studies of the juices of plants had already before its formation practically rewritten the formulæ for extracts, and his success as a practical pharmacist had won for him the appointment of Chemist to the Queen. Much other valuable work, more or less scientific, was done by him, but perhaps some of the most lasting in its influence was that connected with compilation and publication in 1851 of the comparison of the three Pharmacopœias then official in the three kingdoms, which paved the way for and rendered inevitable the British Pharmacopœia. Other publications of Mr. SQUIRE are too well known to mention here, and, probably whilst adding to his reputation they yielded him satisfactory returns of another kind. Throughout his life, from boyhood to old age, PETER SQUIRE was active, persevering, industrious, and self-reliant. Whilst some of his characteristics were too marked to allow him always to escape criticism, yet if his opponents had survived instead of preceded him, as most of them have done, they would have been among the first to proclaim that in PETER SQUIRE pharmacy has lost a sterling man.

ALCOHOLIC FERMENTS.

THE capability of saccharine juices obtained by expression from fruits, such as grapes and apples, to undergo the change now known as alcoholic fermentation was evidently familiar to the human race in the earliest historic periods, but it has been only in recent years that clear glimpses have been obtained of the nature of the phenomena involved. Even now, although it is generally well understood that alcoholic fermentation is a physiological function of certain species of fungi, there remains considerable obscurity about the life history of these organisms. The presence on the surface of ripe fruit of germs capable of inducing fermentation in the juice of the fruit was first demonstrated by M. PASTEUR, but even this able investigator was obliged to leave the source of the germs unexplained. Different observers have shown that these particular kinds of germs are frequently present suspended in atmospheric air, but not in sufficient quantity to explain the abundance in which they occur on the surface of fruits. Moreover, M. PASTEUR noticed that the germs are not found on the skin of the grape until it ripens, so that it is only during a comparatively short portion of the exposure of the fruit to atmospheric influences that the skin becomes coated with the fermentative particles. It is evident, therefore, that in order to understand the manner in which the ferment is perpetuated from one vintage to another, some clue as its habitats at different periods of the year was necessary, and an important contribution towards the elucidation of this point was made two or three years since by a Danish botanist, Dr. HANSEN, in the observation that the soil is the winter resting-place of the spores of *Saccharomyces apiculatus*. Following up this line of investigation a French worker, M. BOUTROUX, has discovered other natural habitats of the alcoholic ferments in flowers and insects, but for the most part the species of ferments observed were new ones. Although the interesting account of his work which has been recently published in the *Annales des Sciences Naturelles* cannot be said by any means to have settled the question as to the hibernation of the most important of the ferments, it is suggestive of a field of research that is at present almost unexplored.

The course of investigation adopted by M. BOUTROUX was to test various substances as to whether they were acting as carriers of ferment germs by placing them in a previously sterilized fermentescible liquid, under conditions favourable to fermentation. If any evolution of gas resulted the organisms present were examined under the microscope, and in the event of any being detected that appeared to be alcoholic ferments they were isolated by successive cultivations in media favourable to their propagation and unfavourable to the development of other organisms by which they might be accompanied. A slightly acid medium was found preferable as preventing the development of bacteria; grape must proved extremely suitable, as might be expected, and cherry juice diluted with water was also used successfully. In this way the experimenter determined the presence of alcoholic ferment germs in the nectaries of a considerable number of flowers; they were found at all times of the year, being simply less numerous in winter than in summer, and the conclusion arrived at was that the occurrence of such germs upon flowers is not accidental, but a normal condition. Thus even in winter the germs were present on such flowers as *Petasites vulgaris* and *Erica mediterranea*, and as the weather became warmer the number of ferment-bearing flowers increased, so that in May, every single flower of a plant much frequented by bees, like borage, proved capable of setting up alcoholic fermentation in cherry juice. That the presence of these germs on the flowers was not due to accidental deposition from the atmosphere was inferred from the fact that unripe fruits, taken at the same time from the same plants as the active flowers, were incapable of setting up alcoholic fermentation, whilst even ripe fruits appeared very variable in their behaviour. In fact, a point affecting the presence of ferment germs more than the maturity of the fruit is the condition, for whilst perfectly sound ripe fruits, even grapes, seemed to be practically devoid of germs, the slightest insect puncture or other damage was found coincident with a comparative abundance of them. The question therefore arose whether any connection could be traced between insects as germ carriers and the plants they visited as germ bearers. A number of insects, including bees, wasps, flies, and some small coleoptera, were therefore subjected to a treatment similar to that applied to the flowers. The result was to show that as a rule the ferment germs were more numerous upon the bodies of the insects than upon fruits or even flowers, and it was thought that this fact tended to show that the ferment germs are sown upon fruit by insects who bring them either from other fruits or from flowers that they visit. To prove this theory it was necessary to show that the ferments found upon the insects were of the same kind as those occurring on the flowers; but before this could be done, it was necessary to isolate and define the growths of the different species of *Saccharomyces*, the result being that no less than nineteen kinds of growths were found, presenting different characters and possibly representing different species, but all capable of provoking alcoholic fermentation in saccharine liquids. In connection with this long and tedious portion of the investigation many interesting observations were made, but it must suffice to mention here that it was found that the nineteen kinds were divisible into two groups,—fifteen of them being capable of provoking alcoholic fermentation in a solution of cane sugar as well as of glucose, and therefore called "inversive," while four were capable of provoking it only in solution of sugar already inverted, and were therefore termed "non-inversive."

Having thus prepared the way for ascertaining the relations existing between the ferment germs found in different situations, M. BOUTROUX proceeded with his observations in this direction, but it must be confessed that the results, so far as they are recorded, are far from being decisive. A tabular analysis shows that flowers yielded four inversive and two non-inversive varieties, four of which, two inversive and two non-inversive, were also obtained from immature fruits. Intact ripe fruits yielded no inversive germs, but only the same two non-inversive varieties that were obtained from flowers and green fruits. In damaged ripe fruits, however, one of these disappeared and in its place was another non-inversive ferment, *Saccharomyces apiculatus*, not observed on other fruits or flowers. From insects all the kinds previously referred to were obtained, and therefore the connection between flowers, fruits and insects as alcoholic germ carriers appears to be so far established. But, unfortunately, none of the ferments actually discovered was of primary importance in regard to those cases in which fermentation is carried out economically, and therefore no connection was established between the germs found on flowers and insects and the organisms that are characteristic of the wine, beer, or cider fermentations. The possibility is not excluded that the explanation of this may lie in some of the forms treated as different by M. BOUTROUX being really modifications of the same organism induced by surrounding conditions; though it is candidly admitted that no tendency to such modification was noticed during the experiments. It may be, that the failure to find these economic germs on flowers or insects is due to their extreme rarity, for there appears to be no relation between their ordinary number and their abundance when they find a favourable *nidus* for their development. Thus in a sample of grape must, in which the *Saccharomyces ellipsoideus* was so rare as not to be detected immediately after the crushing of the fruit, it multiplied so rapidly that in two or three hours it was plentiful and very soon crowded out all the other ferments that were originally present. Notwithstanding, however, the apparently imperfect evidence, M. BOUTROUX feels that his results warrant him in putting forward a theory respecting the manner in which the alcoholic ferments are preserved from year to year. In the autumn the germs occur everywhere on ripe damaged fruits, where they multiply rapidly. After the fruit season, they are preserved partly, as shown by M. PASTEUR and M. CHAMBERLAND, on the surviving *débris* of the fruit, and partly, as shown by Dr. HANSEN, in the earth, and thus they pass through the winter. At the commencement of the spring, or even earlier, the germs still surviving are borne by insects to the nectaries of flowers, where they multiply to a certain extent, and during the summer they are cultivated in a succession of flower-nectaries, thanks to the incessant re-sowing carried on through the same agency. Then, in the autumn they are transported by the untiring carriers to the ripe fruit, and the cycle is complete.

We are requested to say that, in consequence of the examinations occurring during the present week in the Society's rooms in Edinburgh, it was found impracticable to hold the Evening Meeting of the North British Branch announced for the 9th inst. It is thought probable, too, that in the following weeks the Tercentenary University festivities would constitute a disturbing influence. It has, therefore, been decided to abandon the meeting, and Dr. Macfarlane has promised to read his paper in the course of next session.

* * *

It is satisfactory to find, from a letter on another page, that the decision of the Council to acquire more important premises in Edinburgh for the housing of the North British Branch is appreciated so far north as Aberdeen. It is hardly for us to decide whether the suggestion made by our correspondent as to the furnishing of the new premises is worthy of carrying out; but we may venture to say that a still better way would be for every Scotch member or associate who desires to show his approval of the liberal policy of the Council to take every opportunity to promote the fuller representation of the Society in the North.

* * *

A circular has been issued stating that pending the rebuilding of the works of Messrs. Powers and Weightman, of Philadelphia, destroyed in the late disastrous fire, an arrangement has been made with Mr. BÖHRINGER by this firm for the manufacture of their quinine in Europe. It appears, however, to be thought not unlikely that, in view of the disadvantages attending the home manufacture of quinine in the United States since the abolition of the import duty, this arrangement may have a somewhat more permanent character than is conveyed in the announcement.

* * *

We have received a copy of the Twenty-Seventh Annual Report presented at the meeting of the Pharmaceutical Society of Victoria on the 12th ult., from which we learn that the progress of the Society during the past year was, in all respects, satisfactory. Allusion is made to the proposal to hold a conference of pharmacists representing the different Australian colonies, which, however, was not carried out in consequence of the refusal of the Pharmaceutical Society of New South Wales to participate in it at present. Another subject prominently alluded to in the Report is the formation of a Chemists' Assistants' Association, having for its object the shortening of the hours of labour. A general meeting of chemists and druggists was called and the proposal put forward by this Association was that shops should be closed on week-day evenings from Monday to Friday at nine o'clock, and on Saturday at ten. This was not accepted by all the employers, and, indeed, was not unanimously supported by the assistants; consequently no general agreement was arrived at. But we are glad to notice that the question is being more satisfactorily dealt with in some districts. The School of Pharmacy is said to have shown a large increase of students, some of whom came from the other colonies. The finances also seem to be in a good condition, the least satisfactory feature in the balance sheet being a considerable loss entailed in the supply of a journal to the members of the Society.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

EVENING MEETING.

(*Concluded from p. 790.*)

The next papers read were on—

SPIRITUS ÆTHERIS NITROSI: COMPOSITION IN RELATION TO DETERIORATION.

BY PETER MACEWAN,

and

SPIRIT OF NITROUS ETHER: ITS CHARACTERS AND TESTS.

BY D. B. DOTT, F.R.S.E.

The papers are printed on pp. 817 and 819, and gave rise to the following discussion:—

Dr. Inglis Clark proposed a vote of thanks to the authors of these papers, and remarked that it was not possible for him to enter into any detailed criticism without the text of the papers before him. Mr. MacEwan had mentioned that acetic acid had decreased, and probably had entered into combination. The decrease was only noted in one specimen, and if it had gone to form acetic ether he would expect that the separation volume would increase rather than diminish. Probably, therefore, the acid had evaporated. Regarding the increase in specific gravity, he thought that this might be the result of contraction caused by loss of the more volatile constituents. Mr. Dott's assay process seemed to give fair results, and its simplicity was in its favour. The high results which he obtained contrasted very markedly with those given by Mr. MacEwan, being over 7 per cent. in the one case and 3·5 per cent. in the other; he would infer from that either that Mr. Dott's specimen was exceedingly good, or that one of the processes was bad. He had listened to the papers with pleasure, and he considered them able contributions to the literature of the subject.

Mr. Gilmour said that he had always considered the official tests unsatisfactory, and he was glad that the papers read were directed to show why that was so. He hoped that better tests would be adopted in the next pharmacopœia. The opinion that the ·850 spirit was better than the official one was pretty widely spread, and it would take a great deal to convince many people that it was not; but it had been very clearly shown that any superior properties which it possessed were due rather to weakness in the proportion of nitrous ether than to superior method of preparation. Mr. Dott's method was very simple and he hoped to give it a good trial after the paper was published.

Mr. MacEwan said that the sample in which acetic acid had decreased so much was at least a year old, and ten months had elapsed between the two estimations. He thought that prolonged contact between the acetic acid and alcohol or other ethyl compound would tend to cause formation of acetic ether. The quantity of this sample at his disposal was not sufficient for the separation test at the time of the second examination, but it gave no separation when first examined. If the method proposed by Mr. Dott gave constant results, or nearly so, he would say that no little difficulty had been overcome, for the continued action of the nitrous fumes on the potassium iodide in the initial stage and during titration seemed an insurmountable difficulty, and had caused him to abandon the process. Judging from the results which Mr. Dott had got with a standard solution of ethyl nitrite he thought that the method promised well. The difference between Mr. Dott's percentages and his own was certainly remarkable, but then the specimens were different. He had used Eykman's process and had taken it upon its merits, for it gave constant results, and this could not be said of any method previously suggested. He had of course deducted from the percentage of ethyl nitrite found by that process the amount of nitrous acid previously determined.

Mr. Dott said he did not say that the method suggested was absolutely correct, but he thought that it gave approximate results, and when thoroughly tried it would be found simple. Of course it should not be forgotten that spirit of nitre was not a pure solution of nitrous ether, so that the other compounds present might influence the test.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 2nd inst.

Present—The President, Mr. James E. Brunker, M.A., in the chair; Messrs. Allen, J. Evans, Grindley, Hayes, Dr. Montgomery, Sir George Owens, Mr. Simpson, Professor Tichborne and Mr. Wells of Dublin; Mr. Doran, Bray; Dr. Whitaker, and Messrs. Payne and Pring, of Belfast; Mr. McIlwaine, Newry; and Mr. Minchin, Athy.

The President said that since they last met the country had sustained a great loss by the death of the Duke of Albany. As loyal subjects he thought they should express their feeling on the subject, and he would, therefore, request them to allow the standing orders to be suspended in order that a resolution might be moved on the subject.

The standing orders having been suspended,

Sir George Owens moved the following resolution:—

"That this Council desires to place on record its sincere regret at the sudden death of His Royal Highness the Duke of Albany, and hereby expresses its deep sympathy with Her Majesty the Queen and the Duchess of Albany in the great affliction which has befallen them in the removal of one who was so bright an ornament of the State."

Mr. Pring seconded the motion, which was passed unanimously.

Mr. Allen moved, pursuant to notice, that—

"Candidates for the Society's licence shall give satisfactory proof of having attained the age of twenty-one years."

At present the Certificate Committee had not power to demand proof of that description, although they could require proofs from the candidate that he had attended chemical lectures, and spent two years at practical pharmacy. It had been found that one young gentleman had passed the examination for the licence who was not twenty-one years of age.

Mr. Payne said he had great pleasure in seconding the motion. He thought a certificate of birth from the registry office should be required.

Mr. Allen said it might be very difficult to give that particular proof sometimes. It would be quite safe to leave it to the Certificate Committee to decide what was satisfactory proof.

The motion was unanimously agreed to.

The President said the next business was the report of the Pharmacy Act Amendment Committee, which had been printed and was in the hands of every member. The Registrar would read it, and it could be discussed paragraph by paragraph. He (the President) supposed they had all seen the fate of the Bill promoted by the English Pharmaceutical Society—that the Government had declined to take up any portion of it except that relating to the sale of poisons.

Mr. Fennell then read the report. Clause 1 referred to the right preserved by section 31 of the Pharmacy (Ireland) Act to "chemists and druggists" who were practising as such in Ireland upon their own account, to continue their business, which carried with it the right to sell scheduled poisons; and recommended that power should be given to the Society to require all *boná fide* chemists and druggists who had been in business on their own account on or before January 1, 1884, to apply to the Council to have their names registered; such persons to pay on registration a fee of three guineas, and to be styled "Registered Druggists."

Agreed to.

Clause 2 recited that there were small towns and villages in Ireland where a highly educated pharmacist could not earn a livelihood, but where persons of proved intelligence and education as retailers of drugs and poisons for veterinary and household purposes were required, and recommended:—(A.) That the Council of the Society should be given power to hold examinations at stated periods for such persons, who, on passing the prescribed examinations and paying a fee of three guineas, should be entered on the registry of "Registered Druggists." (B.) That such persons should be examined with respect to their knowledge of the English language, arithmetic and elementary chemistry, and should have a practical knowledge of, and be able to distinguish by their appearance and by suitable tests the various drugs and poisons or poisonous substances in general sale. The rules affecting the examinations to be approved of by the Lord Lieutenant in Council.

Mr. Payne moved that clause 2 be omitted altogether from the report. The apothecaries of the past had carried on the compounding of medicines to the satisfaction of the public. The only drawback was that there was not enough of them. They merged into medical practitioners, and the profession of pharmacists was created to meet the want that was found to exist. He objected altogether to the creation of a third grade. The object of the Pharmaceutical Society was to provide a well-educated body of men to take the place of the apothecaries. In the country districts and small towns of Ireland there was not a great deal of compounding to be done, and unless the sale of poisons and poisonous drugs and the compounding of medicines were confined to pharmacists and apothecaries, it would be impossible for either of these to exist in such places. On the other hand, by maintaining that restriction they would give scope for the existence of a class of men who could not otherwise exist in those places. The creation of such a new grade as the recommendation proposed would not only be an injury to pharmaceutical chemists but to the public. It would be far better for the public to have thoroughly educated men everywhere. But if a second grade of registered druggists should be created and perpetuated they would have fifty times more illicit compounding then went on at present. The public would not distinguish between the registered pharmaceutical chemist and the other grades at all.

Mr. Doran seconded the motion. He had a feeling of considerable apprehension as to what the fate of the Society would be if the proposed new grade should be established. It would lead to no end of litigation and to prosecutions, for which the Society would have no funds. It would also prevent young men from coming up for the Society's final examination. Young men had told him that they would not go on for the final examination if the recommendation should become law.

Mr. Grindley said his hostility to the proposal under consideration continued as pronounced as ever it had been. He did not know on what grounds it was asserted that there was a deficiency of pharmaceutical chemists and apothecaries in Ireland. Every quarter that Society passed a certain number of men as pharmaceutical chemists. Country villages were generally supplied with medicines from the dispensaries, the dispensary doctor keeping open shop. It now took four years to make a pharmaceutical chemist, and they should not be like children, first sowing their seed in the ground and then rooting it up to see if it was growing. Let them strive to turn out a class of men who would serve the public satisfactorily and without falling into errors, and who would thus gain their confidence. If they created this grade they would render the practice of the pharmaceutical chemist worth nothing in the country. Instead of doing so they should strive to secure some encouragement for the young men who had passed their final examination. The present recommendation had been persistently put forward by a section of the Council who were beaten on it in 1878 at the Annual Meeting.

Mr. Minchin said he quite agreed with what had been said against the clause. He came from a small town in which it was perfectly true that a qualified man could not live by dispensing alone. An apothecary had this advantage, that he could prescribe for patients. A pharmaceutical chemist could not; he could only make up prescriptions. If the exclusive sale of poisons were taken out of the hands of pharmaceutical chemists they would have every grocer and hardware merchant in the country selling poisons.

Dr. Whitaker said that when the apothecaries of Ireland had the sale of these matters entirely in their hands they were urged to cease being medical men and to devote themselves entirely to the sale of drugs and medicines. They refused to do so, and the result was that the Government took the matter into their own hands and passed the Act under which pharmaceutical chemists existed. The Council ought, therefore, to take care that the public were not left without any accommodation that they required. The late Sir Dominic Corrigan called attention to the fact that in his time Celbridge, Lucan, Leixlip, Kilcock, and another town in the vicinity had not a druggist in one of them. And in places where a pharmaceutical chemist could not exist it was absolutely necessary to provide some means by which the farmers of the surrounding districts could get corrosive sublimate, arsenic, or any other thing of the sort that they wanted. Better that these matters should be supplied by somebody over whom the Society would have control than that it should be left in the power of members of Parliament to say that their constituents had to go thirty miles to buy sheep-wash. Supposing that the power which it was recommended that the Society should possess were granted, it did not follow that they would be obliged to use it indiscriminately. He was, on the whole, in favour of the clause.

Mr. Wells said that since the last meeting of the Council he had communicated with nearly all the pharmaceutical chemists in Ireland, except those of Belfast and Dublin. In the two cities just named there were not more than seventy pharmaceutical chemists, or at all events there were not more than a hundred. That left over a hundred scattered through the rest of Ireland, of whom at least forty were in business on their own account. These were in towns having a population up to four thousand, and there were sometimes two in each town. He believed that if they only continued to prevent hucksters and others from selling poisons and continued to endeavour to carry out their Act, in a few years all the small towns would have pharmaceutical chemists in them. He believed that it would be a great pity to make the proposed grade. Out of two hundred licentiates of the Society, he had ascertained that the opinions of a hundred and sixty were totally opposed to it. If the clause were carried two members of the Council would resign and several members of the Society would cease to subscribe to it, and if that went on they would soon have no Pharmaceutical Society at all.

Dr. Montgomery said he was under the impression that the Council had already agreed to the principle embodied in this clause.

Mr. Doran: Only by a majority of one.

Mr. Hayes supported the clause. He believed the proposed grade was required even more now than it was in Sir Michael Hicks-Beach's time. The existing arrangements were insufficient for the requirements of the country.

Mr. McIlwaine said he came from Newry, where there were three pharmaceutical chemists.

Professor Tichborne said there was something to be said in favour of the establishment of the proposed grade. No doubt there were small towns in Ireland where there were neither pharmaceutical chemists nor apothecaries, and that was the strong point for the clause. But there were a great many points against it. In his opinion, it was the original intention of the framers of the Act relating to the sale of poisons that the sale of such articles should be kept entirely in the hands of qualified men. At the same time they must bear in mind that it would be absurd to pass a law that it would be impracticable to carry out. It was undesirable to lay down the principle that the sale of poisons should be left in the hands of unpractised men. But if they passed the clause as it stood they would lay down that principle. Clause A. would tend to create a large body of men in towns where there was great competition, and it would not be long before they would try their hands at compounding.

Mr. Pring: They do it at present.

Professor Tichborne said he would propose the following amendment:—

"That it is desirable that the Council should seek powers to register persons for the sale of poisons in any post town in Ireland, where it is proved that there is no qualified man keeping open shop; and that candidates for the licence as registered druggists shall pass a prescribed examination."

This proposal he thought would meet the difficulty, for it avoided laying down the principle that it was desirable to create a new grade and only made an arrangement to meet an emergency. At the same time they would reserve protection for their own licentiates.

The amendment was not seconded.

The President said this question had been for some years before the Council, and they had almost all made up their minds upon it. Ever since he became a member of the Council he had felt strongly that a necessity existed for some such grade. Very small numbers of young men were coming up for their final examination. In Ireland, omitting the towns of large population, there were about two hundred and fifty towns having a population of from one thousand to two thousand five hundred, and it was in these and the districts surrounding them that the necessity for the proposed grade was felt. It would be cruelty to an educated man to fix him in some of those villages. It was quite within the power of the majority of the Council now to alter the decision that they came too not later than two months ago, but it would place them in a false position before the Government. There had been no public expression of feeling against this proposal from members of the Society outside the Council, and he had not had the slightest reason to believe that any number of members were opposed to it, except so far as was afforded by two or three anonymous letters in the press, which had no weight.

Mr. Payne observed that at the time when the late Sir Dominic Corrigan spoke of an existing want of extra accommodation, the Pharmaceutical Society was very young—it had not been more than twelve months in existence. Since then the Society had grown and many men had qualified themselves and were in business. Ballyshannon, which was a very small town, supported a pharmaceutical chemist, and also an apothecary. Clones had one pharmaceutical chemist; Athy had 2; Coleraine 2; Ballymoney 2; Newry 3; Monaghan 2; and Cookstown 1. These gentlemen would be still better able to maintain themselves if the sale of poisons were confined to them. In Belfast there were a number of pharmaceutical chemists and they objected very strongly to the creation of another grade; and he (Mr. Payne) was quite sure that if the pharmaceutical chemists in business throughout the country were asked their opinions as to this proposal, the majority of them would declare against it.

Mr. Grindley: They have been asked and we have their replies.

Mr. Wells: The Lord Lieutenant has already received a memorial against the proposal signed by over one hundred and fifty members of the Society, including ten members of the Council.

Mr. Payne said the plan of having an optional power would work most unsatisfactorily, because the constitution of the Council changed every two or three years, and the course which the majority of one year might decide on might be reversed by that of another.

The motion of Mr. Payne for the rejection of the clause was then put and carried by a majority.

The remaining clauses of the report were then dealt with.

Clause 3 recommended that it should be made unlawful for any save registered druggists, medical practitioners, pharmaceutical chemists, and apothecaries to sell patent drugs or poisons.

Agreed to.

Clause 4 recommended that it should be made unlawful for any registered druggist to keep open shop for the retailing, dispensing, or compounding of medical prescriptions.

Agreed to.

Clause 5 recommended that all registered druggists should pay an annual fee of 5*s.* to the Treasurer of the Pharmaceutical Society; that on or before the 15th March in each year a list of those who had paid should be forwarded to the inspector of weights and measures in each constabulary district, and that he should prosecute infringements of the law, and be entitled to one third of the penalty in each conviction.

Agreed to.

Clause 6 recommended that penalties for the infringement of the proposed enactments should be the same as and recoverable in the same way as under the Pharmacy Act.

Agreed to.

Clause 7 recommended that the word "person" in section 30 of the Pharmacy (Ireland) Act should be made to apply to all persons or associations of persons keeping open shop, and that each individual should be required to be duly qualified.

The President remarked that from what had happened with the English Bill he did not think there was much chance of that recommendation being included in a new Bill.

Mr. Wells: Perhaps the Government may do for us what they would not do for the Society at the other side.

The clause was agreed to.

Clause 8 recommended, in reference to the sale of patent and proprietary medicines containing poisonous ingredients, that a specification of the poisonous contents and the quantity of same should be printed on the label or wrapper; that the word "poison" should be printed on the various labels and wrappers, together with the name and address of the first seller; that the sale of such articles should be confined to legally qualified persons; and that persons convicted of contravening these regulations should be subjected to a penalty of £5 for the first offence, and of £10 for each subsequent offence: the seller so convicted to have power to recover from the owner of the medicine the amount of the penalty and costs on proof that the article had been sold in the same condition in which it had been received.

Agreed to.

Clause 9 recommended that a pharmaceutical chemist or apothecary keeping more than one open shop for the sale of poisons or medical prescriptions should employ in the shop in which he was not engaged a person who would himself be a duly qualified keeper of such shop.

Agreed to.

Clause 10 recommended that proprietors of shops for the sale of poisons and the compounding of prescriptions should be obliged to furnish, on application in writing, their names, addresses, and qualifications to the Registrar of the Pharmaceutical Society, under a penalty of £5 for each day of default, and that any person selling in the shop during such default should be liable to a penalty of £5 for each offence.

Agreed to.

Clause 11 recommended that any person fraudulently procuring himself to be registered, and anyone aiding or abetting him, should be deemed guilty of a misdemeanour, and liable to imprisonment for a period not exceeding twelve months.

Agreed to.

On the motion of Mr. Payne, seconded by Mr. Grindley, the recommendations as amended were adopted, and ordered to be printed, and copies sent to the Chief Secretary and to the Irish Members of Parliament.

Some other business having been disposed of, the Council adjourned.

Provincial Transactions.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The fourth ordinary meeting of the above Association was held at the Owens College, on Tuesday evening, March 25. Mr. W. Wilkinson, Vice-President, in the Chair.

The minutes of the last meeting having been read and confirmed, the Chairman called on Mr. F. C. J. Bird to read a paper on "New Remedies," which was illustrated with specimens from the Owens College Materia Medica Museum.

Some Short Notes on New Remedies.

BY F. C. J. BIRD.

The author stated that the past few years had been remarkable for the large number of drugs (chiefly of vegetable origin) which had been brought under the notice of the medical profession, and highly recommended as specifics in various diseases. Many of these had attained popularity for a few months, and then not realizing the expectations of those making use of them, had quickly disappeared from prescriptions only again to be met with occasionally. Although this rage for new preparations was at times very perplexing to the physician, still it was not without its advantages, for should a hitherto unknown drug possess any real merit, it would stand a chance of getting a trial, and instead of remaining uselesss and unappreciated in its original habitat its remedial qualities would be utilized for the benefit of mankind. The greater part of these new remedies were of both American origin and introduction, and appeared to have been discovered or at least first used pharmaceutically by the eclectic practitioners of America, whence many of them are commonly termed "eclectic remedies." The word "eclectic" really meant selected, but now conventionally it is understood to refer to a class of medical men in America, who confined the drugs used in their practice to substances obtained from the vegetable kingdom only, and who, when they have exhausted the drug by treating it with alcohol, precipitating the tincture with water, and drying the resulting resinoid powder, believed the preparation thus produced to represent the entire active constituents of the drug divested of all inert woody matter, etc. For a long time this class of practitioners was regarded to a certain extent, by medical men of the other school, in the light of quacks, but the valuable qualities of some of their now well-established remedies, as podophyllin, iridin, etc., have done much to remove that feeling.

The author then proceeded to describe in detail the following drugs, their uses and applications:—*Berberis aquifolium*, *Rhamnus purshiana*, *Grindelia robusta*, *Aspidosperma Quebracho*, *Loxopterigium Lorenzii*, *Convallaria majalis*, *Lippia Mexicana*, *Viburnum prunifolium*, *Francisca uniflora*.

After the reading of the paper a discussion ensued, in which the Chairman, Messrs. Elborne, Benger and Kirkby took part.

Mr. Bird having replied, the Chairman then called on Mr. Kirkby to read his paper on "Kamala."

This paper will be printed in an early number.

After the reading of the paper a discussion followed, in which the Chairman, Messrs. Elborne, Benger and Hermann Woolley took part. Mr. Kirkby having replied, hearty votes of thanks were accorded to Messrs. Bird and Kirkby for their admirable papers, which were carried with acclamation.

Mr. Elborne then drew the attention of the meeting to some recent donations to the Owens College Materia Medica Museum, which gave rise to a discussion, in which the Chairman and Mr. Hermann Woolley took part. The meeting then terminated.

OLDHAM CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

On Thursday evening, March 27, Mr. W. Buckley read a paper before the members of the above Association on the subject of "The Doctrine of Evolution." The chair was taken by Mr. A. E. Martin, President.

The essayist commenced by defining the term, and remarked that it was generally confounded with the Darwinian theory, and gave an extract on the meaning of "Evolution" from Dr. Hooker. He then proceeded to describe the various forms of animal life, beginning with the gregorina, and treating the other forms to the vertebrata. Gregorina was described as an animal which is found as a parasite of the cockroach, which takes in its food in any part of its surface. This is the lowest form of animal life. Amœba was then described as *seizing* its food, which is forced through the mass of protoplasm and excreted anywhere. Infusoria formed a step higher, in the possession of a definite mouth and œsophagus and egestive region. Waterweed hydra, sea anemone, entozoa, earthworm, leech, insect, vertebrata were all described in order of superiority, the various changes in the structure of the same being pointed out until the highest form of animal life was reached in the case of vertebrata. He then explained evolution of reproduction, descrlbing the mode of reproduction (in the first place) of the gregorina by incystation, that is, the animal surrounds itself by a mass of gelatinous matter and then splits up, each part becoming a fresh animal. Infusoria were described as being reproduced by splitting into two equal parts and also by budding, a portion becoming attached to the animal, and after some time becoming free, and having the powers of its predecessor. The different modes of reproduction were fully described in each case, to the vertebrata as in the human being. The whole of the descriptions were most interesting and easy to follow, as the essayist handled the subject in a masterly manner. The descent of man was next noticed, Mr. Buckley showing the similarity of the structure of some monkeys to human beings—more especially the chimpanzee and gorilla. The useless muscles of the human body were spoken of and the reason why they were useless explained. The facts of evidence of relationship of some apes to man was fully treated upon.

The whole of the paper was most interesting and was enjoyed by all present, as their great attention to the delivery of the same showed.

After a discussion, in which the arguments antagonistic to the Darwinian theory were given and discussed by most of the members present—

Mr. J. Lees proposed a vote of thanks to Mr. Buckley, which was seconded by Mr. C. G. Wood (Sec.) and carried.

HAWICK PHARMACEUTICAL ASSOCIATION.

The monthly meeting of the above Association was held on the evening of Tuesday, the 1st inst. The Hon. President (Mr. Maben) occupied the chair. There was a large attendance.

The minutes of the former meeting having been approved,

Mr. M. Dechan, Analytical Chemist, read a paper on "Milk and Milk Analysis." Referring first of all to milk as an article of diet, Mr. Dechan showed by reference to its composition that it was a perfect food. It contained all the substances that were required for the nourishment of the various parts of the body, and these in the proportions in which they were most required. Milk consisted largely of water, which was necessary as the basis of the blood and of the various juices of the system; it contained the nitrogenous constituents essential for producing muscle, and repairing the continual waste of tissue, as well as the sugar and fats required for maintaining the animal heat, and the mineral matters or ash, which went to form bone. Going on to consider the milk of different animals, he pointed out that mare's milk contained the largest proportion of sugar and the smallest of the albuminoids and fats, the milk of the ass coming next in these respects. On this account these milks were peculiarly valued as a diet for consumptive patients. With regard to the sugar and the proteids they came nearer the composition of woman's milk than that of any other domesticated animals, but the same remark did not hold good of the fat, which was present in human milk in somewhat similar proportion to that in which it occurs in the milk of cows.

Proceeding to the second part of his subject, the analysis of milk, Mr. Dechan pointed out that here, of course, we have usually only to do with cow's milk. In the first place, there was great difference of opinion regarding its percentage composition, or, rather regarding what ought to be looked on as genuine milk. Different cows, and even the same cow on different food, varied as to the quality of their milk. This had led to disputes in which a certain amount of bad feeling had been shown among analysts, some, and these the large majority, maintaining most strenuously that genuine cow's milk ought to contain not less than about 12 per cent. of total solids, and that even this was a very low estimate, while others hold that milk had been got with a much lower percentage than this. The natural result of this conflict of opinion was that the public interest suffered. Endeavouring to account for the way in which these discrepancies might have arisen, Mr. Dechan explained that in milking cows, the milk that flowed first was poorest in fat, while that last drawn was poorest in solids not fat. It might, therefore, have happened that samples of milk from one portion only of the milking had been analysed, and while in one sense this was perfectly genuine milk it was obviously quite unfair to take it into account in fixing a standard.

Then, again, there was a difference of opinion as to the method by which milk should be analysed. Having described Wanklyn's method, that of Somerset House, and that approved by the Society of Public Analysts, Mr. Dechan critically examined each, pointing out that no one was in all respects perfect. He then explained the method which he had been using, along with Mr. Maben, for some time. This consisted essentially in employing a continous extraction apparatus, modelled on the principle of Soxhlet's tube, and using ether as a solvent. By this means the fat was readily and completely separated from the solids not fat. These were then dried, and their combined weights corresponded, when the analysis was correctly carried out, with the total solids which were determined separately. The amount of ash was obtained by igniting the solids not fat, and weighing the residue. Milk analysis did not go further usually than this, but if the proximate constituents of milk were all required the solids not fat would be again analysed to ascertain the proportions of proteids and milk sugar, and the ash for the amount of phosphate of lime, chloride of sodium, and other salts.

Mr. Dechan was listened to throughout with great attention, and, at the close of his paper, which had been illustrated with diagrams, he received a hearty vote of thanks.

Several questions having been put and answered, it was intimated that the annual business meeting of the Association would be held next month.

LIVERPOOL CHEMISTS' ASSOCIATION.

The eleventh general meeting of the thirty-fifth session was held, at the Royal Institution, March 13, 1884. Mr. Edward Davies, President, in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations to the Library were announced;—*The Pharmaceutical Journal*, from the Society, and the *Science Monthly*, from the Editor.

The President announced that in accordance with the intimation he gave at the last meeting respecting the letter of resignation from their Vice-President, Mr. Alfred H. Mason, that same had been brought before a Special Council Meeting, and that it had been resolved to accept same with deep regret, and also to make Mr. Mason an honorary member of this Association.

Mr. Arthur Crosfield, was then elected a member.

Mr. J. C. Bredin described experimentally a test for the detection of nickel and cobalt, by means of the ferro- and ferri- cyanides of potassium, which he stated was employed by Mr. R. H. Davies, and described in the *Chemical News* (vol. xxxii., p. 44).

Mr. J. T. Hornblower exhibited purified crystals of barosma camphor, the stearopten of buchu oil, which was obtained from *Barosma betulina* and *Barosma serratifolia*.

Dr. Symes exhibited some leaves, which were packed with a parcel of kola nuts, and which he found on examination to be the leaves of the kola plant.

The President then read a paper entitled—

Notes on Testing for Arsenic.

BY E. DAVIES, F.I.C., F.C.S.

In all ages poisoning has been a crime which has excited the greatest amount of reprobation, both on account of the cowardly nature of the attack on the life of the victim, which leaves him without the means of defence, and also from the difficulty of its detection. In olden times before chemical analysis was discovered, chemistry, as then known, was long employed for the preparation of deadly agents. Indeed, if we could credit the tales of Italian and French poisoners, we should have to admit that they were far in advance of chemists of our own time, as they were believed to be able to administer poison in gloves, perfumes, and even so to prepare the leaves of a book that by touching with the fingers and then moistening them with the saliva in order to turn over the pages, enough poison could be taken into the system to produce death. We read of mysterious concoctions of herbs, distillation of compound mixtures, necessitating the use of glass masks,—by the way, a most futile precaution against the inhalation of poisonous fumes,—and all the paraphernalia so useful to the romance writer who wishes to give a great scientific-dramatic colouring to his works. No doubt the poisoners of that day did, in their ignorance of the chemical nature of the materials on which they worked, combine—

"Eye of newt, and toe of frog,
Wool of bat, and tongue of dog,
Adder's fork, and blind-worm's sting,
Lizard's leg, and owlet's wing,
For a charm of powerful trouble,"—

but the really active ingredient was some simple substance, such as aconite, sugar of lead, and above all, arsenic.

About 1700, a woman named Toffana or Tophania, living at Palermo, and afterwards at Naples, attained a baleful reputation by her preparation of a poison known as "aqua della Toffana." In Beckman's 'History of Inventions,' it is stated that this preparation, as well as that employed by the Marchioness de Brinvilliers, were almost certainly "arsenical mixtures, or as Dr. Hahneman rightly conjectures, neutral salts of arsenic. Loss of appetite, faintness, gnawing pains in the stomach, loss of strength without any visible cause, a continual indisposition, followed by a wasting of the viscera, a slow fever, etc., are all symptoms which seem to announce that dangerous metallic oxide." And in a note he adds an extract from 'Hoffmanni Med. rationalis System.' p. ii., c. 2, section 19, 1718 or 1719. "Garelli, the Emperor's principal physician, lately wrote to me something remarkable in the following words:—'Your elegant dissertation on the errors respecting poisons, brought to my recollection a certain slow poison, which that infamous poisoner, still alive in prison at Naples, employed to the destruction of upwards of six hundred persons. It was nothing else than crystallized arsenic, dissolved in a large quantity of water by decoction, with the addition, but for what purpose I know not, of the herb cymbalaria. This was communicated to me by his imperial majesty himself, to whom the judicial procedure, confirmed by the confession of the criminal, was transmitted. This water, in the Neapolitan dialect, is called aqua del Toffnina. It is certain death, and many have fallen a sacrifice to it.'" The allusion to neutral salts of arsenic is especially interesting, as the arsenate and arsenite of soda have just attained such prominence as poisonous agents.

The truth is that it was not so much the mysterious nature of the poison employed as the inability of the chemists of the day to detect small quantities of mineral poisons which gave to mediæval poisoners the impunity which they often enjoyed.

Previous to the introduction of Marsh's test there was no method by which small quantities of arsenic could be detected. Mr. Marsh, of Woolwich, discovered this process in 1836. It can, no doubt, detect smaller traces of arsenic than any other, but it has two great disadvantages. It cannot be used when a small quantity of arsenic is contained in a large quantity of organic matter, until the organic matter has been destroyed, as the frothing occasioned by it is an insuperable obstacle. Its extreme delicacy is almost an objection, as, though the zinc and sulphuric acid can be tested absolutely in the apparatus, the same is not the case with all the chemicals which have been used in the preparation of the solution. This is not the case with Reinsch's and Fresenius' tests, in each of which everything can be tested in blank experiments.

Reinsch's test, first proposed in 1843, is still, in many respects, the most useful test for the detection of arsenic. A slip of copper, boiled with the suspected material, acidulated with hydrochloric acid, soon becomes coated with an alloy of arsenic and copper. The mere staining of the copper alone is not a sufficient indication of the presence of arsenic. Antimony, mercury, and, in some instances, it would appear, organic matter, may produce a stain resembling that caused by arsenic. By heating the slip in a tube closed at one end we get the arsenic volatilized, and then oxidized into arsenic trioxide. I have found that if the part of the tube upon which the crystals of As_2O_3 are to be deposited is first warmed, the crystals are much more distinct and perfect in crystalline form. Another point which I have found exceedingly important, is to remove any fatty matter which may have deposited on the copper slip, by boiling it in ether. In all cases in which animal matters are boiled with the slip and acid, fatty matters are present and often adhere strongly to the copper. If they are not removed fatty globules of fat and tarry matters mix with the crystals and render them indistinct.

I have also made some experiments to ascertain whether sulphide of arsenic would give the reaction with Reinsch's test. One-tenth of a grain of arsenic trioxide dissolved in water was precipitated as sulphide, filtered and washed thoroughly with water. The precipitate was divided into two parts, and one part, equal to one-twentieth of a grain, was boiled with about one ounce of water acidulated with HCl, and a slip of copper introduced. It was some time before the copper was stained, but in two hours it was completely coated, and a fine deposit of As_2O_3 obtained by sublimation. It thus appears that the test may be applied successfully in any case, however long a body may have been interred.

A great merit of the process is the fact that no previous preparation of the organic matter is necessary, and as both acid and copper can be sufficiently tested by gently simmering the acid diluted with three or four times its bulk of water with a slip of the copper for five or six hours, there is no risk of introducing any arsenic into the material.

To some extent this process may be used for quantitative determination. By boiling the material with successive slips of copper until no more are stained, on heating in a capacious tube the arsenic is obtained free from organic matter. It may then be dissolved and precipitated at As_2S_3. It, however, takes a long time to remove all the arsenic, and some other method is desirable which will enable larger quantities of material to be acted on. Many have been devised for destroying the organic matter, which may be summarized as follows:— 1. Destruction by sulphuric acid alone or in conjunction with nitric acid. These methods involve the use of large quantities of sulphuric acid with risk of thus introducing traces of arsenic, and on the other hand all animal matters contain small quantities of chlorides, and on heating with strong sulphuric acid chloride of arsenic is sure to be formed and volatilized. 2. Oxidation by means of nitrate of potash. Large quantities of nitre must be used, or if the carbon is not entirely burnt, arsenic in the elementary state will be evolved. Then the nitrates and nitrites in the residue must be entirely decomposed by sulphuric acid. This introduces the former objections.

Dr. Taylor advocates the thorough drying of the organic matter and then adding strong hydrochloric acid and distilling. The distillation should be carried to dryness and repeated when the arsenic will be volatilized and condensed in the receiver. This method does give good results sometimes, but it is very difficult to get the organic matter quite dry, and the contents of the retort are very apt to bump. The distillate is not free from organic matter.

The process known by the name of Fresenius and Babo's consists in heating the organic matter with hydrochloric acid, so that the strong acid shall not be more than one-fourth of the bulk of the water present or if necessary added. Chlorate of potash is added in successive small quantities until the solution is a light yellow colour. This is filtered and the residue thoroughly washed. The filtration takes place rapidly and a clear liquid is obtained. The filtrate is heated for some time to remove any chlorine, then boiled with pure solution of sulphurous acid, the excess of sulphurous acid boiled off and well washed. Sulphuretted hydrogen is then passed in slowly for two or three hours. The liquid is gently warmed for some time to remove excess of H_2S, and the precipitate filtered off and washed until quite free from chlorine. The precipitate and filter are dried and treated with pure fuming nitric acid. The residue is dried and moistened with strong sulphuric acid. After heating for some time on a water-bath, it is heated for two hours in an air-bath at 150° C. The charred mass is then boiled with dilute HCl and H_2S passed in. The sulphide of arsenic is then precipitated pure and is most conveniently weighed by dissolving off the filter with dilute ammonia and evaporating to dryness in a weighed porcelain dish. It is well to moisten with strong H_2S solution and evaporate again. The sulphide may then be oxidized with fuming nitric acid, and the solution of arsenic acid tested in various ways.

Objections have been raised with regard to this process. First, it has been supposed that arsenic may be lost in the first treatment. The HCl is too weak to admit of the formation of chloride of arsenic, but as the operation may very well be conducted in a retort any loss can be prevented. The complexity of the process has also been urged as an objection, but in practice this is not found to be the case. There is rather a large number of reagents used, but the quantity of each is small, and besides testing each separately a blank experiment can be easily made, where by using meat for organic matter and double quantities of each reagent the purity of the whole can be proved. Practically, I have never failed to find arsenic by this process when Reinsch's process has shown it to be present, and I have never found it when Reinsch's test has shown it to be absent.

Fresenius and Babo's method has the advantage that it enables us to ascertain the presence of other poisonous metals without the introduction of copper.

Dr. Nevins said he had listened to the paper with very great interest, as the subject of it was one in which he had taken a practical interest during many years of chemical experience. He concluded by moving a hearty vote of thanks to Mr. Davies.

Mr. Conroy, in seconding the vote of thanks, considered the paper showed a most valuable digest of the facts of a long practical experience, and he hoped it would be published, as it would prove a most valuable record for future reference.

The discussion was continued by Dr. Symes, Mr. Ward and Mr. A. C. Abraham, and the vote of thanks was carried by acclamation. Mr. Davies having replied, the proceedings terminated.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, April 3. Dr. W. H. Perkin, F.R.S., President, in the chair.

The following certificates were read for the first time:—R. St. Stephens and R. C. Tresidder.

Professor P. T. Cleve, of Upsala, was present at the meeting, and was formally admitted as a Foreign member.

Mr. Salamon read a paper—

On the Influence of Certain Phosphates upon Vinous Fermentation. By A. G. Salamon and W. de Vere Mathew.—Considerable difficulty is often experienced in the course of the manufacture of beer by the method of high fermentation, in producing a sufficient attenuation of the wort in a given time. Under such circumstances it is constantly urged that the addition of certain salts of phosphoric acid will exercise such a stimulating influence upon the growth of the yeast organism as to materially increase the rapidity of the attenuation of the wort. The authors undertook the present series of experiments to determine whether such a stimulation is really obtained. They have estimated the vigour of the fermentation by the amount of sugar consumed in a given time; the sugar left after the fermentation being determined gravimetrically as recommended by O'Sullivan. The following Pasteur's solution was used as a fermenting medium:—Water, 100 c.c.; potassium phosphate, 0·233 gram; calcium phosphate, 0·02 gram; magnesium sulphate, 0·023 gram; ammonium tartrate, 1·166 gram; cane sugar, 17·490 grams. The temperature of the solutions was maintained at 60° F., and the duration of the experiments was usually sixty hours. The following may be given as an example of the experiments. One hundred c.c. of Pasteur solution were used with 5 grams of pressed yeast.

Sugar consumed in grams. Per 100 c.c.	Potassium phosphate in grams. Per 100 c.c.
8·5770	0·0000
8·5896	0·0575
8·5001	0·1150
8·7666	0·1720
9·6884	0·2300 (= ·0770 P_2O_5)
9·9124	0·2875
7·7586	0·3450
7·5948	0·0425
7·8878	0·4600
7·2850	0·5175

Time, forty-eight hours.

It is seen that the maximum fermentation occurs when 0·23 gram of potassium phosphate is present per 100 c.c. which is the normal amount in Pasteur's solution, a larger quantity is obviously fatal to the proper activity of the yeast ferment. Similar experiments proved that although small quantities of calcium and magnesium phosphates were benficial an excess was most injurious. Now the normal amount of P_2O_5 in an English beer wort is about 0·1160 gram, and in the normal Pasteur solution 0·0875. The ordinary wort contains therefore an excess of P_2O_5 over that which has been found to be most favourable to fermentation, hence it follows that it is not advisable to add phosphates for the purpose of accelerating the attenuation of ordinary beer worts.

The President asked if the authors had made any experiments to decide whether the alteration in activity was due to the potassium salts or the phosphoric acid.

Mr. Warington said that in the tables where the authors had stated the phosphoric acid as 0·00 gram the P_2O_5 in the yeast still had to be taken into account, because probably if no P_2O_5 were present no yeast growth or transformation of sugar would take place. It seemed that it was not at all proved that the action was due to the phosphoric acid. It would be interesting to know what would happen if another salt, as potassium sulphate, was substituted for potassium phosphate.

Mr. Salamon said that their object was to ascertain whether it was advisable to add phosphates to the wort or not, and from the experiments it seemed that this question must be answered in the negative.

The Secretary then read a paper—

On the Occurrence of Rhabdophane in the United States. By W. N. Harley.—In the *American Journal of Science*, xxv., 459, Brush and Penfield describe a new mineral from Salisbury, Conn., under the name of scovellite. This mineral agrees in physical properties, etc., with rhabdophane (*Chem. Soc. Journ. Trans.*, xli., 210), and seems to be a variety of that mineral containing erbium and yttrium, associated with lanthanium carbonate. In a subsequent number of the *American Journal of Science*, March, 1884, Brush and Penfield have recognized this identity of scovellite with rhabdophane.

The Society then adjourned to April 17, when a paper on "The Synthesis of Galena," by Emerson Reynolds will be read.

SOCIETY OF ARTS.

Alloys used in Coinage.

The final lecture of the Cantor course on "The Alloys used for Coinage" was delivered by Professor Roberts on the 7th inst., and treated more especially questions connected with the liability to reduction in weight of various coins by wear during circulation, and the different modes in which coins are liable to be criminally tampered with. Abstracts from the laws relating to the tests to which coins should be submitted were read by the lecturer, who showed clearly how the present laws were based upon and nearly equivalent to those of very early date. He then described various methods that have been employed to correct gold coins which are either slightly above or below the standard weight, 123·274 grains if the coin be a sovereign, or 61·637 grains if it be a half-sovereign. The adjustment has been made by means of a hand-file up till quite a recent date, and some ingenious mechanism has been invented for the same purpose, but the disadvantage of any mechanical method is that the marks of the file or other instrument are never entirely obliterated. Chemical aid has been called into request, and amongst other methods the coin has been subjected to the solvent action of *aqua regia*, but this could only be used when the coin was too heavy. Another method of greater efficiency is the immersion of both the light and heavy coins in a solution of potassium cyanide, and the passage of an electric current through the coins; the result, as Professor Roberts showed by experiment, being that a small portion of the alloy is passed from the heavier coin to the lighter, thus bringing them to the same weight. In the course of the evening the lecturer drew attention to an ingenious apparatus used at present in the Royal Mint, by which the coins above or below the remedy of the standard weight are rejected. Professor Roberts did not attempt, however, to give more than an idea of the working of the machine, a working model of which he had present, but referred persons interested to the 'Encyclopædia Britannica' for details. He then remarked upon the illegal tampering with coin and the steps taken to prevent it. The old method of clipping coin had been prevented by laws enacting that no coin should be tendered in which the sculpture or outside ring did not remain whole; but the lecturer considered the best method of preventing clipping was, the lettering or milling of the edge of the coin. An ingenious method, which Professor Roberts jokingly classed as an American industry, consists in splitting the gold coin and removing the middle portion, after which base metal is introduced in place of the gold alloy extracted and the coin again made whole by soldering. Formerly, coins were weighed by the pound and not separately as at present, so that many of the coins though far heavier than they should be were circulated owing to the presence of light coins. A profitable, though illegal employ of culling coin, that is to say extracting the heavier coins, was extensively carried on, and numerous instances were cited of cases concerning this practice appearing before the Star Chamber. The liability to reduction in weight by wear in circulation would be greatly influenced by both the form of the coin and the nature of the alloy. Theoretically a perfect sphere would be the most durable shape for a coin, as combining maximum weight with smallest surface, but this, as well as a short cylinder, would be a very inconvenient shape; the present cylindrical form is therefore used. Further, a coin struck in low relief would present less chance of disfigurement than one of high relief. If coins of pure metal be brought continually into contact with each other they will soon be reduced to the state of mere counters; but the slightest addition of base metal to form an alloy is followed by a marked difference in the durability of the coin. Experimentally it has been proved that there is no appreciable difference in durability between the English and continental standard alloys; the annealing process also greatly contributes to enable the coins to resist wear in circulation. The rate of wear is fairly uniform, the new coins losing nearly the same amount of metal as old coins, the annual loss averaging about 0·043 grain; thus a coin of standard weight will keep in circulation about eighteen years before falling below the remedy allowed by law. These remarks do not apply to bronze coins, which are withdrawn from circulation when defaced. It is remarkable that at the present time only about one-third of the gold and silver coins struck are retained in circulation in this country, the remainder, which formerly formed a much larger proportion, being exported or melted down as bullion. In reference to some experiments which Professor Roberts had himself made, he stated that coins of aluminium resist wear to a singularly high degree, which is further raised by a slight addition of nickel. In concluding he remarked that the Government would take no steps in the improvement of coinage until urged to do so by the people, who at present had no idea of the main features of the question.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, March 27, Mr. H. G. Greenish, Vice-President in the chair.

The first paper read was on "Unofficial Indigenous Materia Medica," by E. J. Eastes.

The paper will be printed in a future number of this Journal.

The paper was illustrated by dried specimens of the plants alluded to, and was followed by a discussion in which the Chairman, Messrs. Dymond, Ince, McDiarmid, and Short took part.

A vote of thanks was passed to Mr. Eastes.

The Secretary (Mr. Dunstan) then made a Report on Organic Chemistry on "Metethaldehyde."

The paper will be printed in a future number of this Journal.

The report was experimentally illustrated and was followed by a discussion in which the Chairman, Messrs. Dymond, Evans and Lowe joined.

A paper was next read by the Secretary—

Note on the Crystallization of Sodium Hydrate.

BY R. A. CRIPPS.

A short time ago I had occasion to prepare a very strong solution of sodium hydrate, and was somewhat surprised to find that after a short time long colourless crystals appeared in the liquid. On examination they proved to be hydrate of sodium. I found by reference to Watts's 'Dictionary' that this result had previously been obtained, but no formula is given for the crystals. To determine this the water of crystallization was estimated by heating the previously dried crystals to fusion, and was found to be 38·01 per cent. The sodium hydrate was also estimated and 62·91 per cent found. These figures agree sufficiently well with the formula $3NaHO, 4H_2O$, which requires 37·5 per cent. of water. The melting point was about 60° C., but the extremely deliquescent nature of the crystals rendered its accurate determination difficult.

The conditions most favourable for the production of the crystals are as follows:—One pound of sodium hydrate in sticks (preferably containing a little sodium chloride) is packed in a cylindrical glass vessel, a tall beaker for instance, of such a size that on adding 7½ ozs. of water the sticks are just covered; the whole is well stirred at intervals during a quarter of an hour, and then another ounce and a half of cold distilled water stirred in, after which the whole is set aside for about an hour and a half, about one third of the soda being still undissolved. At the end of that time the temperature will have fallen to about 40° C., and the crystals will have separated; the liquid is decanted from the crystals, which are allowed to drain and lastly dried *in vacuo* over sulphuric acid. The temperature of the solution should not be allowed to get quite cold, as the whole then becomes pasty and the crystals cannot be separated.

Potassic hydrate treated in the same manner gave no indication of crystallization.

A specimen of the crystals was exhibited.

After some remarks by the Chairman, Secretary and Mr. Ince, a vote of thanks to Mr. Cripps was passed.

Miscellaneous business being announced, Mr. P. L. Huskisson showed some very large crystals of phosphoric acid, about three inches in length, and some crystals of potassio-ferric oxalate which had been produced during the evaporation of an impure solution of neutral potassium oxalate.

Both these specimens have been presented to the Museum of the Pharmaceutical Society.

The meeting then adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the above Association, held on March 26, 1884, Mr. Parkinson (President) in the chair, a paper on "Emulsions" was read by Mr. Joseph Ince.

The author commenced by defining an emulsion as in most cases a mechanical mixture of two substances which are insoluble the one in the other, and the surfaces of which when brought together do not adhere but rather repel each other, and pointed out that in such instances mechanical mixture cannot be readily maintained unless something be added which can establish a sufficient amount of adhesion to overcome the tendency to separation. The author then described the methods by which emulsions are best prepared, there being two distinct directions to be given to trituration in making an emulsion. In a mortar the action is towards the dispenser; on a pill tile or slab, the action is from the dispenser; the first from left to right, the second from right to left; right and left are determined by the position occupied by the mortar or slab as it faces the operator. There are also two distinct mechanical applications to be used; viz., almost total absence of pressure in the case of liquids, and vigorous pressure in the case of solid substances to be reduced into a fine state for forming an emulsion. Slight modifications occur in practice which may be trusted to the good sense of the dispenser, but the main principle holds good. When liquids, limpid or viscous, are to be combined, the very gentlest manipulation should be employed; increase of pressure generates heat, and heat is fatal to union, thus when olive oil, mucilage and water are to be emulsified, while care must be taken to have the three entirely under the control and action of the pestle, at the same time lightness of hand cannot be too carefully studied. The common advice to press vigorously on the bottom of the mortar will be found to be incorrect. On the other hand, when a solid has to be broken down and worked into a pasty saponaceous mass an exactly opposite mode of treatment must be adopted. The object is to produce a kind of soap which can be only extemporaneously manufactured by strong continued muscular action, with evolution of heat to effect the change. Myrrh, ammoniacum and similar substances may be taken as examples which require this treatment. The author then alluded to several emulsions individually, first giving the following as a type of an excellent emulsion:—

℞ Ol. amygdal dulc.		ℨiss.
Mucilag. acaciæ		℥iij.
Syr. simp.		ℨiss.
Aq. dist.	ad	℥iij.

Here the chief points to be observed are absence of acidity from the mucilage, lightness of hand and quickness in manipulation. Mist. ferri co., B.P., was then mentioned, various ways of manipulation being given, the following method being considered the best: beat the myrrh as usual, divide with the sugar, add the potash and make a thick creamy emulsion with just sufficient water, let them stand covered from the air over night and the following morning finish the operation. A few minutes' trituration will restore the whiteness, and such a mistura ferri co. will keep for some years without alteration. Methods for the best ways of emulsifying ammoniacum, assafœtida, guaiacum, etc., as well as ol. terebinth., were all fully described.

In the discussion which followed, the President, Messrs. Flintan, Millhouse, Taylor and others took part.

A vote of thanks to Mr. Ince for his valuable paper terminated a very successful meeting.

Obituary.

PETER SQUIRE, F.L.S.

With profound regret we put on record the death of Mr. Peter Squire, on Sunday last, at his residence, York Gate, Regent's Park.

Mr. Squire was born at Stratton, in Bedfordshire, in 1798, and therefore at the time of his death he was in in his eighty-sixth year. At the age of fourteen he was apprenticed to a chemist and druggist at Peterborough, and like many other apprentices of those days seems to have had an experience which, however conducive to a mastery of the minutest details of the business, was scarcely so favourable to the comfort of the apprentice. Notwithstanding the disadvantages of long hours,—seven a.m. to eleven p.m.,—the lad, having a love for botany, gave life to his studies of a folio edition of Sir John Hill's 'Herbal,' by the examination of flowers collected in early morning rambles in the fields. In this way he laid the foundation of the sound knowledge of botany which in after years was to be so useful in his business and in the examination room. Shortly after the termination of his apprenticeship he came to London and entered the house of Wilson, Minshull and Co., Snow Hill, where he became the head of the "wet" department and supervisor of the laboratory. Three years afterwards he took charge of the "dry" department in the house of Hodgkinson, Brandram and Stead, Thames Street. From thence he went to Oxford Street to live with Mr. Alexander Garden, the partner of Frederick Accum. There he spent eight years, during a portion of which he enjoyed a share in the business, and at this time his attention seems to have especially turned to the study of chemistry, the lectures which Brande and Faraday delivered at that time at the Royal Institution to the pupils of St. George's Hospital at eight and nine in the morning being attended. The partnership with Mr. Garden having expired, and the position being taken by that gentleman's own son, Mr. Squire paid a visit to Paris, where through an introduction by M. Bertin, the physician to Prince Polignac, then French Ambassador in London, he acquired the privilege of attending the pharmacy of M. Beral in the Rue de la Paix, and thus acquired an insight into the way the business was carried on in France.

Having thus acquired experience from various sources, Mr. Squire, about the year 1831, bought the business in Oxford Street, with which he remained associated for upwards of half a century, from a Mr. Scott, who had carried on a dispensing business there for forty years previously. Mr. Squire now turned his attention to the improvement of medicinal extracts. At that time scarcely one of them could be distinguished from another either by colour or odour. It was impossible for Mr. Squire to prosecute any researches during the day, as he was occupied from seven a.m. to eleven p.m. He accordingly resolved to enter upon a series of experiments after supper and when others had retired to their beds he descended into the laboratory where he remained until one, two, three, and sometimes even four o'clock, as the various experiments might render it necessary, for he never felt exhausted.

The result of these experiments was that these important preparations for the first time appeared with their proper physical characters apparent by the peculiar colour and odour of the plant from which they were derived. The dried leaves and the tinctures made from them next received his attention, and acting under the belief that as the leaves of plants during the process of drying must necessarily be chemically acted upon by the air, the juices expressed from them, preserved by only just enough spirit to keep them from change, might prove superior to tinctures, he, in 1835, made some such preparations of conium, belladonna, digitalis, hyoscyamus, and other plants, and had them tried by his medical friends. He was soon persuaded of their advantage. The digitalis preparation was much employed by one practitioner, who declared that he could bring down the pulse far lower by the preserved juice without producing nausea than he could by the tincture.

These researches of Mr. Squire brought him under the notice of many eminent medical men. Amongst these was Sir James Clark, then Dr. Clark, who was no mean judge of pharmaceutical preparations. He made many visits *incognito*, examined the several tinctures and other preparations with apparent interest, and frequently spent half an hour in conversing upon medicine. Dr. Clark kept his *incognito* until he was satisfied by every inquiry, and then, sending for Mr. Squire, said, "You will recollect our frequent conversations. I have made the inquiries about your general character, and I wish you now to sit down and give me an account of yourself, where you were educated, and what progress you made at school; where apprenticed, and by what means you have acquired the knowledge that you evidently possess of your business." This being answered, he handed Mr. Squire a prescription for H.R.H. the Princess Victoria. His appointment as chemist to the princess followed immediately after (1836), and when the medical staff of the Queen was published in the *Royal Gazette*, immediately after Her Majesty's accession in 1837, the name of Peter Squire appeared as Chemist in Ordinary on the establishment. When he retired from this post in 1877 he had completed his fortieth year of service.

In 1841 Mr. Squire commenced the long series of services rendered by him to the Pharmaceutical Society of Great Britain, he having been a member of the Committee to which the meeting at the Crown and Anchor entrusted the task of drawing up a constitution and framing bye-laws. This Committee carried on the business of the Society until the election of the first Council in 1842, among the members of which Mr. Squire was included. He took an active part in the organization of the Board of Examiners, and for twenty-seven years he occupied a seat upon it. When he retired from the Board in 1869 he was presented with an address, signed by every member of it, couched in the following terms:—

"The Board of Examiners desire to place on record their high appreciation of the valuable services rendered by their esteemed colleague Mr. Peter Squire in organizing and so ably carrying forward the important work of examination from the very first meeting of the Board in July, 1842, to the present time," etc.,—Dated June 11, 1869.

In 1849 Mr. Squire was elected President of the Pharmaceutical Society; and after an interval of twelve years he was again elected in two successive years. His exertions about this time, with others, to secure the exemption of pharmaceutical chemists from jury service cost him a severe illness. Mr. Squire continued a member of the Council until 1870. During his active connection with the Society he contributed a number of important papers to the evening meetings.

When the news arrived of painless operations being performed in America under the influence of ether, Mr. Squire constructed the apparatus by which the first capital operation was performed by Mr. Liston at the University College Hospital, which apparatus is now in the museum of that hospital. Mr. Squire assisted Dr. Stevens in his investigations on human blood, and he likewise assisted Dr. Marshall Hall in his experiments on the subject of the resuscitation of the apparently drowned (the so-called ready method).

Mr. Squire was a founder of the College of Chemistry, which formerly occupied the premises now used by the Medical Council. He was also one of the founders of the Royal Botanic Gardens in the Regent's Park, and a fellow of the Linnæan Society.

With regard to the works written by Mr. Squire the first to mention is 'The Three Pharmacopœias Compared' (1851). This work contained the entire contents of the London, Edinburgh and Dublin Pharmacopœias set side by side in three columns (Royal 8vo) in order to show the alarming differences in strength of preparations bearing the same name, and the danger of a prescription written in London being made up in Dublin, say twelve hours afterwards. Such a prescription might, in the case of acetum colchici for example, have three times the power the prescriber intended. A risk of this kind in days of railway travelling was considered a great evil and almost the first act of the Medical Council was to resolve upon having a National Pharmacopœia which should supersede those of London, Edinburgh and Dublin.

A committee for this purpose was appointed, and the Pharmaceutical Society was requested to send its delegate to be a member of the Committee, and Mr. Squire was chosen. Dr. Farre, Dr. Garrod and himself were to represent the London section of the Committee. Dr. Apjohn, Dr. Neligan and Dr. Aquilla Smith represented Dublin; and Dr. Christison, Dr. Maclagan and Dr. A. Wood represented Edinburgh. This Pharmacopœia was published in London in 1864.

Mr. Squire, believing that an International Pharmacopœia might some day be brought about, published what he called 'The Companion to the British Pharmacopœia' and in this he compared the formulæ of the British with similar preparations found in the Austrian, Belgian, French, Prussian and United States Pharmacopœias and also with the former Pharmacopœias of London, Edinburgh and Dublin.

The success of this book induced Mr. Squire to apply the same idea to the Pharmacopœias of the principal hospitals of London. He accordingly collected and published these, classifying their formulæ for ready comparison. This book was published under the title of 'The Pharmacopœias of the London Hospitals.'

As an instance of the activity of mind which Mr. Squire retained up to the very end of his long life, it may be mentioned that a few months before his death he was engaged in studying the best method of preserving the freshwater medusæ found in the "Victoria Regia tank" at the Botanical Gardens, and communicated the result of his investigations in a paper which was read (July 9, 1883) before the Royal Microscopical Society.

We understand that the primary cause of Mr. Squire's death was congestion of the lungs, resulting in exhaustion. The funeral will take place in Kensal Green Cemetery, on Saturday, the 12th inst., at two o'clock.

ANSWERS TO CORRESPONDENTS.

J. Strachan.—We should think the stronger the better.

An Apprentice.—The name is apparently a fancy one, and is probably not intended to favour the identification. If you will send a portion of the "root," we will try and find out something as to its origin.

Antiseptic.—We do not know the preparation. An analysis would furnish you with the information you require.

Pharmacist.—Although agreeing with much that is contained in your letter, we are not prepared, in face of the fact that a similar experiment to that suggested by you has been already tried in this country and failed, to undertake to recommend its repetition at present. At any rate it would be prudent to wait and see the result of the effort now being made on the other side of the Atlantic.

A Correspondent from Dufftown.—The growth consists of *Merulius lachrymans* and *Lentinus lepideus.*

"*Amicus.*"—Put half the yolk of one egg with the acetic acid and turpentine into a 6-oz. bottle; shake well at intervals three or four times.

Correspondence.

THE NEW PREMISES IN EDINBURGH.

Sir,—In reading over the report of the meeting of Council in the Journal of the 5th inst., I was very pleased to find the unanimity prevailing regarding the purchase of premises for the North British Branch in Edinburgh. The rooms at present are very good, but I feel sure that the Scotch members will be delighted to hear that scientific pharmacy is about to obtain "a habitation and a name" in the Scotch metropolis.

I do hope the membership will increase, and would suggest that a special donation might be asked from members of the trade in Scotland to defray part of the expense in fitting up the new premises.

What could be more delightful or profitable for country members than a stroll through the Pharmaceutical Society's premises when in Edinburgh? I hope some demonstration will take place at the opening and give the new premises a start.

ST. RULE.

THE POSITION OF PHARMACY.

Sir,—Mr. Hart tries to be witty at my expense. Well, I hope it pleases him, for it does not hurt me, and if he is happy I am content.

However, I am not going to descend to personalities either with him or any one else over this matter.

I entirely deny that there is any inconsistency between my first letter and any of the subsequent ones; what I wrote then I still maintain, and no one has yet attempted to dispute my statements or to deny their truth; whilst everybody who has written on the subject cries out against the Council with some pet grievance of his own, but leaves my allegations entirely unanswered.

I hope I am not so blinded by prejudice as not to see how much both pharmacists and non-pharmacists owe to the Society, nor so devoid of justice as to be unwilling to acknowledge it, and if I am in consequence to be charged with vacillation and inconsistency, I am well content to bear the imputation.

Cheetham Hill, Manchester. W. WILKINSON.

Sir,—The other evening, during the hour that intervenes between business and bed, I had been reading the correspondence which Messrs. Wilkinson and Co. have recently carried on in your columns, until wearied at last with the shop and all its belongings I laid down my Journal and took my Tennyson from his shelf. Instinctively I turned to that delicious picture of the lotus eaters, delicious indeed to a poor toiling druggist! and endeavoured to lap myself in its fancied Elysium. But your correspondents' baleful influence was strong upon me and would not be shaken off. The terrible pharmaceutical suggestions of the verse—

"And from the craggy ledge the poppy hangs in sleep"

completed the mischief, and from that point onwards Tennyson and Wilkinson, lotus land and the dispensing department, became inextricably mixed in my consciousness. I could not even recover myself to take in the loveliness of—

"The crisping ripples on the beach,
And tender curving lines of creamy spray."

But gradually I became more and more involved in confusions and uncertainties, until at length the words danced like demons over the page in the most fantastic combinations, and I read—or seemed to read—some such cross-bred doggerel as this—

"Let us swear an oath and keep it; let the Council find
We'll keep up no Society (whate'er the cause assigned)
While they live like gods together, careless of their kind.
For they sit and talk in London, and their napkins are unfurled
At their pharmaceutic banquets, and their lips are lightly curl'd,
Naturally, at us 'poor devils' in this lower world.
While they smile in secret, looking over wasted lands,
Stores and groceries, joint-stock companies, borough analysts' demands,
Doctors' raids, unscheduled patents, closing shops, and praying hands.
For they smile, they find a music, centred in a doleful song,
Steaming up, a lamentation, and an ancient tale of wrong;
Like a tale of little meaning, though the words are strong;
Chanted from an ill-used race of men who vilely toil,
Pass exams., yet unprotected after mickle moil
Spend fourteen hours a day 'dispensing' horse-balls, paints, and oil,
Till they smash, and so they're done for—some, 'tis whispered, bolt as well,
Others as assistants languish, and a few, oh! strange to tell,
Get a ten-pound note per annum from the Fund they helped to swell.
Surely 'tis a bitter ending, after all that went before,
Pounding pills, and spreading blisters, and 'the bums' when all is o'er;
Then, hark ye, brother pharmacists, let us subscribe no more!"

Here, sir, the climax of the absurdity (for which, believe me, your correspondence columns are alone to blame) awoke me; and I hastened to write out a cheque for a guinea in favour of Mr. Bremridge for fear I should longer forget that my annual subscription was overdue.

C. C. BELL.

THE ANTIPODES.

Sir,—Can any reader of the Journal furnish information as to the prospects of pharmacists at the antipodes? In view of the fact that the increase in the number of chemists on the register is out of all proportion to the increase of population, and with the "stores" spectre turning our dreams of success in business into dismal nightmares of anticipated failure, it appears to me that some of us, who are young and strong, cannot do better than take Lord Derby's advice, and, for the sake of our fellows as well as for our own sakes, try to find employment for our brains and muscles in another country. Two of us (both qualified, and with small capital), intend going to Australia or New Zealand in the autumn. But 12,000 miles is a long way to go "on spec." Perhaps some reader of the journal can tell us whether there is plenty of business to be done, and whether the remuneration is good. Is trade so very different to that in this country? Would it be better to take situations as assistants, or start at once on our own account?

Believing, Sir, that replies to these questions will be read with much interest by very many assistants, I ask with confidence that you will allow them to be inserted.

INQUIRENS.

EUCALYPTUS OIL.

Sir,—In a recent issue of the Journal I noticed a paragraph under "The Month" in which it is stated that eucalyptus oil of the kind that has been in the market for some years is obtained from *Eucalyptus globulus*; this is an error, and one that I have endeavoured to get the wholesale trade at all events to give up.

Eucalyptus oil was first distilled by Dr. Bosisto, of Melbourne, some twenty years ago, from the *Eucalyptus amygdalina*, which is as distinct from *E. Globulus* as *M. Piperita* is from *M. sativa*, and is an entirely different oil from that obtained from the *E. Globulus*.

The success which Dr. Bosisto's oil has met with has induced people, having no knowledge of the different kinds of *Eucalyptus*, or gum-trees as they are called in Australia, to distil any oil from the leaves gathered indiscriminately from one or any of the forty or more *Eucalypti* growing in the Australia bush, and consequently have obtained an oil totally different from Dr. Bosisto's.

Some two years ago Dr. Bosisto distilled an oil from *E. dumosa*, or, as it is known in Australia, the mallee scrub. This oil differs slightly from the *amygdalina* in perfume, but Dr. Bosisto is of opinion that medicinally its properties are the same.

The *E. Globulus* is the tree that has a great power of absorbing moisture from the earth and passing it off by its leaves into the air, and has hence been largely planted in malarial districts. The introduction of this tree into Europe (at Rome, etc.) has doubtless been the source of the constant confusion as to the origin of Dr. Bosisto's well-known oil.

82, *Bishopsgate Street, E.C.* E. H. GRIMWADE.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Schacht, Moore, Howe, Jumbo, Assistant.

METACETALDEHYDE.*

(METALDEHYDE.)

BY WYNDHAM R. DUNSTAN,

Assistant Lecturer in Chemistry and Physics to the Pharmaceutical Society and Demonstrator of Practical Chemistry in the School of Pharmacy.

My attention was recently directed by the excellent Curator of the Pharmaceutical Society's Museum, Mr. Holmes, to some crystals which had been found in a bottle of acetaldehyde. They had been presented to the Museum by Messrs. Morson, and were supposed to be aldehyde-ammonia. The white opaque crystals, which formed fairly well-defined quadratic prisms, were quite permanent in the air and had no odour; they were easily powdered, and the powder at first emitted an odour which somewhat recalled peppermint, but after being exposed to the air for some hours was quite odourless. When heated the crystals sublimed near 100° C. without previously melting, forming a flock-like network of needle-shaped crystals, the condensation of the vapour taking place but a very short space above the source of heat; in fact, when a crystal is heated on platinum foil it burns with a non-luminous flame, and if the foil be quickly withdrawn from the source of heat, and the flame blown out, the vapour at once condenses upon the remaining portion of the crystal, forming a beautiful coating of silky needles. The crystals were insoluble in cold and hot water, and also in cold alcohol. Boiling alcohol dissolved them, and on cooling the solution, fine needle-shaped crystals were deposited. The crystals were also soluble in boiling ether and chloroform. Sulphuric, nitric and hydrochloric acids had no effect upon the substance in the cold. Warm sulphuric acid dissolved the substance, at the same time evolving a vapour smelling like acetaldehyde. Warm nitric acid powerfully oxidized the body with copious evolution of nitrous fumes; acetic acid was found in the resulting liquid. Hot hydrochloric acid also dissolved the crystals. The crystals contained no nitrogen. The combustion of the body with lead chromate yielded the following results:—

	Found. I.	Found. II.		Calculated for C_2H_4O.
C. .	53·4	54·3	C. .	54·54
H. .	9·3	10·0	H. .	9·09
O. .	37·3	35·7	O. .	36·37
	100·0	100·0		100·00

These figures, taken in conjunction with the physical and chemical properties that have been described, indicated that the crystals were *metacetaldehyde*† $(C_2H_4O)_n$, the solid polymer of ordinary aldehyde and the congener of paracetaldehyde, which has so lately been introduced into medicine as a hypnotic. When metacetaldehyde is heated it partially dissociates into acetaldehyde, and for this reason it has not been possible to determine its molecular weight and hence its two-volume formula is unknown. Judging from physical properties the molecular weight is probably higher than that of paracetaldehyde $(C_6H_{12}O_3)$.

In addition to the reactions already mentioned, the following have been observed, and, as far as I am aware, have not been noticed by previous experimenters—Liebig, Fehling, Weidenbusch, Kekulé and Zincke, Pinner and Krämer. Metacetaldehyde in alcoholic solution does not reduce an ammoniacal solution of silver nitrate and is thus distinguished from acetaldehyde.

Metacetaldehyde is very slowly acted upon by a hot strong solution of potash, yielding "aldehyde resin." When a mere trace of metacetaldehyde is brought in contact with phenol dissolved in excess of sulphuric acid (phenol sulphonic acid) a fine scarlet colour is produced, which changes to a dark red when the mixture is warmed. The reaction is extremely delicate and is also given by acetaldehyde. Many other aldehydes (benzoic, cinnamic, cumic, formic, etc.) give this reaction with phenol sulphonic acid in a more or less marked degree. Oil of cinnamon (cinnamic aldehyde), in very minute quantity, gives a deep scarlet colour, which changes through deep red and violet to a greenish blue. When the crystals of metacetaldehyde are heated in a sealed tube to 130° C. for a few hours a liquid is formed which mainly consists of acetaldehyde. Metacetaldehyde is dissolved by boiling paracetaldehyde and to less extent by boiling acetaldehyde. When these solutions are cooled the metacetaldehyde is deposited in needles. Hot hydrochloric acid is capable of dissolving a large quantity of metacetaldehyde which is thereby depolymerized and converted into acetaldehyde. When the acid liquid is diluted with water and neutralized, it gives the reactions of acetaldehyde with great distinctness. This is the readiest method of depolymerizing metacetaldehyde.

I have prepared metacetaldehyde by the action of sulphurous acid upon acetaldehyde at 0° C., and have found that the crystalline body thus obtained agrees in its properties with the crystals now under consideration. The formation of these crystals in the bottle of aldehyde was in all probability induced by the use of calcium chloride for dehydrating the original aldehyde. This substance is known to exert a polymerizing action upon acetaldehyde; in fact, when a piece of calcium chloride is placed in acetaldehyde it becomes covered with crystals of metacetaldehyde. When metacetaldehyde is slowly deposited at normal temperatures from a solution in ordinary aldehyde (acetaldehyde) it appears to form quadratic prisms, but when produced by the action of sulphuric acid at 0° C. it is deposited in needles. It has already been noticed that the quadratic prisms are resolved into needles when sublimed, or when dissolved in boiling alcohol and the solution cooled.

The physiological action of metacetaldehyde has not yet been studied. It would, however, seem worth while to investigate it, for the substance can easily be obtained in a state of great purity, and has no unpleasant taste; in fact, is practically tasteless. If it should be found to have a powerful hypnotic action metacetaldehyde will probably supersede both chloral and paracetaldehyde in medical practice. I found that no hypnotic effect ensued from the administration of about seven grains of the substance, but intense salivation was produced.

My best thanks are due to Mr. Walter H. Ince for his assistance, especially in preparing some of the experiments to illustrate this report.

* Report upon Organic Chemistry. Read at a Meeting of the School of Pharmacy Students' Association, March 27, 1884.

† The polymers of acetaldehyde are commonly termed paraldehyde and metaldehyde, but as aldehydes other than acetaldehyde yield similar compounds, these bodies are more appropriately termed paracetaldehyde and metacetaldehyde, indicating their formation from acetic aldehyde or acetaldehyde.

THE MATERIA MEDICA OF THE NEW PHARMACOPÉE FRANÇAISE.

(*Continued from page* 758.)

C.

The following are now omitted:—Caïlcedra bark (*Khaya senegalensis*); Caïnca root (*Chiococca anguifuga*, Mart.); *Anthemis Cotula*, *Camphorosma monspeliaca*, L.; Cassia flowers and oil of cassia; the barks of *Cinnamomum Culilawan* and *Dicypellium caryophyllatum*; Safflower flowers and fruit; *Nepeta Cataria*, L.; Citron fruit and oil; Greater Centaury (*Centaurea Centaurium*, L.); Sweet Chervil; Greater Celandine; Woodlice; the root of *Cyclamen europæum*, and Cypress cones (*Cupressus sempervirens*, L.). The synonym for Capsicum, "Corail des Jardins," is also omitted as a cross reference.

Alterations have been made in the following instances:—

Cachou de Pegu or Caschutie.—The official catechu is now limited to the extract of *Acacia Catechu*, W., and *A. Suma*, Kurz.

Cade, Huile de.—The botanical source is still given as *Juniperus Oxycedrus*, L., although, according to the authors of 'Pharmacographia,' there is no proof that it is now yielded by that species, the crystals found in the tar obtained from that plant, being absent in the commercial article.

Cajeput.—*Melaleuca Leucadendron*, L., is now adopted as the botanical name, instead of *M. minor*.

Camphre du Japon is now removed to the second class of chemical preparations, probably because the drug is always used in the refined, and not in the crude state.

Caoutchouc is now described as being obtained from *Castilloa elastica*, Cerv., *Hevea guayensis*, *H. Spruceana*, *H. brasiliensis*, some species of *Moraceæ*, and American or African Apocynaceous species, belonging to the genera *Hancornia* and *Vahea*.

Capillaire.—The directions for distinguishing between the Capillaire du Canada (*Adiantum pedatum*, L.) and Capillaire du Montpellier (*A. Capillus-Veneris*, L., are now omitted.

Cevadille.—The seed as well as the fruit are now official. *Schœnocaulon officinale*, A. Gray, is adopted as the botanical name of the plant.

Chene.—The bark of *Quercus Ilex*, L., is now official, as well as that of *Q. pedunculata*.

Cochenille.—The word "femelle" is omitted.

Colchique.—Colchicum corm was described in the last edition as a "tubercule bulbiforme;" now it is described as a "bulbe," a term not usually applied to colchicum in this country.

Colombo.—*Chasmanthera palmata*, H. Bn., is now adopted as the botanical name for the plant, but *Jateorhiza palmata*, Miers, is given as a synonym.

Colophone or Arcanson.—This is not now limited to the resin obtained from *Pinus maritima*, but is described as the product of different species of Coniferæ.

Concombre sauvage.—*Ecbalium Elaterium*, A. Rich., is given as the name of the plant, and *Momordica Elaterium*, L., as a synonym.

Copahu.—*Copaifera coriacea*, Mart., is added to the species mentioned in the last edition as yielding the drug.

Courge potiron.—The seeds are now only to be obtained from *Cucurbita maxima*, Duch.

Cousso.—*Hagenia abyssinica*, Lam., is now adopted as the botanical name, and Bruce's name, *Banksia abyssinica*, dropped.

Curari.—The poison is now said to be principally obtained from *S. Castelnœana*, Wedd., the production of the region of the Upper Amazon. (See *Pharmaceutical Journal*, [3], xi., p. 492.)

Curcuma long et rond.—*C. longa*, L., is now given as the botanical name, in place of *C. tinctoria*, Guib.

The drugs marked with an asterisk under "C." are Catechu, Roman Camomile, *Canne de Provence* rhizome, (*Arundo donax*, L.), Cinnamon, Cantharides, Canadian Maidenhair, Malabar Cardamoms, Carragheen, Cassia fistula, Hartshorn, Castoreum, lesser Centaury (*Erythræa Centaurium*, L.), *Chardon bénit* (*Centaurea benedicta*, L.), Chicory root, Hemlock, Wax, Calumba, Colophony, Colocynth, *Consoude grande* (*Symphytum officinale*, L.), Copaiba, *Coquelicot* (*Papaver Rhœas*, L.), Coriander, Cousso, Croton seeds, Cubebs and Cummin.

D.

The only alterations under "D." are the introduction of dita bark and directions under digitalis for distinguishing it from the leaf of *Inula Conyza*. The tests given are that the lateral veins are at an oblique angle to the midrib in *Digitalis*, and that the infusion treated with ammonia does not give the green coloration characteristic of the infusion of *Inula Conyza*.

E.

The following are now omitted:—*Veratrum album*, Estragon (*Artemisia Dracunculus*, L.), *Euphrasia officinalis*, L. *Helleborus niger* and *H. viridis*, are now placed under "H," as *Hellebore blanc* and *Hellebore noir*.

Elemi.—Other varieties of Elemi beside the Brazilian are now admitted in the following terms:—"Résine extraite de diverses espèces de Burseracées d'Amérique et de Manille, principalement (?) du *Canarium commune*, L." This sentence, to say the least, is very ambiguous, and the last four words might well have been omitted.

Encens, Oliban, is now mentioned under the first of these names, and is correctly attributed to *Boswellia Carterii* and *B. Bhau-dajiana*, Birdw., although both the specific names are printed incorrectly.

Eponge fine.—*Spongia usitatissima* as well as *S. officinalis* is now given as a source of sponge.

Erysimum, Vélar, Tortelle, Herbe aux chantres (*Sisymbrium officinale*, DC.), is now given under the first instead of the second name. Here, again, a printers' error has not been corrected in "Sysimbrium."

Escargot or Limacon des Vignes.—The remark that *Helix aspersa* and *H. vermiculata* are used in the south is now omitted.

Euphorbe (Gomme resine d') is now referred to *Euphorbia resinifera*, Berg.

The only addition under "E" is the *Eucalyptus globulus*, Lab., of which the leaves only are official.

F.

The only alterations under this head are the addition of potato starch, and the change of the name of *Ignatia amara* to *Strychnos Ignatii*, Benth., and that of the ash tree from Frêne élevé to Frêne.

G.

The articles omitted are Chinese galls, Gambier, Genêt purgatif (*Genista purgans*, L., and *G. tinctoria*, L.), Ginseng and Grenouille (*Rana esculenta*, L.). Gélatine animale has been removed to the Pharmacie Chimique division, and Graisse de porc to Pharmacie Galénique, where it may be found under the name of Axonge.

GALANGA OFFICINAL; GALANGA DE LA CHINE, PETIT ET MOYEN.—This rhizome is now rightly referred to *Alpinia officinarum*, Hance.

GALBANUM.—This is now stated to be probably the product of *Ferula galbaniflua*, Boiss. et Buhse, and *F. rubricaulis*, Boiss. The distinction of the drug as a dry and a soft galbanum is no longer made, nor is any description of its appearance given. This, however, is perhaps of little importance, as a process for its purification is given in the section devoted to Pharmacie Galenique, and a uniform consistence can therefore be obtained.

GALIPOT.—*Pinus Pinaster*, Sol., is the name now adopted in preference to that of *Pinus maritima*.

GALLE DE CHENE D'ALEP OU NOIX DE GALLE D'ALEP.—The oak yielding these galls is now made a variety; thus, *Quercus lusitanica*, Webb., var. *infectoria*.

GAYAC.—Guaiacum is now referred to *G. sanctum*, L., as well as *G. officinale*, L.

GOMME ADRAGANTE.—Tragacanth is now described as being derived from various species ot *Astragalus*.

GOMME AMMONIAQUE.—*Peucedanum Ammoniacum*, R. Br., is given as a synonym of *Dorema ammoniacum*.

GOMME ARABIQUE VRAIE.—Is described as being friable and soluble in water. It is now referred to *Acacia Senegal*, W., and *Acacia Arabica*, W. Both of these species yield a gum, however, which can hardly be said to be friable, being usually hard and clear internally.

GOMME GOUTTE.—This is now correctly referred to *Garcinia Hanburii*, Hook.

GOMME DU SÉNÉGAL.—This is stated to give a viscous solution and to be obtained from several species of acacia, chiefly *A. Senegal*, W., *A. Seyal*, Del., and *A. Arabica*, W.

GRENADIER.—The remarks in the last edition under this drug are now omitted.

GUTTA PERCHA.—This is now attributed to *Dichopsis Gutta*, Thw., *Sapota Mulleri*, and other trees of the Sapotaceous family. The product of the last-named tree is known in commerce as Chicle gum. Dr. Beauvisage has recently shown that some of the gutta percha of commerce is produced by *Dichopsis Krautziana*, a name which might well have replaced that of *S. Mulleri*.

The only addition under "G" is Gland doux, the sweet acorn of *Quercus Ballota*, L.

H.

HOUX COMMUN (*Ilex aquifolium*), Huile de palme, and Huitre commune, L., are now omitted, and the only addition is *Hydrocotyle Asiatica*.

HYSSOPE is now referred to *Hyssopus officinalis*.

I.

INDIGO and the rhizome of *Iris fœtidissima*, L., are omitted. Ipecacuanha and iris root are marked with an asterisk.

ICTHOCOLLE OU COLLE DE POISSON.—*Acipenser ruthenus* and *A. vulgaris* are now given in addition to *A. Huso* as sources of isinglass, and all mention of E. Indian and S. American isinglass is omitted.

IRIS DE FLORENCE.—*Iris germanica* and *I. pallida* and "other species" are now mentioned as sources of orris root.

Peucedanum Ostruthium, Koch., is the name now accepted for *Imperatoire*, and *Uragoga Ipecacuanha*, H. Bn., is mentioned as a synonym for *Cephaëlis Ipecacuanha*.

J.

JACÉE DES PRÉS (*Centaurea Jacea*, L.) and JOUBARBE DES TOITS (*Sempervivum tectorum*, L.) are now omitted and Jaborandi has been added.

JALAP and *Hyoscyamus niger* are marked with an asterisk.

JABORANDI.—The leaves of *Pilocarpus pennatifolius*, Lem., and *P. Selloanus*, Eng., and allied species are official. As the leaves of *P. Selloanus* have been stated to contain less alkaloid than those of *P. pennatifolius*, and there exists no definite information of the strength of "allied species," the preparations (extrait, tisane, teinture, etc.) made from the drug are likely to vary considerably in strength.

JUSQUIAME.—The remark that the only henbane seed now to be found in commerce is that of *Hyoscyamus albus* is omitted.

K.

KERMÈS ANIMAL is omitted.

L.

LADANUM, LEQUE LIERRE COMMUN (Ivy) and the fruit and oils of Limes Lupin (*L. albus*) are omitted.

LACTUCARIUM is now acknowledged as being derived from several species, *L. virosa*, L., *L. sativa*, L., *L. Scariola*, L.

LAURIER-CERISE is now referred to *Prunus Laurocerasus*, DC.

M.

The following articles are omitted:—Malabathrum, Mandragore, Maniguette or graine de paradis, Marronier de l'Inde, Mélèze, Melisse de Moldavie (*Dracocephalum Moldavicum*, L.), Méum and Myrobalan citrin.

Those marked with an asterisk are Manne, Mauve (*Malva sylvestris*, L.), Melilot officinal, Melisse officinale, Menthe poivrée, Menyanthe, Mercuriale annuelle, Miel, Morelle (*Solanum nigrum*, L.), Mousse de Corse (*Alsidium Helminthocorton*, Kutz), Moutarde noir, Musc and Myrrhe.

The following alterations have been made:—

MARJOLAINE.—*O. majoranoides*, Willd., is no longer official, but only *O. Majorana*, L.

MAUVE.—*Malva glabra*, Desr., is now omitted, and *M. sylvestris*, L., is alone official under this name.

MAUVE PETITE.—This is now the official name for *Malva rotundifolia*, L., instead of Mauve à feuilles rondes, as in the last edition.

MENTHE VERTE.—*Mentha viridis* apparently replaces *M. crispa*, L., which is now omitted.

MOUSSE DE CORSE.—This is now referred to *Alsidium* (*Gigartina*) *Helminthocorton*, Lam.

MOUTARDE NOIR.—This is now referred to *Brassica nigra*, L., while Moutarde blanche is still referred to the genus *Sinapis*, and *S. nigra*, L., given as a synonym.

MUGUET.—The entire plant as well as the flower of the lily of the valley is now official.

MURE is now the official name for Mulberry, instead of Murier noir.

MYRRHE.—This is described as a gum resin exuding from different species of *Balsamodendron*, especially from *B. opobalsamum*, Kth. This is not correct, *B. opobalsamum* yields Balm of Gilead, as stated in the last edition of the work. See also *Pharm. Journ.*, [3], vol. ix., p. 893.

(*To be continued.*)

UNOFFICIAL INDIGENOUS MEDICINAL PLANTS.*

BY E. J. EASTES.

The object of this paper is not to describe some of those plants which, although excluded from our Pharmacopœias, are yet commonly employed by our regular practitioners, but it is intended to give a brief sketch of the more important of those plants which may be called domestic remedies, being such as are still in common use in country districts, and are still sold in towns and cities by herbalists, and medico-botanists, *i.e.*, dealers in and prescribers of both British and American herbs.

It is a fact that these common herbs have a great reputation with many people as being the best remedies for numerous ailments, and as a consequence the demand for them is also great, and the public must go to shops of some description to obtain them. As is well known not one chemist in a hundred keeps in stock such articles as comfrey, burdock, buckbean, yarrow, tansy, etc., therefore the people who use them must go to the herbalist for them. It seems to me that chemists, by so completely ignoring this branch of materia medica, are, in country districts at least, deliberately turning away many scores of customers, and that at a time when there is a universal cry about trade going down, and profits being cut excessively fine. For these things would bring a profit of at least fifty per cent., and customers once obtained would be almost certain to come again to the same shop. Looking at it from a higher standpoint also, many of these plants possess considerable activity, such as bryony, tansy, and purging flax, and although probably very useful if taken in proper quantities, in some cases an overdose might, and no doubt frequently does, produce unlooked-for and perhaps dangerous results. Therefore, who so proper to deal with them as the registered chemist, who has been examined in the very branches of science which bear upon the recognition, properties, and appearances of drugs; and who is expected to be able to manifest in his examination a knowledge of our indigenous medicinal plants.

If any of the members of this Association should ever be located in a country pharmacy, they will in all probability be asked for these articles. Certainly in a French pharmacy they would be expected to be familiar with their appearance and properties, a large number being included in the present French Codex.

I thought, therefore, that perhaps it might be interesting to show specimens and give brief descriptions of a few of the more important of them. For certainly this branch of our business seems to be worth the trouble of cultivating.

The specimens on the table were obtained from a genuine herbalist's shop not a hundred miles from Bloomsbury Square, and may, I think, be taken as fair samples of the drugs as usually sold. It was suggested to me by Professor Bentley that it would be interesting also to try and find out if these herbalists sold any of the more active poisonous drugs, such as henbane, savin, foxglove, lobelia, which might be used for unlawful purposes. But on asking for such articles the proprietor of the shop was most careful in assuring me he never sold anything that was at all poisonous. But I think his statements must be received with caution, for I noticed in a corner a bill stating that stramonium was sold for smoking at 3*d*. per ounce. On asking also for henbane seeds he told me he had none, although he did occasionally keep them, but never at any time sold them except in very small quantities, certainly not enough to do anyone any harm. He evidently rather mistrusted me, for a couple of days later I sent a friend to the same shop, who readily obtained some with the following directions for their use as a remedy for toothache:—To place some on a hot shovel, that a white smoke would arise, over which the patient was to hold his open mouth. The package was labelled, "Henbane seed, poison."

Of the following plants described, the medical and economic purposes for which they are at present employed are given on the authority of Sowerby's 'British Botany,' and Barton and Castle's 'British Flora Medica.'

Linum Catharticum, purging flax, mill mountain.—First mentioned by Thalius in the 16th century. Whole plant used. Inodorous. Taste very bitter. Active principle probably a bitter extractive. By the concurrent testimony of nearly all the old writers this plant is a safe and effectual cathartic. The infusion is said to be more purgative than senna. But its action at times is somewhat uncertain. It is commonly used in Wales and Scotland. It is even now retained in some Pharmacopœias.

In some parts of the country it is boiled in ale and the decoction given for rheumatism. The usual dose is 1 drachm of the dried plant, or a handful of the fresh herb infused in water or whey.

Gerard relates how he came to be acquainted with the plant while in company with Dr. Lake, afterwards Bishop of Bath and Wells, and "who always used this herbe for his purge after the said manner as his man affirmed; putting a handful of Mil Mountain into a small tunne or pipkin of a pinte, filled with white wine, and setting it on the embers to infuse all night, then drinking the wine in the morning, fasting."

Agrimonia Eupatoria.—In Barton and Castle's 'British Flora Medica' the specific name is said to be derived from the Greek "hepar," the liver, from its value in diseases of that organ, but this derivation seems far from satisfactory. Also called "philanthropos," on account of its beneficent and valuable properties. It is official in the French Codex. The plant has a faint agreeable odour which is nearly lost on drying. The flowers are said to smell like apricots. It contains a great deal of astringent matter to which probably most of its properties are due. An infusion is considered very beneficial in jaundice and liver complaints and dropsy. Also used as a diuretic and vermifuge. Has been used in North America with great success in fevers. Also considered a purifier of the blood in cutaneous diseases and eruptions. The infusion forms a very good gargle for sore throat. An old writer recommends agrimony to be taken with a mixture of pounded frogs and human blood as a remedy for internal bleeding. A decoction made with wine and drunk, was reputed an antidote for the bites of serpents.

Culpepper says, "the leaves and seeds being stamped with old swine's grease, and outwardly applied, helpeth old sores, cancers, and inveterate ulcers, and draweth forth thorns, splinters of wood, nails, or any other such thing gotten into the flesh."

Agrimony has been employed for the tanning of leather. It also furnishes a good yellow dye.

Bryonia Dioica, white bryony.—Official in the French and United States Pharmacopœias. The dried root, according to the herbalist from whom I obtained it, is a valuable tonic and stomachic, similar to gentian. He said working men bought much of it to chew whilst they were at work. But I think he must certainly be in error, for all the works to which I have referred give its properties as being acrid and purgative, and in large doses emetic and poisonous. From its great activity when fresh it is called in France the "devil's turnip." Pereira mentions a case of poisoning by it, the symptoms of which were mistaken for those of cholera by the practitioner who attended the case. Both this plant and the black bryony, *Tamus communis*, contain an active alkaloid, bryonin, intensely bitter, soluble in water and alcohol. Twenty-two grains killed a rabbit in ten hours, 34 grains injected under the skin of a dog killed it in fifty-eight hours. The root of white bryony is used in Germany and Sweden as a purgative, and also as a vermifuge. With regard to this latter use there are some extraordinary stories on record of its efficacy in expelling

* Read at a meeting of the School of Pharmacy Students' Association, March 27, 1884.

toads and frogs and several nondescript animals from the abdomen. The fresh root is used externally as an application to bruises. Withering says a decoction of the fresh root is the best purge for horned cattle.

Gerard says the bruised root mixed with sulphur and vinegar is used for rubbing on the face to remove freckles and spots. The berries are poisonous and emetic. The young spring shoots when boiled have been eaten as a vegetable. The forked root is sometimes offered by herb gatherers around London as mandrake root.

Tamus communis.—Interesting as being the only British illustration of the Yam family, yams forming an important article of food in all tropical countries.

The large fleshy root or rhizome is the part used. It possesses very similar properties to those of white bryony. My herbalist said he had a great demand for it, and always kept it in the fresh and moist state. It was, he said, a most valuable application to bruises. He was quite celebrated for the number of black eyes he had cured with it. As his shop is in close proximity to Seven Dials, I have not the least doubt of the accuracy of that statement. The manner of using is to scrape the fresh root into a pulp, and apply as a poultice or plaister. The root of Solomon's seal, *Polygonatum officinale*, is also used for the same purpose, but more rarely, fresh raw beef being a common substitute. The young shoots of black bryony and other species of *Tamus*, when well boiled, are said to greatly resemble asparagus. Cooked in this manner with oil and salt they are much eaten by the Moors. The root taken internally is acrid and cathartic; it contains also much starch.

Sanicula Europœa, Wood Sanicle. — Although the word Sanicle has now come to mean something curative, it is not derived from the Latin "sanare" to heal, but from St. Nicholas or St. Nickel. There is a legend of this saint having interceded with heaven in favour of two children, whom an innkeeper had murdered and pickled in a pork-tub; and he obtained their restoration to life and health. No wonder, therefore, that the old herbalists so vaunt the virtue of this plant, dedicated to him, as a healing agent. In the middle ages there were many proverbial sayings extolling its virtues as "He who has bugle and sanicle makes a joke of the surgeons," or "He who keeps sanicle has no business with a doctor." The leaves are the part usually employed, but the whole herb is frequently used. The taste is very harsh and bitter. Sir James Smith entertained the idea that it partook of the poisonous acridity which is so frequent in umbelliferous plants.

It is commonly considered a very excellent remedy for internal bleeding. The juice or decoction is applied externally for the cure of ulcers and removal of tumours. Gerard says, "it makes whole and sound all wounds and hurts, both inward and outward."

Galium aparine, cleavers, clivers, goose-grass, catchweed.—Generic name from Greek "gala," milk, one of the species, *G. verum*, having been employed to curdle milk. Adrianus Junius alludes to it under the name of galium. The French name is "caille-lait," meaning curdle-milk. Its specific name aparine is from Latin "apairo," to lay hold of, because of its hooked bristles which attach themselves to passing objects. Young geese are extremely fond of it, hence the name goose-grass. The plants of this family are called bedstraws, from our ancestors having used their stems to stuff their beds with.

Properties.—Aperient, diuretic, antiscorbutic. Principally employed as a so-called spring medicine for purifying the blood. Has also been used in dropsy. As an outward application it was considered of the greatest value for the cure of cancers, scrofulous and scorbutic ulcers, the inspissated juice being used for that purpose. It used to be taken as a decoction to prevent persons from growing corpulent (perhaps it is an ingredient in Allen's anti-fat!) It was once thought to be a remedy for the bites of adders and poisonous spiders.

The roasted seeds have been employed as a substitute for coffee, which belongs to the same natural order. The madder belongs to the same order, and like that plant, the root of *Galium aparine* is said to furnish a red dye. Small birds that feed on it are said to have their bones tinged with red from this reason.

Artemisia Absinthium. — Wormwood. — The dried flowering tops are official in U. S. Pharmacopœia and the French Codex. Taste persistently bitter. Odour, strong and aromatic; reported to drive away fleas and other insects. Contains 1·5 per cent. volatile oil, isomeric with camphor, bitter, resinous and extractive matter, and a peculiar neutral principle called "absinthin." This is the essential bitter constituent of the plant. Wormwood is used as an anthelminthic and aromatic tonic; in the green state steeped in vinegar as a fomentation for bruises and sprains. Much employed in France in the preparation of the liqueur known as absinthe, which is very largely consumed in that country. In large doses wormwood produces headache, giddiness, and narcotic effects due to the volatile oil; in the lower animals it causes death. The salt obtained by lixiviating and evaporating the ashes of the plant, formerly much used and highly celebrated by the name of salt of wormwood, is merely K_2CO_3.

Culpepper's remarks on this herb are somewhat curious, and serve as an illustration of the absurd way in which he ascribes the virtues of plants to planetary and astrological influences. He says: "Wormwood is an herb of Mars. It causeth an appetite for meat, because Mars ruleth the attractive faculty in man. The sun never shone upon a better herb for the yellow jaundice than this. Wormwood, being an herb of Mars, is a present remedy for the biting of rats and mice. Mushrooms are under the dominion of Saturn; if any have poisoned himself by eating them, wormwood, an herb of Mars, cures him, because Mars is exalted in Capricorn, the the house of Saturn, and this it doth by sympathy. Suppose a man be bitten or stung by a creature, as a wasp, a hornet, a scorpion, wormwood, an herb of Mars, gives you a present cure. Mix a little with your ink, and neither rats nor mice will touch the paper that is written with it. Moths are under the dominion of Mars, his herb wormwood being laid among clothes will hinder moths from hurting them. The right eye of a man and the left eye of a woman the sun claims dominion over; the left eye of a man and the right eye of a woman are the privilege of the moon: wormwood, an herb of Mars, cures both. A draught of wormwood beer, taken every morning, is a certain remedy for a stinking breath." This is a sample of the medical treatises of our forefathers. Gerard also mentions that wormwood is an antidote for the poison of mushrooms, toadstools, and hemlock, and a remedy for the bite of the shrew mouse and sea-dragon.

Artemisia vulgaris, Mugwort.—Name derived from maggot wort, being sometimes used as a vermifuge. Before the introduction of hops it was much used for infusing in beer; some suppose the word mugwort formerly bore allusion to that use. The fresh flowering tops, when rubbed, have a fragrant and aromatic odour. The taste is sweetish and slightly bitter. An infusion is considered a good tonic, and is sometimes used as a remedy for intermittent fevers. It has also been recommended in epilepsy and convulsions. But its principal use is as a fomentation and emmenagogue. The powder of the dried leaves taken in wine is said to be a most speedy and certain cure for sciatica. A decoction applied outwardly is also used for the same purpose. Gerard and others recommend it as the best antidote for opium. The flesh of poultry and geese is said to be rendered more tender and savoury by being stuffed with this herb. The ancients used it for fattening animals. Pliny says the sheep of Pontus became very fat and were always without gall after eating this plant. He also remarks that if a traveller tie this herb around him he will feel no weariness, be hurt by no poison, nor by any wild beast.

Tanacetum vulgare, Tansy.—Name derived from St. Athanasius. Official in the U.S. Pharmacopœia and French Codex. Possesses similar properties to the two plants last mentioned. Resembles wormwood somewhat in odour and taste. Employed as an anthelminthic, tonic, stimulant, and blood purifier. In Gerard's time it was a common custom in the spring season to make cakes of the young leaves fried with eggs, and these were eaten with the notion that they purged the body of its foul humours. He also says the root preserved with sugar is an especial remedy against the gout, if every day, for a certain space, a reasonable quantity thereof be eaten fasting. According to Withering, if meat be rubbed with tansy leaves it is effectually preserved from the attacks of the flesh fly. It is also reputed to drive away insects from a bed in which it is laid. Was formerly much eaten in Lent as the representative of the bitter herbs commanded to be eaten with the Paschal lamb. Dr. Threlkeld relates the case of a soldier at Montpelier, who was cured of an obstinate dropsy by a decoction of tansy alone. In the *Pharmaceutical Journal* ([3], ii.) tanacetic acid is mentioned as a vermifuge, and substituted for santonin. It has a sharp bitter taste, insoluble in water, soluble in alcohol and ether. Forms crystallizable salts with bases. The volatile oil of tansy is said to be poisonous. In the *American Journal of Pharmacy* for 1882 there is a full analysis of tansy by O. Leppig. He gives the active bitter principle as tanacetin ($C_{11}H_{16}O_4$), which exists in the plant combined with tannic acid. He gives various reactions and tests by which it may be detected.

Chrysanthemum Parthenium, Feverfew.—So called from its supposed febrifuge qualities (Prior). Sometimes called feather few from confusion of name with feather foil. Official in the French Codex. The whole plant has a strong odour, somewhat resembling chamomile or wormwood, but which is partially lost on drying, and a bitter taste. It contains a small quantity of resin combined with a bitter mucilage, and a bluish volatile oil, which may be separated by distillation with water. Its properties are considered to be tonic, stimulant, sudorific, diuretic, emmenagogue, and anti-hysteric. Was once much used in ague and intermittent fevers. Gerard says:—"It is used both in drinks, and bound to the wrists with bay salt, and the powder of glass stamped together, as a most singular experiment against the ague." Principally employed now to drive cold out of the system by promoting perspiration; and as an emmenagogue, etc., in the same way as pennyroyal. Has also been recommended as a vermifuge. Externally a decoction has been employed in fomentations. It was said by the old herbalists to be good for vertigo or swimming of the head, and for such as be melancholy, sad, pensive, and without speech. Its odour is said to be particularly disagreeable to bees, and that these insects may be easily kept at a distance by carrying a handful of the flower heads.

Achillea Millefolium, Yarrow, Milfoil, Nose Bleed.—Generic name from the Greek warrior, Achilles, who is said to have discovered its virtues, and by this plant healed the wounds of his companions in arms. Called nose bleed, because country girls tickle the inside of their nostrils with a leaf of this plant, saying—

"Yarroway yarrow, bear a white blow,
If my love love me, my nose will bleed now."

Known also as "old man's pepper," from the pungent taste of its foliage. The leaves and flowering tops have a fragrant aromatic odour; they are official in the French Codex. It is principally used by herbalists for the cure of colds. I am told the patient is given a large quantity of yarrow tea to drink and is then put to bed. Profuse perspiration sets in, and after a night's rest the cold is said to be entirely driven out. An old quaker who made some prentension to medical skill was asked the best thing for a cold, he said "Take a pint of yarrow tea made strong on going to bed, put a hot brick at thy feet wrapped in a cloth wet with vinegar, and thou wilt surely be well in the morning." He was then asked for a cure for rheumatism, "Take a pint of yarrow tea made strong on goiog to bed and put a hot brick at thy feet wrapped in a cloth wet with vinegar and thou wilt be well in the morning." On being asked the best thing for worms in children, he said "Take a pint of yarrow tea made strong on going to bed, put a hot brick at thy feet, etc., etc." And for every disease that could be brought to mind he gave the same answer. Yarrow is much used in Norway for rheumatism. The Swedes infuse the flowering tops in beer to increase its intoxicating qualities. Has also been used as a styptic and vulnerary; a decoction as an anodyne fomentation. The leaves are chewed as a remedy for toothache. There is an ancient charm for the cure of tertian agues with yarrow. A leaf is to be pulled off with the left hand, pronouncing at the same time the sick man's name and this leaf is to be taken.

Arctium Lappa. Burdock, bur, or clot bur; official in the U.S. and French Pharmacopœias. The appearance of the involucres is well known. Country boys use them for catching bats by throwing them in the way of their flight. The bats entangle their membranous wings in the hooked bristles, and are thus brought to the ground. Virgil recommends it to be extirpated from the meadows in which sheep are fed, as it lessens the quality of their wool. The root is much used in disorders of the skin, being diaphoretic, tonic, and slightly purgative. Has also been used in dropsy, rheumatism, bladder complaints, and scrofula. It is thought to resemble sarsaparilla in its mode of action, and, like it, is used for purifying the blood. Recently recommended in Squibb's 'Ephemeris' as a remedy in certain skin disease. Some old writers considered it a specific in gout. The scraped root applied as a poultice has been found an excellent application to foul ulcers and various cutaneous affections. The bruised leaves are also used for the same purpose. The seeds are diuretic, and employed also by herbalists in nervine elipepsy. The young stalks split open and the rind removed, form a delicate vegetable when boiled. In the raw state they are eaten with oil and vinegar as a salad. Several varieties of this plant are cultivated in Japan as a vegetable under the name of "Gobo." There is an article on its used as a culinary vegetable in the *Journal of the Acclimatisation Society of France*, for August, 1883.

Symphytum officinale.—Comfrey, fr. Latin "confirma;" called also "knit back" from its strengthening and restorative qualities, formerly known as "Consolida major." In the French Codex still called "Grande consoude." Called "bone-set," because the root was used in the form of a poultice and bandage round broken legs, and, in drying, hardened like plaster of paris, forming a splint. The root contains much starch and mucilage, with slight astringency. Principally used internally for what are popularly know as inward wounds, its mucilaginous properties probably being the principal reason of its employment. Boiled in milk used for spitting of blood in consumption. The most marvellous virtue attributed to it by the old writers is, that if it be boiled in a pot with meat that is chopped in pieces, its healing powers are so great it joins the pieces of flesh together again. The young leaves and shoots are sometimes eaten as a vegetable, and are said to form a good and nutritious food. Leaves used to flavour cakes. Comfrey is much relished by cattle, and is frequently cultivated as a fodder.

Marrubium vulgare, white horehound.—Name supposed to be derived from Hebrew "marrob," which signifies a bitter juice. In Arabic languages at the present day "Marout" means a bitter plant. The whole plant has a peculiar aromatic odour, somewhat vinous or musky. Taste, very bitter and astringent. Official in the U.S. Pharmacopœia and French Codex. Not used professionally in this country, although it seems to merit some attention. One of the most popular remedies for coughs, either preserved as syrup or candy, or as an infusion of the dried herb. A decoction of horehound with cayenne pepper is given for colds. It has been found of great service in asthma, chronic catarrh, and pulmonary consumption; it has also been used in scarlatina and intermittent fevers, and as a stimulant and tonic in chlorosis and hysteria. By the ancients it was extensively used with the view of removing obstructions of the lungs and viscera. The green leaves, bruised and boiled in lard, used as an ointment, were reputed to heal dog bites. Linnæus records an instance in which salivation, occasioned by the continued use of mercurial medicines, was removed by the administration of an infusion of horehound, after every other remedy had failed. In Devonshire a beer made with yeast, white horehound, and sugar, is much esteemed as a remedy for coughs, and a palliative in consumption.

Teucrium Scorodonia, wood sage.—Properly wood-germander, called wood sage from the shape of its leaves. The whole plant is very bitter and aromatic, contains volatile oil, and a bitter principle found in all the species of this genus. Much used by herbalists as a tonic for purifying the blood and in chest complaints. With regard to its recent employment, I have been informed on the most trustworthy authority of a difficult case of pyrosis, which was cured by this plant alone. It is used as a poultice with linseed in sores and inflammations. I quote the following from the book of a well-known medico-botanist, Dr. Coffin:—"A patient had a tumour on his left hand the size of a hen's egg. The doctors said he must have it cut or he would lose his hand. Being in great pain he applied a poultice of Indian meal, and wood sage in the green state; he obtained ease in ten minutes. By continuing the same treatment the tumour disappeared in a fortnight."

Verbena officinalis, common vervain.—This plant has been known and celebrated from the most ancient times. Magical virtues especially having been attributed to it in all ages. The Greeks called it ἱερά βοτάνη or holy herb. Virgil says the priests bound it about their temples on the morning of the death of Æneas. In the time of the Druids it was held in high repute, their veneration for it was almost as great as for the mistletoe; they wore it as a charm against evil and witchcraft, and for good luck. In more recent times it entered into the composition of various love-potions, and other mystic compounds. During the last century it was brought forward by an empiric as a remedy for scrofula, a piece of the root being suspended round the patient, while other medicines were taken internally. Its influence in this disease was supposed to be due to sympathetic action. The plant is very bitter, but, notwithstanding all that has been said in its praise, and the marvellous cures it is reputed to have wrought, its medicinal qualities do not appear to be very valuable. The herbalists, even of the present day, consider it of great value. They say that as an emetic it is superior to ipecacuanha, and rank it next to lobelia, which they esteem the best of all; they also say it is one of the most powerful sudorifics in nature. They use it as an antiscorbutic and vermifuge, for colds, coughs, pains in the head, fever, and small-pox. It is still official in France.

Erythræa Centaurium, centaury.—Well known to the ancients; named from Chiron the Centaur, because it cured him of a wound caused by an arrow poisoned with the blood of the Hydra, which he dropped on his foot whilst examining the weapons of Hercules. The plant is nearly inodorous. The taste is intensely bitter, which caused it to be formerly called fel terræ or gall of the earth. It is one of the most valuable of our native plants, and, till lately, was official in our pharmacopœias; it is still included in the French Codex. It is much employed by physicians on the continent in dyspepsia and intermittent fevers, and sometimes as a vermifuge. The principal constituent is "centaurin," a bitter resinous body, which, combined with hydrochloric acid, has proved a powerful and valuable remedy in low fevers. Centaury is a safe and valuable tonic, possessing all the active properties of *Gentiana lutea*; in fact, it is better in some respects, being less apt to disorder the digestive organs than preparations of the latter plant. In intermittent and other febrile disorders it has supplied the place of cinchona bark. It is a general corrective in bile and liver complaints, jaundice, and indigestion. It has been also used in hydrophobia, kidney diseases, and gout. It was a principal ingredient in the once celebrated Duke of Portland's gout powder.

Menyanthes trifoliata, buck-bean, marsh trefoil.—Nearly allied to centaury. It was also official until recently, and is still retained in the French Codex. It possesses somewhat similar tonic properties, is also slightly astringent, and, in large doses, purgative and emetic; its properties are due to an active principle, menyanthin. It has frequently been used as a substitute for bark, as it grows in marshy districts where remittent and low fevers abound. The dried leaves are given, in powder, in doses of 20 to 30 grains in intermittent fevers, chronic rheumatism, and in some cutaneous disorders. The plant is employed medicinally in Germany to a very great extent. In Lapland, in times of scarcity, the dried roots, powdered and mixed with a little flour, are used as food, but the bread thus made is designated by Linnæus as very bitter and detestable. The dried leaves have been used instead of hops for preserving beer, two ounces of dried leaves being equivalent to a pound of hops. The herbalists of the present day extol it as a most valuable bitter, and remedy in biliary complaints. Its virtues, in a book written by one of their number, are said to be far superior to the quinine and morphia of the doctors' shops.

RECENT STUDIES ON THE CONSTITUTION OF THE ALKALOIDS.*

BY SAMUEL P. SADTLER, PH.D,

The sciences of to-day present, as might be expected, a very different aspect from the same branches of knowledge as they appeared fifty or sixty years ago. It is not merely that the mass of observations in most of these lines of study has enormously increased during this interval. Were that all, the change could hardly be considered as an unmixed benefit, because of the increased difficulty of assimilation of this additional matter. Many would be the contradictions in the observations and hopeless would be the task of bringing order out of such a chaos. The advance in the several branches of knowledge has been largely one resulting from improved methods of study, rather than one following simply from diligence in the application of the old ways.

Let us turn to chemistry for our illustration of this. The chemistry of the last century and the early decades of this was largely a descriptive science, such as the natural history branches, zoology and botany, are still in great part. Reasonably exact mineral analyses were made, it is true, but the laws of chemical combination and the fundamental conceptions of atoms and molecules had not been as yet generally established. Now, this want of comprehensive views of chemical reactions, their why and wherefore, was bad enough as it affected the study of inorganic and metallic compounds, but what must have been the conditions for studying the complex compounds of carbon, so widely spread in the vegetable and animal kingdoms. Their number is so enormous that, in the absence of any established relationships, not much more than a mere enumeration was possible for the student of this branch of chemistry. It is only within the last twenty years that chemists have attained to any comprehensive views at all in the domain of organic chemistry. It has been found possible to gradually

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range most carbon compounds under two categories, either as marsh-gas or as benzol derivatives, as fatty compounds or as aromatic compounds. To do this, methods of analysis very different from those used in mineral chemistry had to be applied. The mere finding out of percentage composition tells us little or nothing about an organic compound. What the elements are that compose the compound is not to be found out. That can be told beforehand with almost absolute certainty. What is wanted is to know how the atoms of carbon, hydrogen, oxygen and nitrogen are linked together, for, strange to say, these differences of groupings, which may be found to exist between these three or four elements, endow the compounds with radically different properties and serve us as a basis of classification.

The development of this part of chemistry, therefore, required very different methods of research. Instead of at once destroying a compound in order to learn of what elements it was composed, we submit it to a course of treatment with reagents, which take it apart very gradually, or modify it in the production of some related substance. In this way, we are enabled to establish its relations with well-defined classes and to put it in its proper place. Of equal importance with the analytical method of study, however, is the synthetical. This method of research, as applied to organic compounds, embodies in it the highest triumphs of modern chemistry. It has been most fruitful of results, both theoretical and practical. Within recent years, hundreds of the products of vegetable and animal life have been built up from simpler compounds. Thousands of valuable dye-colours and other compounds used in the arts attest its practical value. It may, therefore, seem anomalous when I say that one of the most important of all the classes of organic compounds has not shared in this advance. The alkaloids, that most important class from a medical and pharmaceutical point of view, have until quite recently been defined in the books simply as "vegetable bases, containing nitrogen." Whether they were marsh-gas or benzol derivatives was not made out; how the four elements, carbon, hydrogen, oxygen and nitrogen, were grouped together in them was absolutely a thing unknown. Chemists all admitted two things—first, that their constitution was very complex, and, second, that the synthesis of any of the more important medicinal alkaloids would be an eminently desirable thing to effect from every point of view. Within the last five years, however, quite considerable progress has been made in arriving at a clearer understanding of these most important compounds, and I shall offer to your attention this evening a brief statement of what has been done and what seems likely to be accomplished in the near future.

It was early recognized that the alkaloids were complex amines or ammonia derivatives. The more or less strongly marked basic character of these bodies, the presence of nitrogen as an essential element, and, above all, the analogy shown to ammonia in the way these bases united with acids to form salts, not by replacement of the hydrogen of the acid, but by direct addition of acid and base, pointed unmistakably to this constitution. But with this granted, the simplest alkaloid formulas, those of conine, $C_8H_{17}N$, and nicotine, $C_{10}H_{14}N_2$, still showed that the amine molecule contained quite complex groups of carbon and hydrogen atoms, and the great majority of the alkaloids—the non-volatile ones—contained groups in which the three elements, carbon, hydrogen and oxygen, all entered. Hence the difficulty in acquiring a knowledge of the molecular structure of those alkaloids at all comparable with that attained in the case of other organic compounds. Of course synthesis could not be applied until analysis had revealed something of the molecular grouping of these compounds, so the action of different classes of reagents was tried upon the alkaloids. Before summarizing the results of this study of the decomposition and alteration products of the alkaloids, a brief reference to a related class of organic compounds will be of assistance to those unfamiliar with recent researches in this field.

It is well known that in coal-tar is found a series of ammonia-like bases, aniline or amido-benzol, toluidine or amido-toluol and xylidine or amido-xylol, which are utilized practically in the manufacture of the so-called aniline dye-colours. It is perhaps not so well known that there are other series of bases found there too. The first of these is the pyridine series, including *pyridine*, C_5H_5N, *picoline* (methyl-pyridine), $C_5H_4N\ (CH_3)$, *lutidine* (dimethyl-pyridine), $C_5H_3N\ (CH_3)_2$ and *collidine* (trimethyl-pyridine), $C_5H_2N\ (CH_3)_3$. This series is also found in relatively larger proportion in what is known as Dippel's oil, the product of the dry distillation of bones.

The second series is the quinoline series, including *quinoline*, C_9H_7N, *lepidine* (methyl-quinoline), $C_{10}H_9N$, and *cryptidine* (dimethyl-quinoline), $C_{11}H_{11}N$. The two compounds which give name to these series, pyridine, C_5H_5N, and quinoline, C_9H_7N, respectively, bear to each other a relation analogous to that existing between benzol, C_6H_6, and naphthalene, $C_{10}H_8$, and the theory generally accepted by those chemists who have been occupying themselves with these bases and their derivatives is that pyridine is simply benzol, in which an atom of nitrogen replaces the triad group, CH, and quinoline, the naphthalene molecule with a similar change. Indeed, Ladenburg has recently succeeded in obtaining benzol as an alteration product from pyridine in certain reactions. Moreover, from methyl-pyridine, $C_5H_4N\ (CH_3)$, would be derived an acid known as pyridine-carboxylic acid, $C_5H_4N\ (COOH)$, just as benzoic acid, C_6H_5COOH, is derived from methyl-benzol, $C_6H_5CH_3$, and from dimethyl-pyridine, $C_5H_3N\ (CH_3)_2$, an acid known as pyridine-dicarboxylic acid, $C_5H_3N\ (COOH)_2$, just as phthalic acid, $C_6H_4\ (COOH)_2$, is derived from dimethyl-benzol, $C_6H_4\ (CH_3)_2$. The same thing applies to quinoline as compared to naphthalene.

We may now look at the question of the decomposing effect of reagents upon the alkaloids. The means which have proved most efficacious in decomposing these bases are the action of oxidizing and reducing agents, of bromine, of organic iodides, of concentrated acids and alkalies, and of heat.

Taking up the volatile alkaloids, we find with regard to *Conine*; first, that the action of methyl iodide shows it to be a secondary amine, that is, it retains only one replaceable hydrogen atom of the original ammonia molecule. Its formula is therefore $C_8H_{16}NH$. From conine can be prepared methyl-conine, which also occurs in nature, and dimethyl-conine. From this latter has been gotten a hydrocarbon, C_8H_{14}, conylene, homologous with acetylene, C_2H_2. Conine, on oxidation, yields chiefly butyric acid, but among the products of oxidation has been found the pyridine-carboxylic acid before referred to. The formula of conine, $C_8H_{17}N$, shows it to be homologous with piperidine, $C_5H_{11}N$, a derivative of piperine, the alkaloid of pepper, to be spoken of later, and, just as piperidine is derived from pyridine by the action of reducing agents, so conine is probably derived from a propyl-pyridine. The artificial alkaloid, paraconine, isomeric with the natural conine, will be referred to later.

Nicotine, $C_{10}H_{14}N_2$, the next simplest in formula of the alkaloids, is a tertiary base, that is, contains no replaceable hydrogen atoms in its molecule. It shows very close relations to pyridine. When nicotine vapour is passed through a red-hot tube, it yields essentially collidine, and with this some pyridine, picoline, lutidine and gases such as hydrogen, marsh gas and ethylene. Heated with bromine water to 120° C., it decomposes into bromoform, carbon dioxide, nitrogen and pyridine. When its alcoholic solution is treated with ferricyanide of potassium it is oxidized to dipyridine, $C_{10}H_{10}N_2$. Potassium permanganate, chromic or nitric acid oxidizes it to nicotinic acid, $C_6H_5NO_2$, which is simply pyridine-carboxylic acid, C_5H_4N (COOH), and which, distilled over quicklime, yields pyridine, C_5H_5N.

Turning now to the non-volatile and oxygenized bases, we take up first the opium alkaloids. *Morphine*, $C_{17}H_{19}NO_3$, is a tertiary amine, and appears to contain a hydroxyl group like phenols, to which class of bodies it has some analogies, as is shown in its reaction with ferric chloride. Its methyl ester, which can be formed from it, is *Codeine*, one of the accompanying alkaloids of opium. Besides the methyl derivative, however, others are possible, and several have been recently prepared, giving rise to a class of artificial alkaloids known as *codeines*. Morphine, rapidly distilled over zinc dust, yields phenanthren, trimethyl-amine, pyrrol, pyridine, quinoline, and other bases. The action of strong hydrochloric acid upon morphine changes it into apomorphine, $C_{17}H_{17}NO_2$, by the withdrawal of a molecule of water. Ferricyanide of potassium and caustic soda solution change morphine into oxydimorphine, $C_{34}H_{36}N_2O_6$. When heated with strong potassium hydrate, it yields methylamine.

Narcotine, another of the opium alkaloids, when heated with manganese dioxide and sulphuric acid, is oxidized and splits apart into opianic acid, $C_{10}H_{10}O_5$, and cotarnine, $C_{12}H_{13}NO_3$. This latter, by careful oxidation, yields apophyllenic acid, $C_8H_7NO_4$, and this, on heating with hydrochloric acid to 240° C., yields pyridine-dicarboxylic acid, $C_5H_3N(COOH)_2$. The base cotarnine also results from the prolonged heating of narcotine with water alone. In this case, instead of opianic acid, its reduction product meconine, $C_{10}H_{10}O_4$, is produced.

Meconic acid, $C_7H_4O_7$, which is found in opium in combination with the different bases, has also been investigated. By acting upon meconic acid with ammonia, comenamic acid is formed, and this latter, when heated with zinc dust, yields pyridine.

If we go now to the cinchona alkaloids, we meet with exceedingly interesting results. *Quinine*, $C_{20}H_{24}N_2O_2$, when carefully oxidized with chromic acid or potassium permanganate, yields a series of products. First is formed quitenine, $C_{19}H_{22}N_2O_4$, a weak base, then quininic acid, $C_{11}H_9NO_3$, then the so-called oxycinchomeronic acid, $C_8H_5NO_6$, and finally cinchomeronic acid, $C_7H_5NO_4$. Now the two acids last mentioned are simple substitution products of pyridine, oxycinchomeronic acid being a pyridine-tricarboxylic acid, $C_5H_2N(COOH)_3$, and cinchomeronic acid, a pyridine-dicarboxylic acid, $C_5H_3N(COOH)_2$. When distilled with potassium hydrate, quinine yields quinoline and its homologues. The alkaloid has been shown to be a tertiary base.

Quinidine yields with chromic acid the same decomposition products as quinine.

Cinchonine, $C_{19}H_{22}N_2O$, the second most important alkaloid of these barks, when oxidized with potassium permanganate, yields cinchonic acid, which is a quinoline-carboxylic acid, $C_9H_6N(COOH)$, cinchomeronic acid, which has just been stated to be a pyridine-dicarboxylic acid, and a pyridine-tricarboxylic acid. When cinchonine is treated with potassium hydrate, it is decomposed into quinoline and a solid body, which on further treatment yields a liquid base C_7H_9N, which is probably lutidine. It has been found, moreover, that both tetrahydroquinoline and dihydroquinoline, hydrogen addition products of quinoline, are present. When cinchonine is distilled with solid potassium hydrate, it yields pyrrol and bases of both the pyridine and quinoline series.

Cinchonidine, when heated with potassium hydrate, yields quinoline also, and with nitric acid the same products as cinchonine.

Strychnine has been found to be a tertiary amine. When distilled with potassium hydrate, quinoline is formed.

Brucine is a tertiary diamine, that is, formed by substitution in a double ammonia molecule. When distilled with potassium hydrate it yields quinoline, lutidine, and two isomeric collidines.

The alkaloid *Atropine* has been quite thoroughly studied with results of great interest. When heated with either baryta-water or hydrochloric acid, it takes up a molecule of water and is split into tropine, $C_8H_{15}NO$, and tropic acid, $C_9H_{10}O_3$. This latter is phenyl-oxypropionic acid. Tropine, when heated to 180° C., with concentrated hydrochloric acid, splits off a molecule of water, and yields tropidine, $C_8H_{13}N$, a liquid base, with an odour resembling conine. When this tropidine is heated with an excess of bromine, it yields dibrompyridine.

Piperine, the alkaloid of pepper, has also been well-studied. When boiled with alcoholic potash solution, it takes up a molecule of water and splits apart into piperic acid, $C_{12}H_{10}O_4$, and piperidine, $C_5H_{11}N$. This latter base has been shown to be a hydrogen addition product of pyridine, C_5H_5N. When heated with concentrated sulphuric acid, it is oxidized to pyridine. Piperidine hydrochlorate, also, when heated with excess of bromine to 180° C., yields dibrompyridine.

Sinapine, the alkaloid which exists as sulphocyanate in white mustard seed, yields under the same reaction as that applied to atropine and piperine, quite different results. When boiled with baryta water, sinapine decomposes into sinapic acid, $C_{11}H_{12}O_5$, and choline, $C_5H_{15}NO_2$, the latter a well-known constituent of the bile, and produced also in the decomposition of the lecithin of the brain and yolk of egg.

Cocaine, the alkaloid of coca leaves, is decomposed by heating with hydrochloric acid into methyl alcohol, benzoic acid and a crystalline base ecgonine, $C_9H_{15}NO_3$.

Caffeine and *theobromine* have also quite different relations. Caffeine, it will be remembered, is the methyl ester of theobromine, and can be prepared from it. When caffeine is carefully oxidized with chlorine, it yields dimethyl-alloxan and methyl-urea. Both theobromine and caffeine are decomposed by heating to 240° C. in sealed tubes with hydrochloric acid, identical products being obtained. These products are carbon dioxide, formic acid, ammonia, methylamine, and sarcosine, the last three being of course in combination with the excess of hydrochloric acid. The artificial preparation of theobromine and caffeine from xanthine and guanine also shows clearly their relations.

If, having completed our survey of what has been done in the way of decomposing the alkaloids by the different classes of reagents, we review the field, it will be seen that with all the alkaloids mentioned, except the last four, a more or less immediate connection with the pyridine and quinoline bases has been indicated. The conviction accordingly forces itself upon us that, if we want to attack the problem of building up any of these important alkaloids artificially, we must turn to these bases as our starting point.

As already stated, both series occur in coal-tar and the pyridine series also more abundantly in bone-oil. Pyridine, picoline, lutidine, and collidine, the first four members of the pyridine series, have, moreover, all been formed synthetically, although the processes are not such as would yield the products as cheaply as they can be gotten from Dippel's oil. Quinoline, the first member of the higher series, had been made synthetically by several chemists, but by expensive and involved methods, when Skraup, in 1881, effected its synthesis from nitrobenzol and glycerin, or still better, a mixture of nitrobenzol and aniline with glycerin. This process allows of its being made on a commercial scale if desirable. Shortly after, by an application of the same principle, Döbner and Miller effected the synthesis of lepidine, the second member of the quinoline series.

At the same time that this general agreement to consider these bases as the starting point in the endeavour to effect the synthesis of the natural alkaloids had been arrived at by chemists, it was thought well to look into the question whether these bases and their immediate derivatives had any therapeutic value of their own.

Piperidine, the decomposition product of piperine, which we have shown may be considered to be hexahydropyridine, was examined by Dr. Kronecker, of Berlin, at the request of Professor Hofmann, and was found to have an action upon animals in many respects resembling that of conine. Professor Filehne, of Erlangen, who has studied a large number of these pyridine and quinoline derivatives, found, moreover, that the hydrochlorate of ethyl-piperidine had a physiological action quite analogous to that of conine.

The physiological action of quinoline itself has been studied quite extensively by Donath and others, and it was found that several of its salts were quite valuable febrifuges, acting very like quinine, and capable in cases of being used as a substitute for it. In general, the hydrogen addition products were found to be more active than the simple base, an observation entirely in accord with the theory formed by Wischnegradsky, and by Königs, as the result of the study of the decomposition products of the alkaloids, viz., the alkaloids are in general hydrogen addition products of pyridine and quinoline, or of the two bases combined. Thus, Professor Filehne found that hydrochlorate of tetrahydroquinoline was much more energetic in its action than quinoline, but could not be used on account of a too powerful local effect. The hydrochlorate of dimethyl-tetrahydroquinoline, which was distinguished by its strong bitter taste, much resembling that of quinine, had an effect like that of curare poison. The most decided febrifuge action, however, was found by Professor Filehne to reside in the hydrochlorate of oxyhydro-methyl-quinoline, introduced to public notice by Professor O. Fischer under the name of "kairin," and in the acid sulphate of tetrahydro-methylquinoline, introduced under the name of "kairolin." These compounds had a very surprising febrifuge action, without any unpleasant after-effects or local disturbances.

The most active workers in the field of synthetic formation of the alkaloids have been Wischnegradsky, of St. Petersburg,—who, unfortunately for science, died at an untimely age in 1880,—Königs and Fischer, of Munich, and Ladenburg, of Kiel. The study of the decomposition products of the cinchona alkaloids especially points quite distinctly to the probable existence in quinine of a hydrogen addition product of pyridine, in combination with a methyl-quinoline group. The many experiments that are now being made to test this and other questions that suggest themselves will not long leave us in the dark. Whether a practical commercial synthesis of quinine will follow is another matter, but it is within the bounds of possibility, or perhaps even of probability.

It must not be supposed that no syntheses of alkaloids have been effected as yet. By heating butyl-aldehyde with alcoholic ammonia is formed *paraconine*, an alkaloid isomeric with the natural conine, but differing in physiological action. By the action of sodium upon pyridine is produced a compound, $C_{10}H_8N_2$, known as dipyridyl, and this, under the influence of nascent hydrogen, takes up six atoms and becomes *isonicotine*, $C_{10}H_{14}N_2$, a physiologically active alkaloid, isomeric with the true nicotine. The formation of a series of alkaloids under the name of *codeines*, by the substitution of other organic radicals instead of methyl in the codeine reaction, has already been alluded to. *Atropine* can be formed by uniting tropine and tropic acid, the two decomposition products already noted. The latter of these products is already shown to be capable of synthetical formation, and the other will no doubt be formed in the same way. The artificial atropine is identical with the natural alkaloid. Ladenburg has also formed a series of artificial alkaloids, called *tropeines*, by uniting the base tropine with different organic acids, as in the case of the compound of mandelic acid and tropine known as *homatropine*, an alkaloid of action similar to atropine, but possessing some decided advantages in its use. *Piperine* has also been made by the uniting of piperidine and piperic acid, and, as piperidine has already been formed from pyridine, we have here a true synthesis also. Both *theobromine* and *caffeine*, its methyl derivative, have been made from xanthine, which itself can be formed from guanine, a constituent of guano.

We may conclude, from this reference to what has been done in the last few years, that the reproach mentioned in first speaking of the alkaloids as a class, that almost nothing was known of their constitution, will not long remain, and that as their molecular structure is laid bare in these studies now being made, keen-sighted chemists will effect their artificial formation. When these most valuable compounds can be made by exact methods, in a state of entire purity, and at a cost much below that paid for the present extraction of them from relatively rare plants, organic chemistry will have placed all of us under obligations as great as those owing any branch of science, no matter how practical we call it.

SAPONIN.*

BY E. STÜTZ.

At the commencement of this paper, an historical account is given of saponin, a compound obtained from the *Saponaria rubra* and its allied species. The formulæ proposed for this substance, deduced from the percentage proportions of carbon and hydrogen found in it, are various, but most experimenters are agreed in proving that it is decomposed on boiling with acids, yielding a carbohydrate among other products.

The source of the saponin studied in this paper was the bark of the *Quillaia saponaria*, a member of the Spiræa family, indigenous in Chili and Peru. This was digested with water, the extract evaporated down, and hot alcohol of 90 per cent. added; on cooling, white flocks of saponin separated, which were then frequently recrystallized from alcohol, and finally purified by animal charcoal.

Saponin thus obtained is a white, amorphous, neutral powder, generally possessing an astringent taste, due to traces of impurities; it is soluble in water, insoluble in absolute alcohol and ether; its aqueous solution forms a lather like soap. When heated to 195° it turns brown, and at a higher temperature evolves a vapour resembling caramel in odour.

The author was unable to obtain saponin free from inorganic impurities; and from the properties of its barium compound it would appear probable that the impurities, principally consisting of calcium, were intimately associated with the saponin. From the mean of four concordant analyses the formula $C_{19}H_{30}O_{10}$ is deduced.

A concentrated aqueous solution of saponin is precipitated by baryta-water; a substance of composition

$$2C_{19}H_{30}O_{10} + Ba(OH)_2$$

being formed, from which the barium is not readily separated by carbonic anhydride. In order to determine the number of alcoholic hydroxyl-groupings present in saponin, it was heated with acetic or butyric anhydride under various conditions. A series of acetyl-derivatives was thus obtained; amongst which are enumerated a tetracetyl, $C_{19}H_{26}\overline{Ac}_4O_{10}$, and a pentacetyl, $C_{19}H_{25}\overline{Ac}_5O_{10}$, derivative, and two compounds formed by the addition of acetic anhydride to the latter substance, viz., $C_{19}H_{25}\overline{Ac}_5.O_9(O\overline{Ac})_2$, and $C_{19}H_{25}\overline{Ac}_5O_8(O\overline{Ac})_4$ From these results it follows that the saponin contains five hydroxyl groups and two oxygen atoms combined only with carbon; its constitutional formula will thus be: $C_{19}H_{25}(OH)_5.O_2.O_3$. From the acetyl-derivatives saponin can be regenerated.

* From *Annalen*, ccxviii., 231-253. Reprinted from the *Journal of the Chemical Society*, April, 1884.

The Pharmaceutical Journal.

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JEAN BAPTISTE ANDRÉ DUMAS.

SIXTEEN months have barely passed since the occasion of a rare compliment paid by the Academy of Sciences to the greatest of contemporary French chemists, in a jubilee celebration, furnished us with an opportunity for referring to some events in the earlier parts of his career, when it was still associated with the routine of a French pharmacy, and now we have to record the fact that DUMAS is dead. France has lost a son who has richly helped to maintain her claim to pre-eminence in the realms of science, and every other civilized country will join her in paying a grateful tribute to the memory of the philosopher who passed away at Cannes on Friday last. But in the presence of so full a life of eighty-four years it would seem idle to affect surprise that the close should come, and almost irreverent to express much sorrow. Long as was this term of years they were crowded by DUMAS with effective work, and the results form no mean part of our present knowledge of physiology, and especially of chemistry. In any case the interest which the readers of this Journal would have in one who has contributed so much towards building up on a solid foundation the science which exercises a most important influence in their daily avocations would have been great, but in respect to DUMAS this is enhanced by the fact that it was in a pharmaceutical laboratory DUMAS made his first chemical experiments and that nearly half a century afterwards he was chosen to preside over a commission entrusted with the revision of the Pharmacopœia of his native country. It may be that these points of contact with pharmacy had their influence in inducing the Pharmaceutical Society of Great Britain to reflect honour upon itself by, in 1870, placing the name of the illustrious chemist upon its roll of honorary members; certainly they will be our sufficient warrant for referring again to some phases of his life and especially, but only briefly, to work not mentioned in our previous notice.

JEAN BAPTISTE ANDRÉ DUMAS was born in the closing year of the last century at Alais, in the department of the Gard. Originally intended for the naval profession, his aspirations in that direction were diverted by the political events of 1814–15, and he became an apprentice to a pharmacist in his native town. His opportunities there, however, appear not to have been commensurate with his ambition, and in 1816 he went on foot to Geneva, where, in addition to attending the lectures of DE CANDOLLE, PICTET and DE LA RIVE, he acquired practical experience as superintendent of a pharmaceutical laboratory. It was in this room that he delivered his first lectures on chemistry to a knot of fellow students, and it was there that in the ordinary course of business he made an analysis of sponge, which led to the introduction of iodine compounds into the materia medica. Before he was eighteen years of age he had produced two memoirs, one recording the observation that the water of crystallization is present in salts in definite equivalents, in which, however, he had been anticipated by BERZELIUS; the other laying down principles that still rule in the method of taking the density of solid bodies, and on which all subsequent inquiries on the atomic and equivalent volumes of bodies have been based. Whilst still occupied in the pharmacy a futile attempt to isolate the active principle of digitalis brought him into communication with PRÉVOST, with whom he soon became associated in systematic physiological investigations that have left their names indelibly connected with the study of the nature of blood and of fecundation. Indeed, it was the success of DUMAS as a physiologist that eventually brought him back to his chemical labours; for it led to a visit from HUMBOLDT, whose conversation raised in him an insatiable desire to visit Paris, which was gratified in 1823. There, through the influence of ARAGO, he obtained the post of assistant to THENARD at the École Polytechnique, whilst soon afterwards AMPÈRE obtained for him the chair of chemistry at the Athenæum, just vacated by ROBIQUET, and thus DUMAS came again fully under the influence of his earlier mistress, Chemistry. Notwithstanding the time taken up by these official duties, and the paucity of suitable apparatus, DUMAS at once re-entered the field of experimental investigation, and in 1826 published his classic memoir "On Some Points of the Atomic Theory," in which he stated that he was engaged in experiments intended to fix the atomic weights of a considerable number of bodies "by determining their density in the state of gas or vapour," and shadowed forth the distinction between molecules and atoms by urging the necessity of giving greater attention to AVOGADRO'S hypothesis that the molecules of gases were capable of further division, the division occurring in the moment of combination. About this time, too, he resumed with BOULLAY a dropped investigation of the compound ethers, which eventually not only threw a flood of light upon the relations that exist between what is now distinguished as ethylic alcohol and its ethers, but led to the discovery that in wood spirit, spermaceti, and potato spirit there were other bodies, exhibiting similar properties, each producing with acids its series of ethers and yielding an acid when treated with oxidizing agents, whilst they differed from one another in composition by one equivalent of carbon and two of hydrogen, or multiples of that quantity. Here was the first page in the history of the homologous alcohols and their derivatives, which has since become one of the most richly developed in the domain of chemistry. Whilst following up this investigation an apparently fortuitous inconvenience suffered at a *soirée* at the Tuileries through the irritating vapours diffused from some wax candles led to the inference that chlorine used in bleaching had been retained by the wax in definite proportions, the outcome being the theory of substitution, which opened up a new world of research to chemists. In 1846 DUMAS showed that between formic and margaric acids it was possible that there existed a series of fifteen other acids, of which only nine were then known, passing from one extreme to the other by steps of CH_2, and thus was provided the starting point for the homologous classification of the fat acids. Between 1858 and 1860 DUMAS published the results of numerous researches in previous years upon atomic weights of the elements, which, like the manipulative processes associated with his name, had been incidental but necessary preliminaries to the satisfactory performance of other work. Thus the correction of the atomic weight of carbon, which had been fixed by BERZELIUS at 12·24, was indispensable to any satisfactory progress in knowledge of the carbon compounds. It was natural that under these circumstances he should have devoted much attention to the examination of PROUT'S hypothesis that the different elements consist of the same primordial matter in different physical conditions, and although his results precluded an admission that the theory was supported by the atomic weights of all other elements proving to be multiples of hydrogen taken as unity, he seems not to have been disinclined to believe that the unity would be found at some lower point. At any rate, his speculations in connection with this question were very ingenious and interesting and went much further than is generally admitted towards the establishment of what is now known as the "periodic law." Afterwards his experimental work again approached the field of physiology, in that it was devoted to the phenomena of nutrition, the formation of sugar in the organism, the composition of blood, and allied questions, and in 1872 he published his theory as to the nature of alcoholic fermentation.

Notwithstanding the variety and scope of the investigations thus hinted at rather than outlined they formed only a part of the labours of DUMAS. To these must be added his work as professor, author, journalist, member of numerous commissions, politician and Perpetual Secretary to the Academy of Sciences. These all belong to his public services, which is the portion of his life in which we are most interested. But there is another aspect of the man that should not go unnoticed. It would seem as if he regarded the valuable sympathy and help given to him liberally in his earlier years by HUMBOLDT, LAPLACE, ARAGO, and other eminent men, as a trust to be handed on to succeeding aspirants to fame. His relations with his contemporaries were also admirable, and although he engaged in some sharp polemical passages with men working on similar subjects, they were never allowed to become embittered or lead to injustice. Thus, although BERZELIUS, naturally disturbed by the irreverent manner in which some of his conclusions as to the atomicity of the elements were overthrown by the experimental work of the younger man, did not hesitate to adopt a tone which was apt to provoke retort, DUMAS went out of his way years after, when again writing on the subject, to caution experimenters that if working under the same conditions they arrived at results different from those put on record by BERZELIUS, it would be the safer plan for them to assume that they had made a mistake. So also with LIEBIG: the many collisions between the two great chemists did not prevent DUMAS from publicly testifying to the admiration he felt for his great German rival, or LIEBIG from dedicating to DUMAS an edition of his famous 'Familiar Letters.' DUMAS was equally generous in his recognition of the genius of our own countryman, FARADAY, and a passage taken from the first Faraday Lecture, delivered by him in 1869, may with a slight alteration be well addressed to France at the present time—

"Mutato nomine, de te
Fabula narratur."

"The name of your illustrious fellow-countryman "is not one which any single nation can claim as its "exclusive property; his labours and discoveries are "as widely recognized in England, in Germany, and "in America, as in France. DUMAS belongs to the "whole world. There is not a spot on this earth to "which civilization has penetrated that does not "claim the right of participating in the respect and "gratitude you entertain for him."

The Aberdeen Society of Chemists and Druggists met in the Palace Hotel, on April 8, to present their esteemed Secretary, Mr. Alexander Strachan, with a testimony of their appreciation of his services in connection with the Society. The testimonial took the form of a marble timepiece, two equestrian bronzes, and a complete set of table cutlery. The meeting was largely attended and enthusiastic.

* * *

The Secretary of State for India has been pleased to appoint Mr. David Hooper, F.C.S., as Quinologist to the Nilgiri Government Cinchona Plantations in the Madras Presidency. Mr. Hooper was a Pereira Medallist of the Pharmaceutical Society in 1880, and has been lately engaged as analyst in the laboratory of Messrs. Southall, Brothers and Barclay.

* * *

In connection with the forthcoming International Health Exhibition provision is being made for an ample supply of literature in the form of a series of official Hand-books. Among these are to be specially written works on 'Healthy and Unhealthy Houses in Town and Country,' by Mr. W. Eassie and Mr. Rogers Field, C.E.; 'Heating, Lighting, and Ventilation,' by Captain Douglas Galton; 'Food,' by Mr. A. W. Blyth; 'Principles of Cookery,' by Mr. S. Berdmore; 'Food and Cookery for Infants and Invalids,' by Miss Wood; 'Alcoholic Drinks,' by Dr. J. L. W. Thudichum; 'Non-Alcoholic and Aërated Drinks,' by Professor Attfield; 'Fruits of all Countries,' by Mr. W. T. Thiselton Dyer; 'Condiments, including Salt,' by the Rev. J. J. Manley; 'Laboratory Guide to Public Health Investigation,' by Mr. W. W. Cheyne and Dr. W. H. Corfield; 'Physiology of Digestion and the Digestive Organs,' by Professor Arthur Gamgee; 'Fermentation,' by Dr. Duclaux; with a Preface by M. Louis Pasteur; and 'Spread of Infection,' by Mr. Shirley F. Murphy. It is announced that the Exhibition will be opened on Thursday, the 8th of May, by H.R.H. the Duke of Cambridge, acting on behalf of the President, H.R.H. the Prince of Wales.

* * *

The recent convictions in Massachusetts for the sale of drugs not answering to the standard of the United States Pharmacopœia appear to have provoked a curious counter-move. It is reported that an attempt is to be made to deprive the Pharmacopœia of the precedence at present accorded to it as the authoritative standard for the quality of articles included in it and bring it down to the level of a "community," whilst the 'United States Dispensatory,' which is essentially a commentary on the Pharmacopœia, is to be raised to the dignity of chief standard. As, however, there are at least two other important rivals of the 'Dispensatory,' which, like it, are private ventures, it is not probable that the attempt, if made, will succeed without a struggle.

* * *

An extraordinary specimen of paternal legislation has recently been introduced into the United States National House of Representatives, with the view of preserving from temptation the Chinese and other opium consumers in that country. The Bill provides for the prohibition absolutely of any importation of opium except in the form of aqueous extracts for medicinal use and tinctures, and would subject any person contravening its provisions by importing or dealing in solid opium to imprisonment for a term not exceeding five years.

* * *

Many of our readers will see with regret the account on another page of the circumstances attending the death of Dr. Henry Brown, of Northallerton, in whom they will recognize a former frequent correspondent of the "Dispensing Memoranda" columns of this Journal. Although the positive tone in which the communications of Dr. Brown were usually couched had a tendency to provoke irritation, there could be no doubt that the motive which prompted them was a sincere wish to impart useful information, and in discussing the different topics he frequently evinced a knowledge of pharmacy, and an appreciation of its importance, beyond what is usually manifested by medical practitioners.

* * *

The next meeting of the Chemists' Assistants' Association will be held on Wednesday, April 23, when a paper on "The Alchemists: their Failure and their Success," will be read by Mr. S. R. Atkins.

Transactions of the Pharmaceutical Society.

EXAMINATION IN EDINBURGH.

April 9th and 10th, 1884.

Present on both days—Messrs. Baildon, Clark, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

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

MINOR EXAMINATION.

9*th.—Sixteen* candidates were examined. *Nine* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Aspinall, William..................Platt Bridge.
Barlow, Ernest Silas ....Oldham.
Cappell, Robert ....Crieff.
Christie, James......................Old Meldrum.
Drake, Harry Francis............Stowmarket.
Graham, Thomas Andrew ......Stirling.
Hamilton, Francis ....Glasgow.

10*th.—Fourteen* candidates were examined. *Nine* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

McGuffie, Wm. Alexander ......Stranraer.
McIntyre, James ....Grantown.
Manson, William Mackenzie ...Edinburgh.
Riddiough, Fred ....Leeds.
Robertson, George ....Burntisland.

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.

A general meeting was held on Friday, March 28, at the Museum and Library, Queen's Road; Mr. James Walter White, President, in the chair.

After expressing in a few earnest sentences his appreciation of the services rendered to the Association by his predecessor, Mr. Schacht, Mr. White addressed the meeting as follows:—

"Gentlemen,—On such occasions as the present it has become the established rule for the President to open the proceedings with a few introductory remarks, sometimes called an address; and at first sight there would seem to be the very widest field for the choice of a subject connected with our calling. For the aspect of pharmacy is very many-sided, and the practice of its art comprises branches of knowledge so varied, and so comprehensive, that no man bound by the limits of average human intelligence can hope to acquire an intimate acquaintance with them all. Accordingly one finds that our trade literature abounds with dissertations upon all the arts and sciences allied to pharmacy; its ethics, and its trade questions, mingled with exhortations to young druggists entering upon life, and lucubrations from old ones about to quit it.

"As is to be expected also all kinds of opinions are represented in these addresses, and their matter has been considered from all points of view. For instance, you will find on the one hand that students are encouraged to consider themselves, one and all, adolescent Faradays and Tyndalls, needing only industry, perseverance and the flux of time, to develop into paragons of science and mines of wealth. On the other hand, you will see displayed to these same students all the perils of ambition; how far preferable it must prove to live content as honest mediocrities, and the supreme folly of attempts to set the Thames on fire.

"Again, to some minds, the business of a chemist and druggist has appeared to be invested with the status of a learned profession; whilst more matter of fact spirits have acknowledged themselves to be mere drudges, whose mission was simply to work hard, live hard, die hard, and—not to expect much increase of dignity afterwards. There is of course nothing very remarkable in these diversities of opinion, and their mode of expression is generally admirable. They are commented on here simply as tending to show how thoroughly threshed out the subjects have been. Would that the process had resulted in a more copious yield of golden grain! and in making that remark I touch upon the dismal topic of the present condition of pharmacy. Perhaps it may be deemed fitting to the occasion if I restrict myself this evening to making in a few plain words a sort of profession of faith in relation to the topic just mentioned, because although my individual views may carry little weight, yet in the circumstances under which we meet, it would seem right to express them to my fellow members.

"Notwithstanding the immense advance in some directions which has been made through the influence of the Pharmaceutical Society, aided by the efforts of kindred associations established for the promotion of scientific pharmacy, it cannot be denied that as a body we have very grave reasons for dissatisfaction with the condition of our trade. I wish to state my belief that although the sources of discouragement are undoubtedly grievous, we are apt to lay too much stress upon some of them, and to show an amount of faintheartedness which does us little credit.

"Formerly the trade of a chemist and druggist was thought to be a very desirable one. The cost of apprenticeship, although higher than in many other trades, was not excessive, and the capital required for commencing business was comparatively small. Further, it was thought to be a genteel trade, requiring a greater amount of school learning than most others, involving the exercise of some scientific knowledge, and partaking in a small degree of the character of a profession. The profits, comparing isolated transactions with those of other trades, appeared to be very great, and indeed the business did offer the means of easily acquiring a moderate income.

"Now this was a condition of things far too good to last. It meant that even an ignoramus could make a decent living as a chemist and druggist, whilst people possessing an average amount or more of scientific knowledge and business aptitude were certain of attaining affluence. Our fathers benefited also from the profuse system of medicine taking which prevailed at the time, and which induced people to think that it was necessary to attack a disease with an array of physic bottles, just as soldiers attack a town with batteries of guns; but that system has had its day, and has produced a revulsion from which we are now suffering to some extent. With the advance of time came other changes more momentous. Increasing populations striving for means of livelihood crowded into the professions and trades and gave rise to unwonted competition. Thus it has come to pass in our day that only the fittest have a prospect of surviving in the throng, and that the blockheads are going to the wall. It is this keen competition which presses us most sorely; but it is inevitable, and must be manfully met and grappled with. For the world moves on, the old gives place to the new, and the imperfect to that which is more perfect; and though this progress often involves hardship to individuals, no sensible person will think it possible to arrest it. For my own part I do not believe any good can result from one-sided denunciations of the evils, real or imaginary, of cutting shops, or of co-operative trading. Both are facts, the existence of which must be recognized, and it is only by rigorous competition that we can hope for a solution of the problem which has now for some time perplexed tradesmen. Protective legislation cannot be hoped for, even if it were worth having; and, although the trial will probably be severe and damaging, the sooner it is faced the better.

"There is but one safe course to pursue. If blockheads and ignorami must henceforth starve, and only the most capable are to thrive, let us, by dint of scientific culture, and activity in business, endeavour to avoid being included in the former category, that we may share the success of the latter.

"A very mortifying phase of this competition trouble is the fact that the public are, with some exceptions, so slow to recognize that the responsibilities, knowledge, and scientific attainments of the latter-day pharmacist are worthy of some professional remuneration. Notwithstanding his life of anxiety, and of unremitting study and toil, he is begrudged any emolument he may claim on account of his responsible duties over and above a bare profit on the goods sold. We may reasonably expect that time will modify this anomaly.

"Another source of discouragement is the difficulty we experience in winning the confidence of the medical profession. A pharmacist may become a repository of all knowledge relating to the natural history, the commerce, the chemistry, the preparations, the properties, the doses, and the modes of administration of everything used in medicine. He may be an accomplished *savant*, and his name may be a household word throughout the world of pharmacy, yet the physicians of his own neighbourhood will scarcely trust him to make two grains of quinine into a pill. Very often they will prefer to have the pill prepared three thousand miles away by persons of whom they can know nothing at all, save that they have imported into this country attractive-looking assortments of such medicines, remarkable solely for the brilliancy of their hue, and the eccentricity of their shape. It might be expected also that the prescriber wishing to try a new remedy, or to administer a medicine in some new form, would look to the pharmacist as an intelligent adviser, with whom he might confer on practical points, which are important in guiding his decision. I am glad to acknowledge that this does often happen; but how often also do we have an experience like the following. A remedy is advertised purporting to be made from a herb gathered somewhere in the Antipodes, a plant without a name even, whose botanical affinities have not yet been ascertained, but whose virtues are extolled on faith of Indian medicine-men. This precious article is prescribed right and left, until presently a fresh nostrum engages attention, and the other falls into oblivion.

"Still another disappointment seems to be in store for the British pharmacist. He has excellent and well-founded claims for a substantial share in constructing our national Pharmacopœia: for taking that part which his fellows fulfil with benefit to the state in every civilized community besides our own. But by the time his claims are admitted, if ever they be, that work will possibly have ceased to exercise any influence on the medical mind, and may have been discarded by the prescribing doctor. *His* pharmacopœia bids fair to be the advertising pages of the medical journals, supplemented by circulars and samples, shoals of which pour in upon him daily. The poor pharmacist may find that he has been chasing an *ignis fatuus*, and once more may have to pocket his dignity with a sigh.

"We must hope, and indeed we cannot doubt that it may be possible, to counteract, and to prevail over these degrading and demoralizing tendencies by a right use of the means at our disposal. I believe that of those means, the highest scientific education applied in a sound commercial spirit will be found the most effectual.

"Let us trust that although our own personal aspirations may have been quenched in disappointment; it may yet remain for our posterity in the near future to enjoy that status and those rewards which we have striven to deserve."

Mr. G. F. Schacht then offered a communication upon—

Extract of Nux Vomica, and some Methods of Estimating the Alkaloids it contains.

Mr. Schacht said that his first words should be to remind his audience that the chief part of what he should endeavour to put before them was the result of the labours of two gentlemen, Messrs. Dunstan and Short, to whose ability and industry they could scarcely be too grateful; and he begged them to take notice that all he might have to say in criticism of their papers was limited to certain deductions they had drawn from a contemplation of their work, and did not in the smallest degree aim to disparage the work itself.

The results of these investigations had been placed before them by the authors themselves in a series of papers of great merit, which had been published from time to time in the *Pharmaceutical Journal*; and for present convenience he would endeavour to summarize what these gentlemen had done.

1. They examined experimentally the various methods of extracting the mixed alkaloids contained in nux vomica, and of determining the proportion in which they exist in the drug, and they supplied elaborate details of the one they considered the best, and in the course of these experiments they evolved a reliable process by which these alkaloids, strychnia and brucia, may be separated, the one from the other.

2. They reported upon the variation in alkaloidal strength of various samples of nux vomica as met with in commerce, from 3·9 per cent. to 2·74 per cent.

3. They reported upon the variation in alkaloidal strength of the tincture as met with in commerce, from 0·36 per cent. to 0·12 per cent.

4. They reported upon the variation in alkaloidal strength of the extract as met with in commerce, from 17·54 per cent. to 10·32 per cent.

5. Also that the relative proportions of the two alkaloids, strychnia and brucia, differ in different samples:—From 100 strychnia and 100 brucia to 100 strychnia and 179 brucia.

6. They reported that spirit of varying strength exerts different exhausting power on the drug, the most efficient being a mixture of 100 parts of spirit and 25 parts of water.

7. And in the light of these facts they conclude and recommend that the tincture and extract of nux vomica be authoritatively *standardized* as regards their *mixed alkaloidal* strengths, the standard they elect for the extracts being 15 per cent. of mixed alkaloids, and that of the tincture being 0·24 per cent.

Mr. Schacht continued — These results, Gentlemen, thus hastily summarized, represent a very large amount of work, and I beg to assure you, that work is of high order and deserves your careful study throughout.

I should like, however, to comment upon one or two points.

The plan Messrs. Dunstan and Short adopt and recommend for the estimation of the mixed alkaloids in the crude drug, the extract and the tincture, is described in full at page 442 of vol. xiv. of the Journal. It consists in obtaining a solution of the impure alkaloids in chloroform, washing them out as salts in acidulated water, precipitating with an alkali, dissolving the pure alkaloids in chloroform, evaporating the solvent and weighing the residue.

The method is undoubtedly accurate. A sample of the extract I here show you treated as above yielded to Messrs. Dunstan and Short 17·9 per cent. of mixed alkaloids, and to myself 18· per cent. But the process requires time and care, and a misadventure at any part of its course spoils the whole; it must be repeated from the beginning.

I have found a method of titration with potassic mercuric iodide, based upon the recommendations of Dragendorf, very nearly as accurate and much more easy of application. These are its details, as applied to the titration of the extract.

Prepare a test solution of potassic mercuric iodide by mixing 1·355 gram of perchloride of mercury with 4·98 grams of iodide of potassium and water to make 1 litre. Each c.c. of this solution precipitates 0·00184 gram of mixed strychnia and brucia.

Dissolve 1 gram of the extract to be examined in 30 c.c. of water, acidulated with 1 c.c. of hydrochloric acid, warm gently for half an hour and cool. Filter through paper and wash with water until the filtrate measures 100 c.c.

Of this solution take 10 c.c. in a small beaker and drop in from a burette sufficient of the test solution to throw down the whole of the alkaloids.

The point of completion may be determined, almost certainly, by the clearness of the supernatant liquor after stirring the whole with a glass rod, and may be confirmed by the addition of ammonium sulphide to a little of the filtered mixture which would render evident any excess of the precipitant. But the experiment is so easily and quickly performed that the result may be confirmed again and again with fresh quantities (10 c.c.) of the original solution under examination.

Of such a solution of 1 gram of the extract before you, 10 c.c. were found to require 9·7 c.c. of the test solution, and $0·00184 \times 10 \times 9·7 = 0·17848$; therefore, the sample contained 17·848 per cent. of mixed alkaloids.

This result coincides very nearly with those obtained by Messrs. Dunstan and Short, and by myself when employing the more elaborate method.

I think our authors scarcely did justice to this process as applied to the particular case before us. It may, perhaps, have received some undue laudation in respect of its power to titrate alkaloids generally, but, as I venture to repeat, in the case of the nux vomica alkaloids it appears to be reliable.

And now I wish to discuss the deductions and recommendations suggested by Messrs. Dunstan and Short as the practical outcome of their labours.

Struck by the great variation in potential activity of nux vomica and its preparations, as measured by the proportions of mixed alkaloids contained in them, they urge that these preparations, the extract and the tincture, be authoritatively standardized, and they suggest a fixed standard.

At first sight this suggestion is calculated to commend itself to general acceptance, but I find myself less pleased with it the more I examine it, and I conclude that without a great deal more knowledge than I think any one is at present possessed of, any attempts to standardize the medical potency of extract of nux vomica must be fallacious. There is no doubt that a large portion of the medical activity of the drug does depend upon the alkaloids it contains, but I am acquainted with no proof that all the rest is inert. Neither am I aware that the effect of brucia upon the human subject as distinct from that of strychnia has ever been clearly ascertained. I incline to the opinion (though I advance it with some reserve) that no physiological experiments of the kind required have ever been made with *pure* brucia, that is, absolutely free from strychnia, and that, therefore little is really known of its medical value. If we are to standardize at all, we should standardize each potential element by itself, and not a mixture of elements, one of which is of undetermined power. As this is a point that appears to me of importance, I draw your attention to this table. It is, in chief part, a copy of one given by Messrs. Dunstan and Short showing the variations in alkaloidal strength of ext. nux vomica, as met with in commerce, and the varying proportions of the strychnia and the brucia that constitute these "mixed alkaloids." The column on the right is my own and is intended to show somewhat more strongly the variations in these proportions; the figures represent the proportion of brucia to the 100 of strychnia. You will see that in the twelfth sample the two alkaloids existed in nearly equal proportions, or as 1 to 1, whilst in the eleventh sample the brucia was as over 1¾ to 1 of strychnia. I fear, therefore. that standardizing the extract by fixing its percentage of *mixed* alkaloids, with such contingencies before us, is misleading.

	Mixed alkaloids.	Strychnia.	Brucia.	Relative proportion of brucia to 100 of strychnia.
1	15·15	6·63	8·52	128
2	15·64	7·44	8·20	110
3	10·32	4·19	6·13	146
4	15·16	7·08	8·08	114
5	12·49	5·53	6·96	125
6	12·52	5·17	7·36	142
7	12·25	4·87	7·38	151
8	17·54	7·52	10·02	133
9	15·78	6·41	9·37	146
10	15·94	6·84	9·10	133
11	16·24	5·81	10·43	179
12	17·12	8·58	8·54	100

Having urged thus much against the general idea of standardizing, it may appear unnecessary to criticize the particular standard suggested by Messrs. Dunstan and Short. But doing so will serve to show another difficulty that would attend the practice. The percentage strength suggested by these gentlemen is 15; the sample before you, made with only ordinary care in the course of business in the laboratory of my own firm, contains 18 per cent. of the alkaloids. What am I to do with it to bring it to the required standard? Dilute it, perhaps, with spirit. Well, that would make it a clumsy soft mess to begin with, and it would soon dry up to its present condition of extra potency. Something else must be added to it; and that I should be sorry to sanction.

And if a sample comes out below the standard? Well, I suppose the batch must all be thrown away (for nothing in the form of alkaloid must be permitted to be added), unless, indeed, it be kept to dilute to the proper standard some future batch that turns out to be too strong.

I think considerations of the kind I have placed before you should make us hesitate before we endorse the final recommendations of Messrs. Dunstan and Short. We may thank them heartily for the good scientific work contained in their papers, but, I think, as prudent men, we should decline to follow them in assumptions that belong rather to other departments of medical authority than to that of pharmacy proper, and that are, to say the least, somewhat premature.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

A general meeting was held in the Society's rooms, on Wednesday evening, April 9. Mr. Preston, the President, in the chair.

The minutes of the previous meeting were confirmed.

The Secretary announced the following donation:—The *Pharmaceutical Journal*, from the Pharmaceutical Society.

The following gentlemen were elected members of the Society:—Messrs. J. H. Bradwell, W. Dutton, W. Clayton, John Clark.

A paper was read on—

A Plea for Botany.

BY G. A. GRIERSON.

Natural science of any kind is now recognized by all eminent authorities as being a most important factor in the training and development of the mind, and especially of that part of the mind wherein lie the powers of observation. In the words of one of our most eminent scientists,—"There is no object on which the youthful energy can be employed more worthily than in the pursuit of knowledge; no kind of knowledge can be more attractive than that which is presented by the works of creation; no source is more accessible; no fountain more inexhaustible; and there is none which affords, both in the mode of pursuing it and in its own nature, so complete or so beneficial a diversion from ordinary scholastic pursuits."

The advantages to be derived from botany may be looked at in two lights. First, from a naturalist's point of view, and, second, from a utilitarian's. Let us first listen to what the naturalist has got to say.

The famous aphorism of Lord Bacon,—"A little knowledge is a dangerous thing," has, I think, a noteworthy exception in the study of botany. For, surely, the little knowledge acquired from books by the dweller in a large town, which induces him to seek the country in order to put his knowledge into practice, is far from dangerous, either from an educational or from a physiological point of view. A science which for its study compels one to take long walks amid bracing air and refreshing scenery is surely not to be despised by him whose lot is cast in a large town amid the smoke and din of a money-making world, and who, but for an interest awakened in natural science, might never think it worth his while to leave the busy streets. Its action in strengthening and stimulating the physical powers is perhaps only equalled by its action on the mental. For quickening and developing the powers of observation I think there is no science can equal it, except, perhaps, zoology. The importance of the proper training and development of these faculties cannot be overestimated by anyone who aspires to the position of a cultured pharmacist, or, indeed, by the member of any profession, the complete success of which depends on observation and experiment. If these faculties were only better developed how many little points would be noticed in the business of every day which might lead to important results, for it is the acute observers and patient experimenters of past years who have placed technical knowledge in the position which it now occupies, and it is this technical knowledge, this applied science, which has given to England the position which she now occupies among other nations.

But besides these lasting advantages, consider the exquisite pleasure to be derived from the study of Nature. "A thousand wonders people the leaf; a museum of curiosities finds a home in the water drop; and the pleasure derived from a search in Nature's fields is one that no accident of life can mar, and no misfortune of existence take away." It is next to impossible for a thinking being to enjoy a ramble in the country or a sojourn by the seaside without a knowledge of the wonders which surround him on every side, and he who in some country ramble is questioned by some inquisitive youngster as to the name of some common plant will, I think, admit that even a little knowledge is better than none at all. Surely none of us aspire to the position of him of whom the poet sang—

"A primrose by the river's brim
A yellow primrose was to him,
And it was nothing more."

Nothing, surely, could impress us more with the power of plants in calling forth the best feelings of our nature than a story which is related of Linnæus, the "father of botany." It is related of him that on landing in England, and passing a heath of yellow flowering gorse, he fell down upon his knees and thanked God for making, in the common road and field, flowers so beautiful.

Let us now look at our subject from a utilitarian point of view, and look first at the uses of plants themselves and then at the uses of the study of plants.

Plants play a very important part in the cycle of organic life. Under the influence of sunlight the chlorophyll of the leaf decomposes the carbonic anhydride of the air, utilizing the carbon to build up its tissues, and giving back to the air the vitalizing oxygen. But for this wonderful provision the carbonic anhydride, which is continually exhaled from animals, would gradually accumulate in our atmosphere, and "the cessation of all vital phenomena" would merely be a question of time. But besides CO_2 plants absorb, from the air by which they are surrounded and the earth in which they grow, ammonia and water. These three substances are so acted on by the plant as to be converted into starchy and albuminous bodies, which we use as our daily food in the form of barley, wheat, oats, etc. The ligneous or woody portion of the plant, not being soluble in the human stomach, has to pass through an intermediate stage before we can use it as food. This intermediate stage is found in the herbivorous animals, such as the ox and sheep. These, from their great digestive powers, convert it into fatty matters, which reach us in the form of beef, mutton, etc., and are, I think, much appreciated, irrespective of the fact that their elements once existed in the form of grass. The influence which plants have on the rainfall of a country is, I think, too well known to require any comment.

Now let us look for a few minutes at the advantages to be derived from a study of those plants which play such an important part in the economy of Nature. "Nothing is more short-sighted than the *cui bono* cry of the ignorant against investigators in science. It is as short-sighted as the remark of Savarino, when he said:—'He who discovers a new dish does more for humanity than he who discovers a star,' forgetting that to astronomy we owe navigation." But exactly as navigation is an outcome of astronomy, or medicine an outcome of physiology and pathology, so is materia medica an outcome of chemistry and botany. We cannot expect to understand any science thoroughly without first grasping the principles on which it is founded. Now, materia medica is the science with which the experienced pharmacist is expected to be intimately acquainted, and this alone ought to be sufficient reason for botany commanding a larger share of attention than it does.

Professor Huxley, in speaking of the influence of science on the business of every day, says:—"As industry attains higher stages of its development, as its processes become more complicated and refined, and competition more keen, the sciences are dragged in one by one to take their share in the fray; and he who can best avail himself of their help is the man who will come out uppermost in the struggle for existence, which goes on as fiercely beneath the smooth surface of modern society as among the wild inhabitants of the woods." But some cynic may say, "We do not deny the advantages of chemistry and astronomy in the practical work of the world, but botany is only for those who have very little to do, and require some 'hobby' to keep them from moping." I should not for one moment think of refuting this by trying to show you all the benefits which have been conferred on the world by the study and application of the science of botany, simply because my knowledge is not extensive enough, and, besides, it would be rather beyond the scope of a paper such as this. But let us just glance at some of the benefits it has conferred on the science of medicine, with which we have the honour to be connected.

To enlist you in the cause of histological botany, I think it is only necessary to point you to the work done by Mr. Howard in the study of cinchona, and Schleiden in the study of sarsaparilla. But perhaps this is more the work of the specialist than of the ordinary pharmacist, time being an important factor in such investigations. Every pharmacist, however, is expected to know the difference between the leaves of such plants as belladonna, hyoscyamus, hemlock, stramonium, and such fruits as caraway, hemlock, dill, anise. Now, underlying all such knowledge, is a botanical principle, which must be understood before it can be applied. Is it not much more reasonable to get up the minutiæ of such knowledge from a study of the works of Nature than from mere book work? I think the most confirmed votary of practical business cannot but acknowledge that plants such as belladonna, hyoscyamus and hemlock are not only much more easily studied, but are much more interesting to study when growing "amid the wild magnificence of Nature," than when dry and lifeless they ornament the walls of a museum, or contribute to the profits of a pharmacy.

All materia medica books teem with botanical terms, and lead the student to think that botany is merely a science of hard names, a means to an end, not a study which can of itself yield both instruction and amusement. It is astonishing how easy the study of terms becomes, if there is only interwoven with it the element of practical work. The pleasure of finding out the name of some new plant by the correct interpretation of numerous hard terms, contained in the description of it, requires to be experienced in order to be appreciated. It is astonishing how a single success in commencing leads the aspiring student to explore further and further the "mine of Nature."

A very large portion of our materia medica is composed of plants not indigenous to our own country. Why is this? Probably one explanation is found in the fact that in warmer climates than our own the natural juices of plants are more thoroughly developed, as is the case with hemp. But I venture to think another reason is to be found in the fact that our native plants do not receive the study they merit from those who are, or should be, competent to make observations, and to deduce from these observations conclusions which might result in the introduction of many really valuable indigenous plants into our materia medica. Of late, several competent observers have come into the field, with the result that certain common wayside plants, known to the herbalist of old, but since discarded for want of more thorough investigation, have again been recognized as valuable from a therapeutical point of view. Dr. Quinlan, an enthusiastic worker in this field, has shown us the value of *Verbascum Thapsus* in phthisis, of the common plantain or ribwort as an astringent of no mean powers, and of *Galium aparine* or common goose-grass in the form of a poultice for ulcers; and quite recently the value of a yellow oil obtained from St. John's wort in the treatment of bedsores has been demonstrated by another worker in the same field.

But apart even from such motives as these, botany is worth studying if it were only for the glimpses it gives us of some of the internal workings of Nature. Like all other sciences, it is worth studying for its own sake, even if we could see no direct benefit to be conferred on the human race by its study. "All that science can achieve is a perfect knowledge and a perfect understanding of the action of natural and moral forces. Each individual student must be content to find his reward in rejoicing over new discoveries as over new victories of mind over reluctant matter, or in enjoying the æsthetic beauty of a well ordered field of knowledge, where the connection and the filiation of every detail is clear to the mind; and where all denotes the presence of a ruling intellect, he must rest satisfied with the consciousness that he too has contributed something to the increasing fund of knowledge on which the dominion of man over all the forces hostile to intelligence reposes."

Now that spring has got well advanced, we are almost in the midst of those innumerable gems in whose cause I have tried to enlist your sympathies.

"Scattered by Nature's graceful hand,
In briary glens, o'er pasture land,
The fairy tribes we meet;
Gay in the milkmaid's path they stand,
They kiss her tripping feet."

Few towns are so favourably situated for the study of botany as Sheffield. It is in the centre of a district teeming with all orders of plants, and all that is wanted to secure them and obtain from them lessons to carry through life with us is a little time and inclination. The former element is generally rather a scarce one with chemists' assistants and apprentices, and so prevents the proper development of the latter; but the inclination, if present, will generally manage to find the time, even if at some inconvenience. At all events, let us cultivate the inclination, and perhaps "the powers that be" may gradually come to see that it is to their own interest to foster the spirit of scientific inquiry, and to grant a little more time for its due development.

A discussion ensued, and at the conclusion a hearty vote of thanks was awarded Mr. Grierson, on the motion of Mr. Thacker, seconded by Mr. Smith, for his interesting and instructive paper.

LIVERPOOL CHEMISTS' ASSOCIATION.

The twelfth general meeting of the thirty-fifth session was held at the Royal Institution, March 27. Mr. Edward Davies, President, in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations to the Library were announced:—The *Canadian Pharmaceutical Journal*, from the Editor; The *Pharmaceutical Journal*, from the Society; The *Pharmaceutical Record*, New York, from the Editor, and the 'Thirty-first Annual Report of the Free Public Library and Museum and Walker Art Gallery, 1884,' from the Council of same, and a copy of the 'New Pharmacopée Française,' 1884, from Mr. A. C. Abraham, F.C.S.

A vote of thanks was passed to the donors, and Mr. Conroy moved, Mr. Parkinson seconded, and it was resolved:—"That a special vote of thanks be given to Mr. A. C. Abraham for his handsome donation to the Library."

The President stated that a complimentary dinner had been given to Mr. A. H. Mason, F.C.S., their late Vice-President, at the Stork Hotel, Queen Square, on Thursday, March 20, which was attended by forty-four gentlemen, and proved, in every way, a very gratifying success; also that Mr. Mason had that day sailed for Canada, bearing with him the best wishes of the Council and members of the Association.

Mr. J. C. Hornblower showed a lump of stone, weighing about 2 lbs., which had been found in an original package of gum assafœtida. The stone had evidently been faced with the gum and passed off as assafœtida.

Mr. Davies thought the stone was calcium carbonate.

Mr. Conroy said it was not at all an uncommon thing to find these stones as adulterants in packages of assafœtida, and he had known, in one instance, as much as 60 per cent. of the contents of an original package consisting of these stones. He considered they were indebted to Mr. Hornblower for drawing attention to the matter.

Mr. Parkinson drew attention to some oil of sweet almonds he had in his store, in which a sort of gelatinous matter was floating, and desired an explanation.

Mr. A. H. Samuel said it was no doubt mucilage, which was found in most vegetable oils, and was usually removed in the process of refining.

The President then called upon the Honorary Secretary to read the paper of the evening, contributed by Mr. M. Whitley Williams, of London, entitled,—

NOTES ON THE AMMONIA PROCESS FOR ESTIMATING NITRIC ACID.

BY M. WHITLEY WILLIAMS.

Some four or five years ago I was led to make some experiments on the transformation of nitric acid into ammonia by observing, in the course of some analyses, very peculiar variations in the rate at which the nitric acid was reduced. The method I was employing was based upon the too little known fact, which we owe to Dr. Gladstone and Mr. Tribe, that zinc when coated with precipitated copper has its chemical activity so highly increased as to be able slowly to decompose distilled water at ordinary temperatures, a decomposition which results in the evolution of hydrogen and the formation of zinc hydrate. In presence of a dissolved nitrate the hydrogen is no longer evolved, at all events as gas, but the nitrate is reduced to nitrite and almost simultaneously the latter is transformed into ammonia.

When we consider that to do this we add nothing to the solution beyond a mere trace of hydrate of zinc, the reaction will obviously strike us as so singularly neat and clean (from a chemical point of view) as to offer peculiar advantages as a means of analysing nitrates. Provided always that it can be proved stoïchiometrically correct and can be made sufficiently rapid to be practicable.

To ascertain its stoïchiometric accuracy was my first care, and in this I was so far convinced of the completeness of the transformation as to feel satisfied that it was effected with much greater nicety than the methods of estimating ammonia permitted me to prove. A quantity of nitre sufficient to yield 1·685 parts of ammonia was successively by the most rigid method proved to yield 1·67, 1·69, 1·68, 1·69, 1·68, 1·68, 1·68, 1·70 and 1·67 parts of ammonia, a result which of itself is sufficiently creditable even to the methods of estimating ammonia.

It would take more time than I can now spare to conduct you through the experiments I made to ascertain the precise conditions under which the transformation takes place with the greatest rapidity. I cannot even now pretend to be master of them all, but so far as the usual necessities of the analyst are concerned, I believe the information obtained to be sufficient. Cold retards and heat greatly expedites the reaction; alkalies and particularly alkaline and earthy carbonates also retard it, while free carbonic acid or the merest traces of other acids make it proceed at a rate quite marvellously increased when we take into account the small amount employed. Thus, a nitre solution requiring about fifteen or twenty hours for complete reduction, in presence of carbonic acid was practically reduced in about two hours, while less than one-tenth per cent. of a mineral acid in solution completed the reduction in an hour.

But the most unexpected result was that small quantities of neutral alkaline or earthy salts had also an enormous accelerating influence. Thus one-tenth per cent. of sodium chloride about quadrupled the rate.

It is clear that with this information the analyst can at will obtain any reasonable rapidity desired. Let him use an elevated temperature, add either carbonic or other acid, or if he please a little common salt, or further still let him remove or decompose alkaline or earthy carbonates, and his reaction can be completed within an hour to a certainty. In the analysis of natural waters it is found that dissolved carbonate of lime has an extraordinary power of retardation. To transform this into an acceleration it is only necessary to add a little crystal of oxalic acid, the lime is removed out of the sphere of action and the liberated carbonic acid with any excess of oxalic acid then serves the most useful purpose.

Since I published an account of this work in 1881, the process has grown into much favour and has attracted much criticism, of which some little is naturally unfavourable; yet the general utility of the method has, I am happy to say, been invariably recognized, and I doubt not sincerely felt, and for a reason sufficiently well founded in human nature. The method is so easy. To estimate the nitrates, say in a natural water, place some strips of clean zinc foil slightly crumpled in a wide-mouthed stoppered bottle, about 1 square decimetre to 300 c.c. of the water, and cover it with a 3 per cent. solution of crystallized copper sulphate solution. When the zinc has acquired a copious black but firmly adherent coating of copper, the solution is drained off and the copper-coated zinc gently washed by covering it two or three times with water. A portion of the water to be analysed is then poured on it to displace adhering distilled water and the bottle then nearly filled with it, the stopper inserted, any acid or salt added at the discretion of the analyst and the whole allowed to digest in a warm place till a little of the solution withdrawn gives no reaction of nitrous acid by Griess's metaphenylene diamene or naphthylamine test. The disappearance of the last trace of nitrous acid marks the end of the reaction. Or the analyst who does not care to trouble himself with testing may simply leave the digestion over a single night, feeling assured of a complete reduction in the morning. The titration of the ammonia is then made upon a measured volume of the fluid, diluted if necessary, or distilled, if the Nessler reagent produces an unavoidable turbidity as happens with some waters, particularly those containing much sulphates or certain other salts.

And here I would remark upon the extreme complexity of the conditions affecting the process termed familiarly *nesslerization*. Very few who use the process have reflected much about them, but many salts exercise influence, those even in the reagent itself affecting its sensitiveness and accuracy, while the proportion of oxide of mercury dissolved plays an essential part in the reaction. As a rule it may be laid down that the best conditions are those which most nearly approach to absence of all negative radicals save iodine and the maximum of mercuric oxide. Again, equality of temperature in the solutions is necessary, and I have observed that with the ordinary reagent the lowest temperatures appear to give the most delicately comparable tints.

I would further remark upon the very unsatisfactory nature of the glasses usually employed in this process. Seldom are two so exactly similarly "barrelled" as to show no difference when two apparently equally tinted fluids are transposed into each other's vessels. I have recommended for precise purposes, and always used, exactly cylindrical vessels made from glass cylinder with plate glass ends cemented with canada balsam, or clipped on.

These may be divided lengthwise into millimetres, and occasionally used for comparing the depths necessary to produce equality of tint. For the metaphenylene diamine estimation of nitrous acid this is peculiarly well adapted, and the results appear to suffer little or no error through the colour being produced in somewhat different strengths of solution.

Commenting on my method in the *Analyst* some time ago, Blunt has made a suggestion well worthy of trial. He suggests that in analysing a water containing lime a certain quantity should be treated with oxalic acid (say about $\frac{1}{20}$ per cent. A portion placed on the coppered zinc, and then instead of using distilled water for the comparison fluid, an equal quantity of the prepared water should be employed. In case of turbidity, he informs us that in this way an equal turbidity being produced in both fluids the determination is not interfered with.

And now my time is short and I cannot refer to some new work on the subject of nitric acid with which I have recently been engaged. It refers to the frequent presence of nitric acid in distilled water, which I believe to have traced by the aid of this process to its proper source. What that source is I must leave unsaid for the present, for I believe you would most unhesitatingly, and I think most properly, reject if I did not substantiate it with a suitable and detailed account of my work; but with your permission I will on a future occasion endeavour personally to show you by experiment.

Mr. A. H. Samuel, F.C.S., moved that a hearty vote of thanks be accorded to Mr. Williams for his valuable communication.

Mr. Ward, in seconding the vote, said he was much struck with the accuracy of the results obtained by the new method with such a small an amount of labour.

The discussion was continued by Messrs. A. C. Abraham and Conroy, and the vote was carried by acclamation, and the proceedings terminated.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The twelfth meeting of the session, being the Annual Business Meeting, was held on the evening of Wednesday, April 2, at 9.15. Mr. C. F. Henry, President, in the chair.

The minutes of last meeting having been read and confirmed, the Chairman called upon the Treasurer to read the financial statement, which showed an increase in the income from annual subscriptions of £1 19*s*., a balance of £9 18*s*. 7*d*. being left in the Treasurer's hands.

The Assistant-Secretary then read the annual report, in which the Committee congratulated the Association on the gratifying increase of membership. Last year there was an increase of fourteen. This year the membership is further increased by seventeen. The number of members on the roll, last year being seventy-two, is now eighty-nine. It is worthy of note that the Association has almost doubled its membership in three years. Of those who joined the Association this session the larger number are apprentices, and it is hoped that this is a sign that an increasing number of candidates will become aspirants for the honours of the two prize schemes now conducted by the Association. The meetings were again held at fortnightly intervals, and the syllabus carried out in its entirety. All the papers had been contributed by members of the Association. A new and successful feature had been introduced, this session, in the form of papers on "Chemistry" and "Botany," intending to guide those preparing for the examinations of the Pharmaceutical Society. On two occasions the Association had been honoured by the presence and expressions of goodwill from members of the North British Branch. The open meetings held in November and January had been largely attended, showing how they were appreciated. The ordinary meetings, as a whole, had been well attended, and an increased desire to carry on the work of the Association had been shown by the members. A memorable event of this session had been the institution of the "Ainslie Pharmacy Prize," the outcome of the handsome gift of Mr. W. Ainslie. There are two prize schemes conducted by the Association, and the successful results of the examinations were a matter for congratulation. The finances of the Association continue in a most satisfactory state. The Committee recorded its indebtedness for most valuable assistance received from the esteemed Secretary of the North British Branch. The report concluded by expressing the hope that the Association will continue to make that satisfactory progress in the future which has distinguished it in the past.

The financial statement and report having been adopted, it was decided to forward £1 1*s*. to the Benevolent Fund of the Pharmaceutical Society.

A vote of thanks was heartily accorded to the retiring office-bearers and Committee.

The office-bearers and Committee for next session were then elected as follows:—President, Mr. W. S. Turnbull; Vice-President, Mr. J. R. Hill; Secretary Mr. W. Pirie; Assistant-Secretary, Mr. W. H. Duncan; Treasurer, Mr. J. B. Dunlop; Members of Committee, Messrs. Boa, Bowman, Hendry, Henry, Manson, Robbie, Robertson and Stephenson; and as Members of Prize Committee, in addition to the President, Vice-President and Secretary, there were elected Messrs. Boa, Henry and MacEwan.

After other business had been disposed of, the proceedings terminated.

Proceedings of Scientific Societies.

CHEMISTS' ASSISTANTS' ASSOCIATION

At a meeting of the above Association, held on April 9, Mr. C. Parkinson (President) in the Chair, a paper on "Operative Dentistry" was read by Dr. Albert J. Kutz, D.D.S.

After a few introductory remarks, the author alluded to the prevention and cure of "Caries," the great method of prevention being to keep the teeth clean; for this purpose the author recommended that the teeth be cleaned four times a day at least, once after each meal and thoroughly rinsing the mouth before retiring being necessary. In the morning a good tooth-powder should be used and after each meal the particles of food should be removed from between the teeth with a quill tooth-pick; metallic picks should not be used as they are liable to damage the enamel. The best method of applying the tooth-brush was then described, and the occasional use of a silk thread with powder on it and drawn between the teeth was recommended. The process of filling or stopping teeth was then given in detail. The materials used for stopping were next mentioned, gold being specially alluded to; the two kinds of gold in use being the adhesive and non-adhesive. The gold is supplied to the dentist in the form of leaves of various thickness and also in soft spongy masses called crystalline or sponge, plastic and shred, all of which are very adhesive. Cohesiveness is the name given to that quality of gold, by which one portion by pressure becomes so incorporated with another as to make a mass about as solid as coin. The author then mentioned the cases in which adhesive or non adhesive gold was the most preferable for use, giving the reasons.

A discussion followed, in which the President, Messrs. Axford, Carter, Cracknell and Millhouse took part.

A vote of thanks to Dr. Kutz terminated the proceedings.

Parliamentary and Law Proceedings.

Prosecutions under the Pharmacy Act.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* MAY.

At the Edmonton County Court, before J. T. Abdy, Esq., LL.D., Judge, on Tuesday, April 8, the Council of the Pharmaceutical Society of Great Britain sued R. May, of Ponder's End, to recover two penalties of £5 each, first for keeping open shop for the retailing, dispensing or compounding of poison, and second for taking, using or exhibiting the name, style or title of "chemist," contrary to the provisions of the Pharmacy Act, 1868.

Mr. Wallace, instructed by Messrs. Flux, Son and Co., appeared for the Society. Mr. Avery, solicitor, appeared for the defendant.

It was admitted by defendant's solicitor that defendant had sold poison and used the title of "chemist," thereby incurring the penalties sued for, and he only addressed the Court with reference to defendant's character.

His Honour held that he had not to take into account the defendant's character. Defendant had incurred the penalties sued for, and he gave judgment for the plaintiffs accordingly,

And upon application, His Honour held that the case was one of public interest and for the public benefit, and therefore gave judgment for plaintiffs with costs on the higher scale.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* BLYTHER.

At the Edmonton County Court, before J. T. Abdy, Esq., LL.D., Judge, on Tuesday, April 8, the Council of the Pharmaceutical Society sued G. F. Blyther of High Road, Tottenham, to recover two penalties of £5 each, first for keeping open shop for the retailing, dispensing or compounding of poison, and second for taking, using or exhibiting the name, style or title of "chemist," contrary to the provisions of the Pharmacy Act, 1868.

Mr. Wallace (instructed by Messrs. Flux, Son and Co.) appeared for the Society. The defendant did not appear.

Evidence was given that a prescription which contained "strychnia" was made up at defendant's shop on the 15th ult., that upon the bill in which the bottle was wrapped were the words, "Sold by Wall, Family and Dispensing Chemist, High Road, Tottenham," and that there appeared over defendant's shop the words, "Blyther, successor to the late W. J. Wall."

Proof of the death of Mr. W. J. Wall having also been given, and that there was no chemist of the name and address of "Wall, High Road, Tottenham," His Honour gave judgment for the plaintiffs for the two penalties with costs on the higher scale.

Poisoning by Prussic Acid.

An inquest was held at Northallerton on the body of Dr. Henry Brown, on April 12. Mrs. Brown, the wife of the deceased, stated that on Thursday evening she left him in the surgery, writing. As he did not return she sent for Dr. Richmond, who paid a visit to the surgery, on pretence that he wanted to borrow a syringe. Dr. Brown said he would return home in a quarter of an hour. Dr. Richmond said that later in the evening he was standing in the street, and saw Dr. and Mrs. Brown walking arm in arm. After midnight he was called out of bed by Mrs. Brown, and proceeded at once to her residence. He found Dr. Brown lying on the sofa, breathing heavily. He instructed them to send for another medical man. He put his fingers down Dr. Brown's throat to make him vomit, but failed. His eyes were fixed. He detected a strong smell of prussic acid. He applied the stomach pump, and washed the stomach out. The fumes of prussic acid were so strong that he had to turn his head away. Dr. Brown died at half-past twelve o'clock. He (Dr. Richmond) sent for the police. He found upon the mantelpiece a bottle of prussic acid. He went with the police-constable to Brown's surgery, and found the letter that he had been writing. The terms of the letter left no doubt that the writer was insane. The cause of death was poisoning by prussic acid. Inspector Beswick gave confirmatory evidence, and the Jury returned a verdict in accordance with the medical evidence.—*Leeds Mercury.*

ANSWERS TO CORRESPONDENTS.

Erratum.—On p. 812, col. ii., line 14 from top, the name of the speaker should be "Mr. Gravill," instead of "Mr. Hadfield."

F. Moore is recommended to experiment with some varieties of "aniline blue" until he obtains the shade that he requires.

Mr. McBeath is thanked for his communication.

A. E. I.—We have never heard of the existence of such a poisonous principle and should be inclined to believe that a mistake has been made. With respect to the proprietary article mentioned we know of no other means of ascertaining its composition than by analysis.

David.—*Vaccinium Myrtilus.*

Omega is recommended to consult a solicitor.

H. P. F.—If we have been successful in deciphering your handwriting, the phrase appears to be a quotation from a well-known litany, and with a moderate knowledge of Latin there should be no difficulty as to its translation.

Communications, Letters, etc., have been received from Messrs. Hocken, Yewdale, Symes, Edwards, Moderate Apprentice, J. W. P., X. Y. Z.

"THE MONTH."

Considering the comparative immunity that has been hitherto enjoyed in these islands from earthquake shocks and the consequent absence of any provision for obtaining accurate and systematic seismological records, it is not surprising that the reports of the phenomenon which has caused so much alarm in the eastern counties during the last week should be characterized by extreme vagueness as to its occurrence and duration. Still, it may be expected that further light will be thrown upon these points, and, in fact, an interesting contribution in this direction has been already contributed to the *Leeds Mercury* by Messrs. Reynolds and Branson. Those gentlemen state that upon examining the diagram traced by their recording barometer on Tuesday they found that between 9.15 and 9.30 a.m. the ink-line thickened suddenly, whilst a gentle movement downwards was shown. A thickened line continued to be produced until 1.30 p.m., when the tracing regained its ordinary character. During this period of four hours six distinct undulations were registered, the greatest of which measured 0·025 in.

An ingenious modification of the process of bleaching has been introduced by Mr. J. B. Thompson, which promises to effect a great saving of time and labour. In the ordinary process the goods to be bleached are usually first boiled with lime for about seven hours, after which they are washed in water and "soured" by steeping them for four or five hours in water acidulated with hydrochloric acid. Then after another washing they are boiled for nine hours in soda ley, again washed, and next submitted to the "chemicking" process, which consists in steeping them in a dilute solution of chloride of lime for four hours. With the exception of the lime boiling this treatment is repeated several times, involving in the case of cotton goods some sixteen distinct operations, extending over a period of five to eight days. In Mr. Thompson's process the "souring" and "chemicking" operations are combined in one. The goods are placed in an air-tight "kier," connected on the one hand with a vessel containing a dilute solution of chloride of lime, and on the other with a gas-holder containing carbonic acid gas. A charge of the bleaching solution is first pumped in and the goods are allowed to soak in it during five minutes, after which communication is opened with the gas-holder and the liquor is run out from the bottom of the "kier." The partial vacuum thus created causes an inrush of the gas, and the goods are subjected to its action for fifty-five minutes, by the end of which time the whole of the chloride has been decomposed in contact with the fibre of the cloth. Bleaching liquor is then again pumped into the "kier," driving the gas back into the gas-holder, and these processes are repeated alternately according to the necessity of the case. Lastly, the goods are passed through a solution of triethylrosaniline and oxalic acid, which removes the natural faint yellow tinge from the cotton.

The interesting results obtained by Grimaux and Gerichte, establishing the close relationship existing between morphine and codeine, have induced Mr. W. C. Howard to take up the examination of thebaine, another opium alkaloid in which nitrogen and oxygen are present in the same proportions as in those two, the empirical formulæ by which the three are represented being—morphine $C_{17}H_{19}NO_3$, codeine, $C_{18}H_{21}NO_3$, and thebaine, $C_{19}H_{21}NO_3$ (*Berichte*, xvii., 527). Attempts made to add hydrogen atoms to the thebaine molecule so as to raise it to a homologue of morphine were unsuccessful. It was observed, however, that when thebaine was heated in a closed tube to about 90° C. with fuming hydrochloric acid, there occurred after a short time an abundant separation of crystals, whilst upon opening the tube there was an escape of a combustible gas. These crystals proved to consist of the salt of a new base, represented by the formula $C_{17}H_{17}NO_3$, and called "morphothebaine" to indicate that it is a decomposition product of thebaine as well as its probable near relationship to morphine. Whether in the decomposition that occurs one equivalent of HCl is taken up and one equivalent of C_2H_5Cl evolved, or two equivalents of HCl are taken up and two equivalents of CH_3Cl evolved, has not yet been determined, though from the fact that an ethoxyl group has not yet been observed in organic bases the latter is thought most probable. On the other hand, only a monoacetyl compound was obtained, though this may be attributable to one of two hydroxyl groups being more readily acetylized than the other, as has been observed in the case of morphine (see before, p. 603.) An analogous compound was obtained when hydrobromic acid was substituted for hydrochloric acid. It may be remembered that Grimaux looks upon thebaine as morphine-ethylether ($C_{17}H_{18}NO_2 \cdot OC_2H_3$), though it has not yet been derived from morphine in this way.

Following up the investigations of Drs. Frazer and Brown in this country and many observers abroad, upon the relation between chemical constitution and physiological action in organic compounds, Dr. Stolnikow, of St. Petersburg, has been experimenting to ascertain the importance of the hydroxyl group in certain poisons (*Zeits. f. phys. Chemie*, viii., 252). It has been shown by Grimaux, and confirmed by Hesse and others, that morphine resembles a phenol in constitution, and that it contains a hydroxyl group, the hydrogen of which is replaceable by the methyl group (CH_3) to form codeine, which may therefore be considered the methyl ether of morphine. With this change, however, the physiological properties of the compound are modified, the narcotic action giving place to a tetanic action. Further, if, instead of the methyl group, the ethyl group (C_2H_5) is introduced, forming a new body that has been named codethyline, the tetanic action becomes more pronounced. Dr. Stolnikow's experiments were directed to ascertaining the effect when instead of an active alcoholic group an indifferent group is substituted, using what he calls a "morphine sulphuric acid ether," which is morphia minus a hydroxyl group and plus a residue of sulphuric acid:—

Morphine. . . . . $= C_{17}H_{18}NO_2\ (HO)$.
Morphine sulphuric acid ether $= C_{17}H_{18}NO_2\ (SO_4H)$.

Comparative experiments were also made with phenol, pyrogallol and resorcin, and with derivatives of those bodies in which a similar substitution had been effected. The general conclusions arrived at are that the toxicity of the original bodies is intimately bound up with the hydroxyl groups they contain; and when these are replaced by the indifferent sulphuric acid group, poisons are obtained which are far weaker, but which, as in the case of morphine and morphine sulphuric acid ether, are not at all altered in their nature.

The marked success that has attended the use of the oleates has induced Dr. Shoemaker to experiment with fresh compounds, and he reports (*Med. Bulletin*, vi., 38) that he has obtained valuable results from the use of the oleates of nickel and tin. The nickel oleate is prepared by the double decomposition of nickel sulphate and sodium oleate. It is described as a green, amorphous, waxy, tasteless substance, having a most decided astringent action, almost bordering upon the effect of a caustic. In cases of chronic eczema of the extremities, where the skin was hard and leathery, it is said to have given good results, and it is now being tested upon old ulcers and cancerous affections of the skin. An ointment is used of the strength of 15 grains of the oleate to 1 ounce of lard. The tin oleate, as prepared by the double decomposition of tin chloride and sodium chloride, is greyish yellow, of an unguent consistence and has a marked metallic taste. It has been found of great utility in giving lustre to diseased nails that have been abnormal or deficient in growth, and to assist by its local action in overcoming split and soft conditions of nails that often follow certain skin affections and external injuries. Combined with a little carmine, it is said to form an elegant toilet article, imparting a beautiful polish to the nails, and by its astringent action modifying the ragged and attenuated state of the skin at their base which gives rise to the troublesome affection of "agnails."

Dr. Lewis states (*Med. Bulletin*, vi., 46) that the odour of iodoform is "almost destroyed" by an admixture of an equal quantity of oleate of zinc. As the application of preparations of zinc has been suggested in many cases in which iodoform is used it is thought that this combination may be advantageous, especially where iodoform is found too irritating to apply alone.

Aluminium and its compounds are affirmed by Dr. Pick (*Med. Bulletin*, vi., 62) to constitute a most effective remedy against pulmonary tuberclosis, this opinion being based on experiments upon rabbits, as well as observations in clinical cases. In one of the latter, where infiltration of the apices of the lungs had occurred, removal of the lesion and all morbid symptoms is said to have followed the administration of aluminium in the following form:—Metallic aluminium, 8 grams; aluminium hydrate, 5 grams; calcium carbonate, 5 grams; gum tragacanth, q. s. Divided into sixty pills, one pill being taken three times a day.

The disagreeable taste and persistence of the odour in the breath which appear to be serious inconveniences attending the adminstration of paraldehyd, are calling forth the ingenuity of German dispensers. Herr Sutter (*Pharm. Zeit.*, April 9) says that he finds rum to be the most advantageous corrigent for masking the taste, and he gives the following formula which he says yields a mixture resembling cold punch:—

℞ Paraldehyd, 100
Jamaica Rum, 150–200
Tinct. Cort. Citri vel Aurantii Rec., 10
Syr. Simp., 300
Aquæ, 1390–1440.

Dose 100 grams. For the adminstration of paraldehyd as a clyster, he recommends a mixture in the proportion of one part of paraldehyd to two parts of olive oil. Herr Hellwig speaks favourably of two mixtures, (*a*) paraldehyd, 3; ol. oliv. 15; ol. menth. pip. gtt, 3; and (*b*) paraldehyd, 3; spiritus, 6; syr. simp., 8; and tinct. vanill., 2. But he prefers an emulsion of paraldehyd, 3; mucil. gum. acac. and syr. cort. aurant. āā 8, with the addition of two or three drops of ol. menth. pip.

M. Pierre Vigier has called attention to a subject which is worthy of being followed out both by prescribers and pharmacists. He points out that certain tinctures when mixed together in a prescription are likely to give rise to precipitates which may affect to a considerable extent the strength of the mixture. Thus a resinous tincture made with 80 or 90 per cent. alcohol will have its resinous matter precipitated by alcohol of 60 per cent. In other cases some of the constituents of a weak tincture may be thrown down by a stronger one. In rarer cases, as in that of tincture of calumba and tincture of cinchona, where tinctures of equal strength are mixed, a precipitate will be formed (*Practitioner*, p. 294). This will probably be especially the case where tinctures containing tannin are prescribed with other liquids containing an alkaloid such as ipecacuanha wine.

A new use for salicylic acid is coming to the front, Dr. J. C. Ogilvie Will (*Brit. Med. Journ.*, March 29, p. 602) describes a case of thickened epidermis of the foot, in which the whole anterior of the foot had become in two months like hippopotamus hide, but was completely cured in three weeks by the use of salicylic acid plaster. The advantages of salicylic acid in curing corns are well known. Dr. Will thinks that there is a very wide field of usefulness for this agent in some morbid conditions of the skin, the treatment of which has hitherto proved extremely difficult.

In the *Brit. Med. Journ.* (p. 605), a case of opium poisoning, in which other remedies had failed, was cured by the subcutaneous injection of $\frac{1}{60}$ grain doses of sulphate of atropine. The patient had taken a quantity of laudanum and paregoric, together, equal to 17 grams of opium.

Hydrochlorate of cocaine has been tried with apparent success by Aschenbrandt in the treatment of exhaustion arising from sunstroke, loss of blood and diarrhœa. In all the cases, particularly in those of the last-mentioned disease, the results obtained were such as to render further trials of this alkaloid desirable. The dose used was from 5 to 20 drops of a 1 per cent. solution (*Therapeutic Gazette*, p. 111, from *Deutsche medicinische Wochenschr.*).

The use of bichloride of mercury as an antiseptic appears to be increasing in favour. Dr. R. Caeestatt, of Uruguay, in the *Münchener Intell. Blatt* (March, 1884) recommends the topical application of a solution of 1 part in 10,000 in the treatment of diphtheria, the part affected being painted every hour with the sublimate solution, using a fresh feather or brush each time. At the same time he gives chloral in larger or smaller doses and disinfects the patient's room by sprinkling the floor with a 2½ per cent. solution of carbolic acid (*Med. Press*, April 9, p. 340). It may be useful to point out that in the abstract from which this quotation is made 1 part in 10,000 is incorrectly stated to be about a gram to the pint.

Dr. Quinlan (*Brit. Med. Journ.*, April 5, p. 664) now recommends the mullein (*Verbascum Thapsus*) to be smoked as a remedy for cough. In a case which he has recently recorded considerable relief was afforded by its use in this way. A sample of the plant was lately found to contain belladonna leaves, as well as other leaves which were not those of *Verbascum Thapsus*. It is desirable, therefore, before the entire credit is given to mullein that careful experiments should be made with selected leaves of that plant.

Dr. Chèvon, in *Le Progrès Médical* (Feb. 23), has recommended veratria as a prompt remedy for pruritus, whether arising from prurigo, urticaria, eczema, herpes, or without any eruption at all. For this purpose he uses an ointment of 1 part of veratria to 120 of lard, but when the pruritus is general he prefers the internal administration of the alkaloid, and gives it in the form of pills. Two centigrams of the alkaloid are made into ten pills with liquorice powder, the dose being one pill three times a day, an additional one being given each successive day until a maximum dose of six is reached (*Med. Times*, April 12, p. 509).

Dr. Hicks, writing in the *New York Medical Journal*, expresses his surprise that coca is so seldom employed, and states that he has found it useful in backache, with high-coloured urine, and excess of uric acid and urates; in short breathing from weakness of the muscles of respiration; in palpitation due to dilatation or weakness of the muscles of the heart; in the craving for alcohol, which it destroys; in headache resulting from over-exertion; and in sick-headache, when given in small doses.

Dr. Bury Hart, led by the statement of Dr. Matthews Duncan that the vomiting of pregnancy is probably influenced by the liver, has tried the effect of iridin, which he states in eight cases out of nine has proved effectual. The dose given has been 2 grains, taken at night and followed by a saline aperient in the morning (*Med. Times*, April 19, p. 539).

At a very influential meeting at the Parkes Museum on March 27 last, at which Dr. Watson Cheyne gave a demonstration of pathogenic micro-organisms, the Chairman, Sir Joseph Lister, remarked that the interesting fact that the bacillus of septicæmia of the house mouse was not capable of causing the disease in the field mouse, led him to conceive that if the slight difference in the blood of these two animals was sufficient to alter the conditions favourable to the development of the bacteria, it was possible by the administration of some medicines that sufficient alteration might be produced in the blood of the human system to kill off or prevent the development of any special bacteria on the first appearance of the symptoms of the disease in the patient.

An examination of the bacteria found in the human intestines has been made by T. Bienstock. He found that in healthy men these belonged exclusively to the group *Bacillus*, their spores alone having sufficient power of resistance to the antiseptic action of the gastric fluid. Of this group five distinct forms were observed, but of these only two manifested any remarkable chemical or physiological properties. These two are invariably present in the digestive canal below the stomach in individuals beyond the age of suckling. The one form causes the decomposition of albumen: this was absent in the intestines of infants fed only on milk. The other has only the power of splitting up carbohydrates, from which it forms alcohol and lactic acid. After cultivation for from twenty to sixty generations these bacilli still retain their power. (*Journ. Microsc. Soc.*, p. 267).

According to some experiments made by G. Bufalini (*Brit. Med. Journ.*, March 29, p. 626) the poison of viperine differs from that of the colubrine snake in resembling the action of an alkaloid, inasmuch as the blood of animals poisoned with viperine poison is not capable of causing death when injected into another animal, whereas that of animals poisoned by the colubrine snake can do so. The difficulty of finding a general antidote for snake bite is thus increased, since it is obvious that what may be an antidote in one case is not likely to be so in another.

In an article in the *American Journal of Pharmacy* (p. 188), translated from the *Pharmaceutische Rundschau*, on "Pipitzahoic Acid," Dr. Charles Mohr gives two figures of species of *Perezia*, whose roots yield this beautiful substance, and states that *Perezia Wrightii*, Gr., yields larger quautities of the acid than *P. nana*, Gr.

Some investigations made by Kugler on the suberin of the *Quercus Suber* indicate that it has a relationship with the fatty oils. He regards it as a fatty oil, composed chiefly of stearine and the glycerine compound of a new acid, phellonic acid, $C_{20}H_{42}O_3$, which has a melting point of 96° C. This throws some light on the formation of Japanese wax in the epidermis of the fruits of *Rhus succedanea*, and of Carnauba wax on the leaves of *Corypha cerifera*, which appear to result from the suberization of the cell walls.

In the *Journal of Botany* (April, p. 124) Mr. Greenwood Price points out that crystals of the colouring material present in the petals and other parts of plants are not, as a rule, easy to obtain, but that they can be easily seen in the well-known stove plant *Justicia speciosa*. If a fragment of a stamen of this flower be mounted in dilute glycerine jelly, not too hot, the colouring matter collects in a few hours in the form of minute, slender prisms, forming a very interesting microscopical object under a quarter-inch objective.

From some researches made by H. Pick it would appear that the red colouring matter of the young shoots and leaves of trees and perennial plants, such as the oak, rose, willow, and cinnamon, is always connected with the presence of tannin, at the expense of which it is formed under the influence of the direct action of sunlight and a low temperature. By the experiment of growing plants behind a screen of the solution of this red colouring matter it was ascertained that the red light is especially favourable to the absorption and transport of starch. The bright red colour of the fruit of *Rivina humilis*, and the bracts of *Euphorbia fulgens*, is, however, according to T. Hildebrand, produced by the superposition of cells containing different pigments of orange and violet-red, and the colouring matter of the bright red root of *Wachendorffia thyrsiflora* is due to a coloured fluid substance in the cells, which is formed even in absolute darkness.

The gourd, *Cucurbita Pepo*, contains large sieve-tubes, from which, when wounded, a juice flows out in large quantities, of an alkaline reaction, which can easily be separated from the ordinary cell-sap. The composition of this juice has been investigated by E. Zacharias by ordinary chemical tests. He finds three classes of substances in the juice:—albuminoids, non-albuminous organic substances, and inorganic salts. If the juice from the sieve-tubes is allowed to stand for a short time, the albuminoids readily separate from it in the form of a transparent colourless rather stiff jelly. Chemical tests show that this substance is of the nature of fibrine, mixed with a small quantity of a substance insoluble in the gastric juice and in dilute potash ley. When this has been removed by strong alcohol, a substance is left in the filtrate which turns the plane of polarization to the right. This substance is of the nature of dextrin, and is converted by dilute sulphuric acid into glucose. The presence of a nitrate or nitrite can also be recognized both in the aqueous solution and in the ash. Zacharias was unable altogether to decide the question of the presence or absence of amido-acids and of other organic nitrogenous compounds soluble in water. Of inorganic salts there was found in the ash distinct evidence of the presence of magnesia. Experiments also indicated the probable presence in the sieve-tubes of potassium phosphate, to which may be attributed the alkaline reaction of the juice.

In *Nature* (April 10, p. 552), Mr. Marshall Ward gives an interesting extract from the *Arbeiten des botanisches Institut*, of Wurtemberg, of work done by Professor Sachs during last year, relating to the formation and disappearance of starch in plants in the open air. It appears from Sachs' observations that the starch formed in the leaves during the day may disappear completely during the night, and that the leaves shown to be full of starch in the evening may be quite free from it the next morning. This he proved by cutting a leaf longitudinally in half on a fine sunny day, placing the one half in boiling water for about ten minutes, then in alcohol to remove chlorophyll, etc., and then laying the decolorized leaf in an alcoholic solution of iodine, the other half of the leaf being similarly tested the next morning before sunrise. He has also confirmed the statement that the transformation of the starch into glucose and the transference of the latter by way of vascular bundles into the stems also goes on during daylight, but is less evident because more starch is formed than is abstracted. This fact had already been demonstrated by Moll, by exposing leaves to the sunlight in an atmosphere freed from carbonic acid by potassic hydrate. The average amount of starch produced per square metre is estimated by Sachs to be 20 to 25 grams per day, and the average rate of production at 1·648 grams per hour. Mr. Ward points out that several practical results follow from these experiments. Leaves used as fodder, hay, etc., will vary very much in nutritive value, according to the warmth and brightness, etc., of the weather, and the time of day when it is cut, and the same remark applies to the collection of tobacco, tea, etc., the former of which, in some countries, is habitually cropped in the morning. It may be added also that the knowledge thus arrived at may be turned to account in the collection of medicinal plants for the preparation of extracts.

At the meeting of the Linnean Society on April 3, Mr. W. Brockbank exhibited a series of double daffodils, some of which showed that the double character of the flower was not due to the alteration of the stamen nor to the multiplication of the floral envelopes at the expense of the ovules, inasmuch as in some specimens of double flowers stamens were present, and in others the ovary was full of ovules. He believed that the double flowering plants were propagated by seed.

Some interesting experiments have been carried out by F. Heyer (*Journ. Microsc. Soc.*, p. 251) with a view to determine the cause of differentiation of sex in unisexual plants. The results obtained in the case of diœcious plants, by experiments with twenty-one thousand specimens of *Mercurialis annua* and six thousand of *Cannabis indica*, was that external conditions have no influence on the production of seedlings of one or the other sex. In the case of the former plant the proportion of males to females produced was as 105·85 to 100, and in the latter as 86 to 100. In a second series of experiments made with monœcious plants to determine whether external conditions of temperature and soil caused any difference in the proportion of male and female flowers, *Urtica urens*, *Atriplex Spinacia*, *Xanthium*, and various *Cucurbitaceæ* produced negative results. He also came to the conclusion that sex is determined at an earlier period than the ripening of the seed. A knowledge of the means whereby female plants could be produced at will would be of considerable commercial importance, as, for instance, in the cultivation of nutmegs.

J. Constantin finds as the results of extended investigations that the duration of a plant and the presence of a rhizome or other underground stem are, to a certain extent, dependent on external circumstances. Thus the proportion of perennial plants increases with the altitude above the sea level, and the same species is sometimes annual at low altitudes and perennial at high elevations. The tissues of the stem become modified by being buried in the soil. The angles of the aerial stem when present tend to disappear, a suberous layer or a suberized epidermis being much developed; the means of support, such as collenchyma, liber fibres, etc., tend to disappear, and food materials are largely increased (*Journ. Microsc. Soc.*, p. 253).

At a recent meeting of the Linnean Society the Rev. J. M. Crombie read a paper controverting the Schwendenerian theory of the composite algal-fungal nature of lichens. In support of his position he pointed out that the hyphæ of lichens differ from those of fungi in being straighter, much more permanent in character than those of fungi, in containing lichenin, and in not being destroyed by solution of potash. He showed also that in cases where the hyphæ of fungi penetrate lichens on trees or rocks they invariably destroy the gonidia, instead of stimulating their growth, and that the same takes place when algæ on the bark of trees are attacked by fungal mycelium. Some very pretty specimens of lichens in an early stage of growth on bare flints and pebbles were exhibited, showing the hypothallus with the lichen thallus just forming under circumstances in which algæ would not flourish.

Some important facts have been ascertained concerning the development of bark, which may probably throw some light upon the best mode of cultivating cinchona trees for the bark. A. Gehmacher finds that the growth of bark is influenced greatly by pressure, that the less the pressure the more numerous the cork cells become, and the greater the pressure the more they diminish. The bast fibres also increase considerably in number with diminution of pressure; when the pressure is very great very few bast fibres or none at all are formed. The bast fibres also increase in size with diminished pressure.

Apropos of what has been remarked concerning the value of cinchona barks, Dr. de Vrij writes that at Amsterdam on February 29 last he observed that two lots of Ledgeriana bark containing 4·05 per cent. of pure quinine were sold at 3*s*. 7*d*. per half kilogramme, whilst one lot of red bark containing 7·35 per cent. of total alkaloids and only 1·18 per cent. of pure quinine was sold at 3*s.* 5*d.* per half kilogramme. The latter was, however, in long quills having a fine appearance. It is obvious, therefore, that price alone is no indication of alkaloidal contents. He also remarks that the presence of cinchonidine in many samples of commercial quinine is easily detected by the optical test recommended a few years ago by Professor A. C. Oudemans.

When balsam of peru arrives at Acajutla and La Libertad, the ports on the "balsam coast" from which it is chiefly shipped, it is in a crude state, usually of a grey-green to a dirty yellow colour, and requires to be submitted to a process of purification before it is fit for exportation. Concerning this process a correspondent of Messrs. Gehe and Co. furnishes some interesting information. He states that a first clarification is effected by allowing the crude balsam to stand in a large iron vessel capable of holding six or seven hundred pounds during a week or a fortnight, by which time the heavier impurities sink to the bottom and the lighter ones float as a scum on the surface. The clear balsam, which has already attained its characteristic black-brown colour, is then drawn off through a tap fixed about four inches from the bottom of the vessel and run into a tinned iron boiler set over an open fire and boiled moderately for two or three hours. All scum is removed as it makes its appearance, and the boiling is continued as long as any continues to be formed. It can easily be understood that the physical properties of the balsam will differ according to the temperature to which it is submitted during this boiling, and it is alleged that the lower specific gravity observed in balsam of peru during recent years is attributable to a modification it undergoes in this operation, and is quite consistent with the genuineness of a given sample.

Besides the foregoing the new quarterly report of Messrs. Gehe has several interesting notes. It is mentioned that whilst a few years since the price of quinidine (conquinine) was double that of cinchonidine, cinchonidine has lately found so much favour in the United States that its price has now become relatively higher than that of quinidine. This tendency has been favoured by the large quantities of cuprea bark that have been worked during the last few years, since in it quinine is accompanied only by quinidine and by no cinchonidine. In Germany the consumption of codeine has become so large that orders have to be executed in the order in which they are received and a hope is expressed that its preparation synthetically upon the manufacturing scale may become possible. Further, the demand for the glucoside adonidin, which is said to resemble digitalin in its action on the heart without being cumulative, has been so extensive that all the native grown *Adonis vernalis* was bought up immediately after gathering, and it became necessary to look to Southern Russia for a further supply of the herb. A tincture from the flowers and leaves of *Convallaria majalis* also remains in request as a digitalis substitute, but digitalin, notwithstanding its competitors, still holds its place. Arbutin, the glycoside obtained from the leaves of *Arbutus uva-ursi* is being used for diseases of the kidneys and bladder. As anæsthetics the bromide and chloride of ethylene are stated to be again coming into favour for external use, and to these the iodide has recently been added. The two former are liquids, but the iodide is a white crystalline substance. Bromide of ethyl is also in active request for internal administration.

THE USE OF ROSOLIC ACID AS AN INDICATOR, WITH ADDITIONAL NOTES ON PHENOLPHTHALEIN AND METHYL ORANGE.*

BY ROBERT T. THOMSON.

The following notes are simply an addition to my former paper on the use of litmus, methyl orange, phenacetolin and phenolphthalein as indicators. The object in view, as I stated before, was to determine the value of each indicator when applied to the estimation of alkalies and free acids, and to ascertain the effect (if any) of the impurities, such as sulphites, sulphides, phosphates, etc., usually found in commercial hydrates and carbonates of the alkalies. The tests were carried out in precisely the same way as described in the former part of this paper.

(1) *Delicacy of Rosolic Acid in Absence of Interfering Agents.*—The solution employed contained 2 grams of rosolic acid per litre, 50 per cent. alcohol being the solvent used. To test the delicacy of this indicator ·5 c.c. of its solution was added to 100 c.c. of distilled water and decinormal hydrate of sodium (1 c.c. = ·0031 gram Na_2O) dropped in. To effect the complete transformation of the pale yellow to a deep pink colour only ·1 c.c. of the standard alkali was required. This is equal to ·01 c.c. of normal alkali, and this figure should be borne in mind for the sake of comparing the delicacy of the rosolic acid in absence of interfering agents with its delicacy in presence of the salts to be examined.

(2) *Application of Rosolic Acid to the Determination of Available Alkali in Pure Hydrate, Carbonate and Bicarbonate of Sodium and Potassium.*—It is hardly necessary to give a detailed account of this portion of the subject. Several tests were made with quantities of the hydrate and carbonate of sodium and potassium containing 1·55 grams of Na_2O and 2·355 grams of K_2O respectively, with the result that exactly these amounts were obtained in each case by titration with normal sulphuric acid. The deep pink colour retains its original intensity up to the point at which bicarbonate of sodium is produced, but soon gives place to pale yellow, owing to the action of the liberated carbonic acid. It is therefore necessary to boil the solution thoroughly after each addition of acid to bring back the pink colour, and when this is attended to the end-reaction is extremely delicate, and can be effected by at least one drop (about ·05 c.c.) of normal acid.

(3) *Determination of Free Ammonia.*—Several experiments made in each case with a solution containing ·85 gram of ammonia (NH_3) gave identical and accurate results. The pink colour remained undiminished in intensity until 49·8 c.c. of the normal acid had been consumed; but on further addition of acid drop by drop, the pink slowly acquired a yellow tinge, and when 50 c.c. had been added the former was wholly eliminated, leaving only the pale yellow colour; but although this is the case, the end-reaction is tolerably distinct. This decrease in delicacy of the rosolic acid is not due to carbonic acid, as the ammonia employed did not contain an appreciable quantity of carbonate; but, as I shall show presently, is owing to the action of the salt of ammonium formed. Rosolic acid has been specially recommended as an indicator for ammonia determinations, but it is evident that it has no peculiar value for that purpose, even the much-abused litmus being considerably superior to it.

(4) *Effect of Sulphate, Chloride, and Nitrate of Sodium, Potassium, and Ammonium.*—The quantities of these salts operated upon were equivalent to 1·55 gram of soda (Na_2O), 2·355 grams of potash (K_2O), and ·85 gram of ammonia (NH_3) respectively. The presence of these salts of sodium and potassium does not sensibly affect the delicacy of the rosolic acid, but each of the salts of

* Read before the Chemical Section of the Philosophical Society of Glasgow, March 19, 1883. Reprinted from the *Proceedings of the Philosophical Society of Glasgow.*

ammonium required ·2 c.c. of normal hydrate of sodium to develop fully the deep pink colour, as against ·01 c.c. when tested with distilled water alone.

(5) *Effect of Sulphite of Sodium.*—The remainder of the experiments were made only on sodium salts, as I did not think it necessary to examine further the potassium and ammonium salts. Two tests were made with 3·15 grams of normal sulphite of sodium, which contain 1·55 grams of soda (Na_2O). When titrated in the cold only ·2 c.c. of normal sulphuric acid was required in both cases to destroy the pink colour, but, when boiled, 5 and 5·2 c.c. were respectively necessary, the results being, in the cold ·006, and in the hot ·155 and ·161 gram of soda (Na_2O). On cooling the boiled solution and titrating back with normal soda, 4·8 c.c. were required to restore the pink colour. From these results it is evident that normal sulphite of sodium (Na_2SO_3) is practically neutral to rosolic acid in the cold, which it also is, as I showed before, to phenolphthalein, while to methyl orange, litmus, and phenaceto in the bisulphite ($NaHSO_3$) is the neutral salt. It is noteworthy that the two last-named indicators give, with the sulphite, very undecided end-reactions, while the three former give very sharp and well-defined end-reactions.

(6) *Effect of Thiosulphate of Sodium.*—This salt is perfectly neutral to rosolic acid.

(7) *Effect of Sulphide of Sodium.*—The whole of the sodium in this compound is accurately estimated by standard sulphuric acid, with rosolic acid as indicator. The pink colour retained its original intensity until the sodium hydrogen sulphide (NaHS) was formed, but on further addition of acid gave place to yellow, owing to the action of the liberated sulphuretted hydrogen. On boiling, the pink colour returned, and a very sharp end-reaction was secured. It is only necessary to state that the results agreed substantially with those obtained with methyl orange and litmus.

(8) *Effect of Phosphate of Sodium.*—Two tests were made with 1·775 grams of monoacid orthophosphate of sodium, which contains ·775 gram of soda (Na_2O). In one case 12, and in the other 12·2 c.c. of normal acid were necessary to complete the change from deep pink to yellow. As the transformation in colour was gradual, the end-reaction was extremely unsatisfactory. The results, however, show that the monoacid sodium phosphate is strongly alkaline, and the diacid salt practically neutral to rosolic acid. It is noteworthy that rosolic acid agrees in this respect with litmus, methyl orange, and phenacetolin, but differs from phenolphthalein, which indicates the monoacid phosphate as the neutral salt; while normal sodium sulphite is neutral to both rosolic acid and phenolphthalein, but strongly alkaline to litmus, methyl orange, and phenacetolin.

(9) *Effect of Silicate of Sodium.*—With rosolic acid as indicator, the whole of the soda can be estimated by titration with standard sulphuric acid. This must be done in a boiling solution, as otherwise a good end-reaction is not obtainable. The tests were made side by side with experiments made on the same quantity of silicate of sodium and using methyl orange as indicator. The results were identical.

(10) *Effect of Alumina.*—The solution employed for each experiment contained ·775 gram of available soda, and ·103 gram of alumina. In one titration 25·2 c.c., and in the other 25·25 c.c. of normal sulphuric acid were consumed, which show ·781 and ·782 gram of soda respectively, instead of ·775. Rosolic acid thus behaves in much the same way, and gives high results to the same extent, as litmus.

(11) *Effect of Nitrite of Sodium.*—This salt is quite neutral to rosolic acid.

(12) *Determination of Soda in Borax.*—Rosolic acid is not well fitted for use in this titration, as the end-reaction is extremely indistinct. A solution containing 1·683 grams of biborate of sodium ($Na_2B_4O_7$), which is equal to ·516 gram of soda, was employed; but after the addition of 13·6 c.c. of normal sulphur acid, its pink began to assume a yellow tint, and the former colour was not discharged till 16·6 c.c. had been consumed. This latter result gives ·514 gram of soda as against ·516 actually present. I showed before that the best indicator for borax was methyl orange, which gives a well-defined end-reaction.

(13) *Determination of Free Sulphuric, Nitric, Hydrochloric, and Oxalic Acids.*—Rosolic acid is an excellent indicator for use in the determination of these free acids, either by standard hydrate of sodium or potassium, the end-reaction being extremely delicate.

(14) *Determination of Free Tartaric Acid.*—For this purpose rosolic acid is not so well fitted as phenolphthaline; but the end-reaction is tolerably distinct, and fairly accurate results are obtainable.

(15) *Determination of Free Acetic and Citric Acids.*—Rosolic acid is useless as an indicator in the determination of these acids, as, besides the end-reactions being very indefinite, normal acetate of sodium is slightly, and normal citrate of sodium considerably alkaline to this indicator. In this respect rosolic acid resembles litmus, while the delicacy of phenolphthalein, and the accuracy of the determinations made with it, are perfect.

It is plainly evident, on taking a survey of the above results, that rosolic acid has no particular superiority over other indicators, unless in some cases the fact of normal sulphite of sodium being neutral to it in cold solutions may be found useful. In nearly every case it behaves like litmus, and has none of the good qualities not possessed by the latter indicator, but which distinguish phenolphthalein, methyl orange and phenacetolin.

Having now concluded the consideration of rosolic acid, I will give a few supplementary notes on the use of phenolphthalein and methyl orange as indicators.

(1) *Determination of Free Citric and Acetic Acids.*—In the former portion of this paper phenolphthalein was recommended as being the only perfect indioator for this purpose, but it was not mentioned that the titration should be done in the cold. The reason for this is, that although the normal citrate and acetate of sodium are quite neutral to phenolphthalein in the cold, yet when heated they give a slightly alkaline reaction (this is especially the case with the citrate), so that a sensibly high result would be obtained in a hot solution. Of course, in the case of acetic acid a hot solution dare not be used, unless excess of soda is first added, and titrated back with acid.

(2) *Phenolphthalein as an Indicator in the Determination of Free Ammonia.*—This is a very important point to which special attention should be directed, particularly with the view of correcting some misleading statements that have been published respecting this indicator. I pointed out formerly that phenolphthalein was incapable of showing at what point a solution containing a salt of ammonia was neutral, the reason being that such a salt had the effect of destroying the red colour produced by the ammonia, even when the latter was present in considerable proportion. Phenolphthalein has, however, been directly recommended as an indicator for ammonia by one author, and the monoacid phosphates of sodium, potassium and ammonium have been stated by another chemist to be neutral to it. This is true as regards the phosphates of sodium and potassium, but with the ammonium salt no definite neutral point is obtainable, owing to the decolorizing action of the salt itself. The experiments made by these chemists have evidently been confined to potassium and sodium salts, while the behaviour of the ammonium salts has been simply assumed from these results. These facts show how incorrect statements may be made by trusting solely to the analogy between the salts of the alkali metals and ammonium.

(3) *Valuation of Phosphate of Sodium or Potassium and Phosphoric Acid.*—In the former portion of this paper I

had occasion to describe the behaviour of normal orthophosphate of sodium and potassium when titrated with sulphuric acid, methyl orange and phenolphthalein being used respectively as indicators. The neutral point with methyl orange is reached when the diacid phosphate (NaH_2PO_4 or KH_2PO_4) is formed, while with phenolphthalein the neutral salt is the monoacid phosphate (Na_2HPO_4 or K_2HPO_4). On this definite difference of indication (which represents exactly one-third of the phosphoric acid present) I have ventured to base a process, which gives fairly accurate results, for the valuation of any of the orthophosphates of sodium or potassium, or of phosphoric acid. This is certainly a determination that is seldom required, but a rapid process of this description is at least of some interest, and may occasionally be found useful. The method consists in adding to 5 or 10 grams of the sample, previously dissolved in about 80 c.c. of water, normal sulphuric acid from a burette till the faintly acid reaction with methyl orange is obtained, or, in the case of phosphoric acid, normal caustic soda is added to the same point. The amount of acid or alkali added need not be measured, as the object is simply to add exactly enough to produce the diacid phosphate. The mixture is now boiled for a short time to expel carbonic acid, if present; then cooled (if the solution is kept hot a low result will be the consequence), a little phenolphthalein added, and the titration accomplished by normal caustic soda or potash, one c c. of which will represent ·098 gram of phosphoric acid (H_3PO_4), or ·142 gram of monoacid sodium phosphate (Na_2HPO_4). Several tests were made of a sample of ordinary phosphate of soda, the results being controlled by two determinations by precipitation with magnesia mixture. The following were the results:—

By Alkalimetric Method.			By Precipitation as $Mg_2P_2O_7$.
Grams of Phosphate of Soda tested.	C.c. of normal NaHO consumed.	Percentage of Na_2HPO_4.	Percentage of Na_2HPO_4.
10	28·1	39·90	40·29
5	14·1	40·04	40·35
5	14·1	40·04	—

The theoretical percentage of dry phosphate of sodium in the crystallized compound is 39·66. It will be readily seen, from the nature of the process, that the presence of carbonate, sulphate, chloride, nitrate, thiosulphate or sulphide of sodium or potassium, will not influence the accuracy of the results. If sulphite of sodium is present, it must first be oxidized to sulphate by the addition of a little peroxide of hydrogen (excess of which does not affect the delicacy of the indicators), as otherwise a high result would be obtained.

It will be observed that I have not noticed the application of phenolphthalein as an indicator in the determination of caustic alkali in soaps, of free and combined fatty acids in oils and fats, and of resin acids—the reason being that this subject has been fully entered into by various chemists.

In conclusion, I may state that I am examining further the behaviour of phenolphthalein, methyl orange, phenacetolin, rosolic acid, litmus and other indicators, with other chemical compounds, having in view the special object of extending their employment, if possible, in the analysis of commercial chemical products.

NIGELLA SATIVA.*

BY HENRY G. GREENISH.

Under the title "Étude sur des Médicaments Nouveaux" M. Eugène Collin, a French pharmacist, has recently published information collated from various sources, concerning several "new remedies." Amongst them was one which attracted my special attention. It was *Nigella sativa*, and I decided to make it the subject of my report because I wished to point out certain corrections that should be made in M. Collin's description and at the same time communicate to you the results of some experiments I have been making during the past few months.

* Report on Pharmacology, read before the School of Pharmacy Students' Association.

As M. Collin's article is not very lengthy I will reproduce it here (translated from the French), omitting the microscopical description and a few unimportant details.

"This plant" (*N. sativa*) "is a native of the island of Crete. It is cultivated in Egypt, Persia and India. The seeds are very commonly employed under the name of 'abesodé' or 'babe sodé' that is 'black grains.' They are also sometimes termed 'black cummin.'

"The seeds of *N. sativa* are very small, measuring $1\frac{1}{2}$ mm. in length, and $\frac{1}{2}$ mm. in their greatest breadth; they are of a dead black colour, perceptibly quadrangular, flattened longitudinally, with prominent edges. Examined with a lens the surface is seen to be finely pitted. A somewhat aromatic odour is developed when the seed is crushed, recalling the peculiar smell of umbelliferous plants.

"The seeds have been used from the earliest ages, as they are mentioned in the Bible. The Egyptians sprinkle the powdered seed on bread and cakes as a stimulant to digestion. In Hanover they are mixed with stews under the name of allspice. The inhabitants of India have used them from time immemorial as an emmenagogue. In the last century black cummin seeds have been used to stimulate the lacteal, urinary and intestinal secretions; they have also been employed as a remedy for the bites of poisonous animals, etc.

"M. Canolle has recently published the results of clinical investigations undertaken in the hospital of Karikol with black cummin seed. He has observed that after doses of 10–40 grams of the powdered seed the temperature of the body is raised, the pulse accelerated and all the secretions stimulated, especially those of the kidneys and skin; in doses of 10–20 grams they possess a well-marked emmenagogue action in dysmenorrhœa.

"Pellacani has found two alkaloids in black cummin seed which he has isolated and named respectively nigelline and connigelline.

"Nigelline resembles curarine in the physiological effects it produces on frogs and mammals, whilst connigelline more nearly approaches jaborine and atropine."

From whatever source the foregoing description of the seed is taken, it refers, without doubt, to *N. sativa*, as a comparison with a genuine sample will at once show. The three or four-sided seeds with prominent angles, flattened surfaces and peculiar odour when crushed are characteristic of *N. sativa*. The taste is something more than feebly aromatic, it is decidedly acrid.

The seeds of *N. damascena*, which are frequently substituted for *N. sativa*, develop an equally characteristic but perfectly distinct odour when crushed; their rounded shape, the deep transverse furrows, and the taste distinguish them from *N. sativa*.

That the samples of these two seeds now before you are genuine I have proved by cultivating the plants and comparing them when in flower with the descriptions and with specimens in the Kew Museum.

It is remarkable that although the two species differ so considerably, the chemical investigations carried out by Reinsch, Flückiger and Pellacani were (as I pointed out some time since in the *Pharmaceutical Journal*) made with *N. damascena*, not with *N. sativa* as published. M. Collin appends to an accurate description of *N. sativa* taken from one source, an account of the chemical constituents of *N. damascena* from another, an error which might easily have been avoided by a glance into the pharmaceutical literature of the past year or two.

The question will now naturally be asked, What seed has Dr. Canolle employed in his physiological experiments?

This I attempted to answer by a reference to Dr. Canolle's paper in the *Journal de Médecine*, of Paris. Unfortunately, I have not been able to obtain access to this journal. I have, however, consulted the works on Indian botany and Indian materia medica in our library, and found that *N. sativa* was largely cultivated there, the seed being used as a condiment and in medicine; of *N. damascena* there is no mention whatever.

To ascertain now whether the seeds described as being derived from *N. sativa* were really the seed of that plant, I repaired to the Kew Museum. Through the kindness of the Curator, Mr. Jackson, I obtained samples of specimens from Egypt, Aden, Burmah, Bombay and Madras (Karikol, where Dr. Canolle's experiments were made, being in the latter Presidency); they proved to be all true *N. sativa*, possessing the characteristic shape, odour and taste.

There can, therefore, be little doubt that the seeds administered by Dr. Canolle were those of the true *N. sativa.*

In the seed of *N. damascena* (or at least a mixture with *sativa*), Dr. Pellacani found two alkaloids, nigelline and connigelline; of the latter 35 lbs. of seed did not yield as much as half a grain; nigelline was found in larger quantity, but how much larger we are not informed. Fifteen centigrams of nigelline produced in a rabbit a flow of saliva and a discharge from the eyes which lasted about forty-five minutes, after which the animal was perfectly recovered; in its action this alkaloid resembles pilocarpine.

According to Pellacani the presence of these two alkaloids, nigelline and connigelline, satisfactorily explains the physiological effect observed by Canolle, but from what I have said it must be clear that, although these alkaloids may possibly produce effects similar to those observed by Canolle, yet of the origin of the therapeutic activity of *N. sativa* there is at present not a scrap of positive evidence.

Some years ago I examined the seed of *N. sativa*, and was fortunate in procuring a genuine sample. Details of this examination have already been published in the *Pharmaceutical Journal*, and as far as I know it is the only investigation that has ever been made of the true *N. sativa.* Although I was unsuccessful in attempting to isolate an alkaloid, I found a glucosidal principle allied to saponin, to which the name melanthin was given. This substance I have recently obtained in larger quantity and pure white in colour. *N. damascena* contains at most only traces of it.

This melanthin has never been tested physiologically, and I am afraid that at present there is but little prospect of such experiments being made, unless indeed I carry them out myself upon my own person. Saponin, however, to which melanthin is nearly related, has produced effects similar to those observed by Canolle, viz., an increase in the secretions, and even vomiting and diarrhœa; and senega, which contains a considerable amount of saponin, has been found serviceable in amenorrhœa. Until proof is adduced to the contrary it is quite within the bounds of reason to suppose that to the melanthin contained in the *N. sativa* part at least of the therapeutic activity may be due.

Being desirous of ascertaining the distribution of melanthin in the plant producing it, I had some of the genuine seed grown for me and the plants gathered at different stages of development. For the care with which this was carried out I have to thank my friend Mr. Gadd, now pharmaceutical chemist in Ramsgate, formerly a member of this Association. At the same time I had the seed of *N. damascena* grown in a similar manner.

I had eventually at my disposal plants of both species gathered—

(1) in a very young state;
(2) shortly before flowering;
(3) whilst in full flower, with unripe seed;
(4) in fruit, the seed being nearly but not quite ripe.

Unfortunately, the weather was so unfavourable in the autumn that the seed did not arrive at full maturity. The characteristic fluorescence that the crushed seeds of *N. damascena* impart to petroleum spirit or to ether was, in consequence, if present at all, entirely masked by the greenish-yellow colour of the chlorophyll. In no part of either species could this fluorescent substance be detected.

I found that all the aerial parts of *N. sativa*, at every stage of development, contained notable quantities of melanthin, especially the leaves. The roots were, on the other hand, quite free from it at all periods.

In *N. damascena* I could find no trace of melanthin in the roots at any period or in the unripe seed; the leaves and the nearly ripe seed contained traces only of either that substance or one very similar.

Should *Nigella sativa* find a place amongst pharmaceutical drugs, the dried leaves would furnish a convenient material from which pharmaceutical preparations could be made. By this means we should utilize a part of the plant which is, I believe, at present wasted, and we should avoid employing a seed rich in fixed oil, always a source of annoyance to the pharmacist. In such case we should do well to examine carefully any supply of the leaves that might be sent to us from Germany.

AMERICAN DRUGS.*

BY J. MOELLER,

Botanist and Microscopist of the Imperial Forest Institute, Mariabrunn, near Vienna.

(*Continued from page* 745.)

FOLIA ARCTOSTAPHYLI GLAUCÆ (MANZANITA).

The leaves are almost uniformly elliptical or ovate, 25 to 40 mm. long, 15 to 25 mm. wide, with a short stem, ending in a small thorn-like point. They are thick and leathery, the margins slightly thickened and entire, smooth on both sides, somewhat shiny, pale green, the primary nerve with slightly prominent secondary nerves running to the margin, similarly delicately crimped and netted on both sides. The drug is odourless and tastes

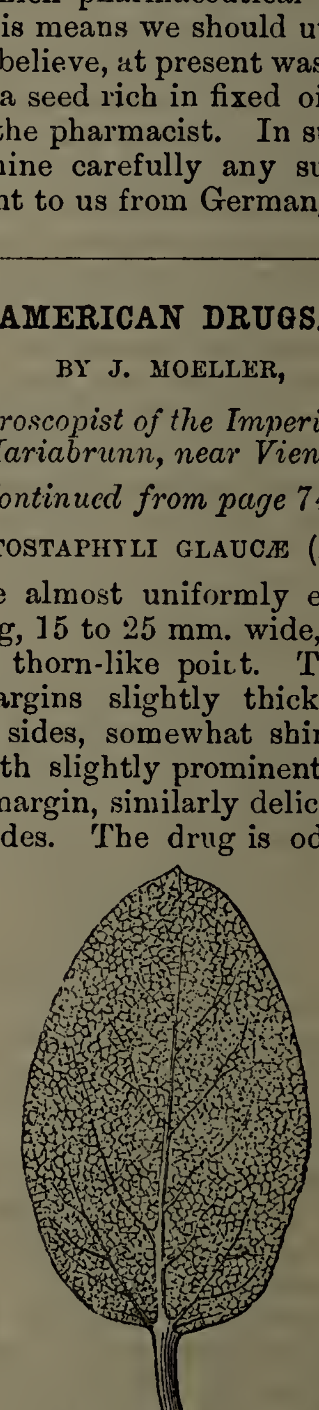


Fig. 11.—Upper side of the leaf of *Arctostaphylos glauca* (nat. size).

strong and bitter. Anatomically speaking, the leaves are interesting on account of the typically peculiar transverse arrangement of the vascular bundles. These have not the circular horizontal section, but linear and keep both sides of the leaf apart like props.

As the bast fibres do not reach the upper skin, their mechanical function is completed through layers composed of collenchymatic construction. These extend directly under the upper skin and even unite often with a structure of the neighbouring vascular collection of the same name. The leaf parenchyma contains a large quantity of tannin, which turns iron blue, but it has no specific points of secretion. I. H. Flint has found

* Reprinted from the *Therapeutic Gazette.*

"arbutin" in these leaves (*Vergl. Arch. d. Pharm.*, Bd. 218, S. 89).

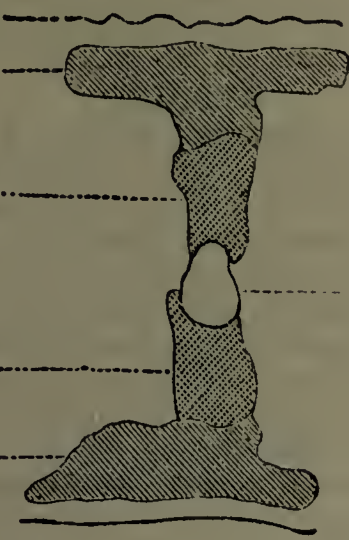


Fig. 12.—Transverse section of vascular bundles in the leaf of *Arctostaphylos glauca*:—*ee*, epidermis; *cc*, collenchyma layers; *bb*, bast bundles; *v*, central portion of the vascular bundle.

Manzanita leaves are readily distinguishable by their size and their bright colour from folia uvæ ursi, which latter have been introduced into all European pharmacies. The edge of the leaf and its nerves offer other further trustworthy earmarks by which to distinguish it. Nor is it easy to mistake it for any other kindred ericaceæ. The leaves of the *Arctostaphylos alpina*, Spr., are equal to them in size, but their edge is sharply identated, becoming fringy towards the stem. The parent plant of the manzanita leaves is the *Arctostaphylos glauca*, Lind., of California.

Ericaceæ.—This plant has long been known in California on account of its tonic and diuretic properties. It is particularly recommended in cases of catarrh of the urino-genital system, in cases of menorrhagia and incontinence of urine.

RADIX MAHONIÆ AQUIFOLIÆ.

Crooked cylindrical roots, generally from 10 to 15 mm. thick, cut for commerce into pieces, from 8 to 10 cm. long. The bark of these roots is almost 1 millimetre in thickness, of a greyish yellow colour, wrinkled lengthwise. The cylindrical pith is surrounded by layers of dense yellow wood substance. The magnifying glass enables us to detect the broad medullary rays which broaden outwards in the bark, and contrast darkly with

Fig. 13.—Section of the root of *Mahonia aquifolia*:— *b*, bark; *w*, wood.

the wood-rays, which latter are much broader and perforated by vascular pores. The bast-rays are concentrically stratified; the inner bark is homogeneous and covered with a thin dark-brown layer of a corky substance.

Microscopic Character.—The wood betrays scarcely any indication of the formation of the growth of a year. The vessels are irregularly distributed, often arranged tangentially to one another, much diversified in the lumen, but seldom exceeding 0·1 mm., with the diaphragm completely perforated, and the side walls profusely spotted and sometimes also spirally striped, and shortly scalariform (0·15 mm.). They are encased in thick-walled liber formation, woody parenchyma being scanty. All sclerotic elements are entirely absent in the young bark; the parenchyma becomes sclerotic in layers later on, giving the bark the appearance of being formed in layers of bast fibres, of which fibres the secondary bark is in reality totally free. The fibres of the parenchyma are remarkably short, often inseparably blended together into whetstone-shaped bundles, and seldom more than three-jointed. The primary medullary rays are ten to fifteen-rowed to begin with, and widen towards the exterior, reaching a width of 1 mm. and even more. As the plant grows older a secondary medullary ray can be found between each pair of bark-rays, which also acquire a respectable width as they proceed outward. The middle groups of cells of the medullary rays become sclerotic in bundles without changing the size and shape of the cells. The middle bark is composed of thin-walled, much elongated parenchyma cells, closely pressed together, and covered by a delicate layer of cork.

The parenchyma is filled with a yellow substance easily removed by washing, whilst the membranes of the sclerotic elements of the bark and wood are very intimately impregnated by the same, Bœdeker did not succeed in producing nitrate of berberin by his microchemic reaction. These roots furnish but faint traces of oxalate of lime, or of any crystals, although a proper treatment with sulphuric acid will generally produce a few gypsum needles. Starch is entirely absent, from which we are led to conclude that it is gathered in the summer season.

Mahonia Aquifolia, DC. (*Berberis Aquifolium*, Pursh.) —Berberideæ.—The parent plant of this drug is that very generally cultivated ornamental evergreen with pointed needle-like leaves (indigenous to North America, but also found wild in some parts of Europe), so closely allied to varieties of barberry. The plant is said to be distinguished from this and all other varieties of *Berberis* by the alkaloids which it contains, and to which it owes its medicinal properties. This alkaloid was discovered at the Michigan College of Medicine, by Professor Jungk, and represented as a yellow, amorphic substance, possessing an alkaline reaction, and having a strong bitter taste. The salt produced by it is white, notwithstanding the yellow colour of its base.

It is not yet known whether or not this alkaloid (called "mahonine," after the discoverer of the plant) is identical with the xanthopicrit (= berberine) obtained by Chevallier and Pelletan from xanthoxylum. It is well known that berberine is obtained from a series of plants differing considerably among themselves. This drug was first used in cases of syphilis some three years ago and is now much used and highly esteemed, especially in America. It is less effective in the first stages than after a preceding mercurial treatment. Extract of berberis, like iodide of potassium, seems to be a powerful adjunct to mercury, eliminating the latter from the system, together with the materies morbi. According to the American view, the beneficial results reached by this line of treatment are unquestionable, whatever may be thought of the theory as such. The preparation has also been successfully applied in all uninflamed chronic affections of the skin, and in chronic or subacute catarrh of the vagina and uterus, especially in those cases of endometritis which are marked by a secretion of albumen. There are a fluid and a solid extract known to commerce, 20 to 30 drops of the former, 3 to 6 grains of the latter, being the proper dose.

(*To be continued.*)

IN THE KAURI GUM FIELDS.*

Sombre, solemn, and grand are the kauri forests of Northern New Zealand. If you want beauty of mixed foliage, of wide-spreading, branching trees, all interlaced with knotted vines and tufts of rosy blossoms—forests where the golden sunlight steals in delicately-divided rays through the exquisite canopy of tall tree-ferns, to fall in radiant gleams on the carpet of all manner of silver-backed and other lovely ground-ferns—you will find these in perfection wherever the grievously "improving" hand of the settler has spared the primeval bush. Alas, that we should have to say, such precious visions of Eden are already few and far between—only to be found in the least frequented districts.

But the kauri forests are a thing altogether apart; and alas! indeed, of these also we must say that they are rapidly diminishing before the too busy axe of the lumberer. The kauri is the pine-tree of New Zealand, the sole representative of the coniferous family, and a very noble representative it is, though by no means answering to our ordinary notions of pine-trees, inasmuch as its foliage consists of leaves instead of needles; but it is tall and straight as a mast, and a very majestic mast, for these stately trees range from fifteen to fifty feet in girth, and attain a height of from a hundred to two hundred feet ere they commence throwing out the branches which form their crown of sombre green. This is a special industry peculiar to Northern New Zealand, and the precious gum is a semi-fossilized deposit which is found buried at a depth of five or six feet below the surface of the ground, on tracts of open land, where in bygone ages grew kauri forests which have long since disappeared. It is thought probable that these forests have been burnt, and that the exceeding heat liquefied the resin and caused it to flow more freely, for the digger is sometimes rewarded by finding a lump as big as his own body, though more frequently it lies buried in fragments from the size of an egg to that of a man's head.

The value of the gum varies with its colour, which is sometimes of a rich brown, sometimes bright amber, and occasionally almost like pale crystal. Sometimes it is clouded, sometimes quite clear, revealing flies and tiny beetles which, perhaps for ages, have been enshrined in its transparent depths. The clearest and most crystalline pieces fetch the highest prices, and are carved into ornaments hardly to be distinguished from amber, but very much more brittle. When these extra fine pieces have been selected, the rest is sold in the Auckland market at from £30 to £40 a ton, and is purchased by English and American manufacturers of varnish. The amount collected must be enormous, as the value of the annual export from the colony ranges from £70,000 to £200,000. None is found in the Southern Isle, nor, indeed, to the south of latitude of 37° 30′, which is the southernmost limit of the growth of the kauri.

Whether the special qualities of the buried gum are due to old age, or to the possible action of fire, is unknown; but that which is obtained from the living tree is altogether worthless for the market, being soft and sticky,—in fact, simple resin. Large quantities in this condition are sometimes found about the roots of growing trees in the forest: but of this very little can be turned to account.

At one time as many as two thousand men made their living as professional gum-diggers, but in these more settled days other occupations are found to be more remunerative, and a comparatively small number now adopt this as their regular employment,—those who do so being for the most part the unsettled, roving members of the community. They are a mixed lot,—of very much the same stamp as an average colony of gold-diggers. Bohemians of every nation, European, American, Australian, all find their way to the gum-fields. There men of all classes rub shoulders; and a white-handed "swell" lately, perhaps, an over-extravagant officer in Her Majesty's service or an unworthy member of one of the universities, may deem himself fortunate should he chance to fall in with some sturdy navvy who will accept him as his pal.

* From *Lippincott's Monthly*. Reprinted from the *Oil, Paint and Drug Reporter*, March 26, 1884.

KEPHIR.*

BY PROFESSOR H. STRUVE.

Kephir is a beverage which is prepared by a peculiar process of fermentation from the milk of cows and other animals. It has been in use from time immemorial by the inhabitants of the northern declivities of the high Caucasian mountain range, to whom it possesses the same importance as koumis does to the nomades of the south-eastern steppes of Russia. The last-named beverage was for the first time brought to the notice of the scientific world in 1784, and since then it has been frequently the subject of investigations, but only within a few decades has it attained greater importance as a remedy.

On the other hand, kephir was, even in Russia, totally unknown until two years ago, although in 1867 Dr. Sipowitsh had made a short communication on this subject to the Caucasian Medical Society, which remained buried in the archives of the latter. Ten years later, in 1877, Dr. Shublowski published a more detailed paper on kephir which, however, failed to direct the attention of science or that of the public towards this new beverage; the proper impulse was first given from Moscow in 1881, almost a century after the first notice of koumis.

On December 1, 1881, Ed. Kern read a paper before the Imperial Society of Naturalists at Moscow (*Bull. Soc. Impér. des Natur. de Moscou*, 1881, p. 141) on "Kephir, a new milk ferment from the Caucasus," which he had collected during his travels. The requisite investigations had been made by Ed. Kern under the supervision and in the laboratory of Professor Goroshaukin. The result is that, within the last two years, kephir was not only introduced as a medicine from the southern to the northern section of Russia; but that also a number of papers and pamphlets on this subject has been published. During the latter part of the past year kephir has also been noticed in other countries, among others by Professor Dr. F. Cohn, at the meeting held December 13, by the section for Natural Sciences of the Silesian Society at Breslau. Kephir has already become an article of speculation, is procurable in commerce, and will doubtless be further scientifically investigated. The narrow circle in which for centuries kephir has been harboured with almost religious piety, has been broken, and it has become public property, notwithstanding the method of its preparation is still surrounded with a certain mystery, depending upon the so-called kephir-grains, the new milk ferment of Kern. This can only be procured from the mountain tribes; but after it has been obtained, kephir may be prepared with the requisite precautions, at all times, in winter or in summer.

This present mystery concerning the origin and nature of the kephir-ferment invites further investigations, and it will doubtless not be a long time before the preparation of kephir in all its details will have been ranged with the known phenomena of fermentation in general. Then, most likely, this simple beverage and remedy of the mountain tribes of the high Caucasus will be accorded an important position among the domestic and general remedies, more particularly as towards koumis. But years of observation will be required to determine its true value; at present kephir is beginning to become a fashionable remedy.

The author has undertaken the chemical investigation of kephir with the view of applying to it the results of his protracted investigations of milk, and of determining the changes produced by this ferment; although more difficult and complicated than expected, he hopes in the near future to be able to report his results.

Tiflis, January 30, 1884.

* *Berichte d. deutschen chemischen Gesellschaft.*—Reprinted from the *American Journal of Pharmacy.*

The Pharmaceutical Journal.

SATURDAY, APRIL 26, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

PHARMACY LAW IN ONTARIO.

AFTER experiencing failure in two previous attempts to obtain an amendment in the law regulating the practice of pharmacy and the sale of poisons in the province of Ontario that was passed in 1871, the pharmacists of that division of the Dominion of Canada have this session succeeded in securing their object. The course which legislation has taken on this occasion, though perhaps not a common one, is certainly conducive to simplicity, for instead of patching up the old Act with a series of amendments, it has been absolutely repealed and its provisions re-enacted with such modifications as experience has shown to be desirable. The provisions of the Act of 1871 may be found in the first volume of the present series of this Journal, and in accordance with what is now our usual practice in respect to colonial Pharmacy Acts, the text of the Act which supersedes it will be printed in a future number for permanent reference; but it may be convenient that we should here briefly summarize the new law and indicate the most important changes that have been effected, especially as some of them are in the direction contemplated in this country for the amendment of the Pharmacy Act, 1868.

In the first place provision is made for the continuance of the Ontario College of Pharmacy, which is reinvested with the duties of supervising the examinations and registration, and with authority to grant certificates of competency. It may be mentioned that membership of this College is involved in registration, and that every person registered under the Act becomes *de facto* a member, is entitled to call himself a pharmaceutical chemist, and has to pay for the uses of the College a yearly subscription of four dollars. In addition the new Act provides that a further sum of four dollars annually shall be paid on account of every branch establishment, and requires that all *employés* or assistants who manage or have charge of such additional places of business shall be legally qualified pharmaceutical chemists. Power has also been given to the Council to raise the fee for the qualifying examination from four to ten dollars. Only registered pharmaceutical chemists are legally authorized to compound prescriptions of legally authorized medical practitioners, or to keep an open shop for retailing, dispensing, or compounding poisons enumerated in a schedule, or to assume or use the title of "chemist and druggist," or "chemist," or "druggist," or "pharmacist," or "apothecary," or "dispensing chemist" or "druggist," in any part of the province of Ontario. As to the persons entitled to registration, it was provided in the Act of 1871 that this privilege should extend, without examination, to persons in business on their own account before the passing of the Act; or who had before that time served an apprenticeship of three years and acted as an assistant for one year. Under the new law this privilege is continued to such persons, upon payment of a fee of ten dollars, during another twelve months, after which it is to cease. Further, persons approved of by the Council of the College, who hold diplomas from the Pharmaceutical Society of Great Britain or certificates from any pharmaceutical college in the Dominion of Canada or elsewhere, may also be registered without examination. Any other person, before being eligible for registration, must pass an examination, for which hitherto there has been no requirement as to previous practical training. But henceforth a candidate will have to satisfy the Council that he has served as an apprentice to a regularly qualified pharmaceutical chemist for a term of three years, whilst any apprenticeship commenced subsequently to the passing of the present Act will have to be evidenced by a contract in writing, and the term of the apprenticeship will not be deemed to commence for the purposes of the Act until proof has been furnished to the Council that a suitable preliminary examination has been passed. Upon any person being registered under the Act he will be entitled to receive from the Ontario College of Pharmacy a certificate authorizing him to carry on business for a specified time, which, if carrying on business on his own account, he is to display in a conspicuous position in his shop; but no person who is in default in respect to the annual fee payable to the College will be entitled to exercise the privileges of a pharmaceutical chemist. In the event of the death of a person in business, his business may be carried on by an executor, administrator or trustee, if and so long as it is conducted by a qualified pharmaceutical chemist and the annual registration fee of four dollars continues to be paid. An important alteration has been made in the provision as to the penalty for offences under the Act, which is now definitely fixed at "twenty dollars and costs," instead of, as before, "not exceeding twenty dollars." This will probably help to curb the lenient propensities of magistrates which result sometimes in practically fining the prosecutor instead of the offender.

The provisions as to the sale of poisons are, in the main, similar to those in our own Pharmacy Act, save that there is no exemption in favour of patent medicines. Potassium cyanide does not appear in the first part of the poison schedule, but this part includes Indian hemp, digitalin and cedar oil. In the second part neither essential oil of almonds nor red or white precipitate occur, but it contains several substances not included in the British schedule,—carbolic acid, calabar beans, St. Ignatius' beans, pink root, podophyllin, ether, iodine, potassium iodide and potassium bromide. Paregoric is specially excluded from the opium preparations subject to the regulations. One subject of controversy during the passage of the Bill through the legislature seems to have been the arsenical insecticides, such as "Paris green" and "London purple," which are now so extensively used by agriculturists in North America. It was contended that it would be against the public interest and convenience that the supply of these substances should become a monopoly in the hands of chemists and druggists, and, eventually, this view of the case prevailed, for it is provided that nothing in the Act shall prevent the sale by persons not registered of the arsenical insecticides, so long as they are sold in well-secured packages, distinctly labelled with the name and address of the seller and marked "poison," and a record of each sale is kept by the seller. The Committee charged with the conduct of the Bill appear to have pressed very strongly the argument that druggists are alone qualified to sell such poisonous compounds, but to little avail; it was found that some compromise on this point was the price that would have to be paid for the new law, and the regulation as to labelling was the result. The question is not unlike one that was recently argued in this country, and may come up again before long. It is, therefore, of interest to note the spirit in which this settlement has been accepted by the Ontario chemists. The *Canadian Pharmaceutical Journal* says:—"By this arrangement a right has been conceded which was so questionable as not to bear assertion, and was practically inoperative. Druggists will continue to sell as great a proportion of these insecticides as ever they did, and from the restrictions surrounding their sale by other dealers will no doubt in the end secure the great bulk of the trade." In conclusion, there is a provision that all compounds named in the British Pharmacopœia shall be prepared according to the formulæ directed in the latest published edition of that work, "unless the College of Physicians and Surgeons of this province select another standard," or unless the label distinctly shows that the compound is prepared according to another formula.

BOTANICAL LECTURES AND PRACTICAL DEMONSTRATIONS AT THE GARDENS OF THE ROYAL BOTANIC SOCIETY OF LONDON.

It will be noticed, by reference to the advertisement of the School of Pharmacy of Great Britain in the present number of this Journal, that Professor Bentley will commence his course of lectures and demonstrations on "Systematic and Practical Botany," at the Gardens of the Royal Botanic Society, in Regent's Park, on Saturday morning next, May 3, at eight o'clock. The lectures will be continued on the succeeding Friday and Saturday mornings, at the same hour until the end of July.

We have been favoured with a copy of the Calendar of the Pharmaceutical Society of Ireland for 1884, and regret to observe from the "Statistics" that although the number of pharmaceutical chemists on the Register, as compared with the previous year, has increased from 219 to 234, the number of Members of the Society has again decreased, from 81 to 71.

* * *

From the Annual Report of the Pharmacy Board for Victoria it appears that during the year 1883 ten persons presented themselves for the "major" examination (there is no "minor") of whom nine passed. A candidate to be eligible for this examination must previously have served as an apprentice for not less than four years, attended one course of lectures, passed examinations in the University of Melbourne, or some school or college recognized by the Board, in the subjects of materia medica, medical botany and practical chemistry, and passed an examination in practical pharmacy before the Board. The same number went up for the "modified" examination, open to persons who have served three years' apprenticeship to a chemist and druggist, of which term three months had been completed at the time of the passing of the Act, and of them seven passed. The candidates for the "preliminary" examination, which is compulsory before the commencement of an apprenticeship, numbered 44, and 21 passed. It is stated that of the total number of persons registered under the Victoria Pharmacy Act in the four years 1880–83, inclusive, 14 passed the "major" and 41 the "modified" examination of Victoria; 29 were registered under certificates from the Pharmaceutical Society of Great Britain, and one under a certificate from the Pharmaceutical Society of Ireland; five qualified by foreign diplomas, and 42 were registered as having been in business in the colony before the passing of the Act.

* * *

We willingly call attention to the report upon another page of the formation at Manchester of a Pharmacy Students' Association "for the promotion of intercourse amongst chemists' assistants, apprentices and others in any way connected with pharmacy, and the discussion of subjects tending to the welfare of all interested in pharmacy." It will be seen that the young Association has adopted the plan of appointing "Reporters" to keep the members acquainted with what is being done in botany, chemistry, materia medica and pharmacy, which constitutes one of the best means of providing a good supply of useful information for those who attend the meetings.

* * *

From a recently issued Report of the Commissioners of Customs it appears that during the year ending March 31, 1883, the gross amount of duty collected upon chloral hydrate (3*s.* per lb.) imported into the United Kingdom amounted to £965, being a decrease of £39 as compared with the previous year. Chloroform yielded during the same time a revenue of £11 (14*s.* per gallon); sulphuric ether, £17 (25*s.* per gallon); iodide of ethyl, £1 (13*s.* per gallon); and collodion, £2 (24*s.* per gallon). Besides these sums, £167 was collected on transparent soap in the manufacture of which spirit had been used (3*d.* per lb.), showing a falling off of £98.

* * *

The Report on the Progress and Condition of the Royal Gardens at Kew during 1882, the preparation of which was unusually delayed in consequence of the pressure of official duties, shows that in the course of that year the visitors amounted to 1,244,167, a number enormously larger than that recorded in any previous year, and nearly half as many again as in 1881. On Whit Monday more visitors (95,300) entered the gardens than had ever before been admitted in a single day. It is gratifying to find that notwithstanding the unprecedented number of visitors in 1882, and the absolute freedom with which every part of the establishment is made accessible, the Director is able to report that the amount of damage which the collections suffered may be described as practically *nil.*

* * *

We notice that among the topics treated of in the Report is that of the cinchona nomenclature, and there is a decided expression of opinion in favour of Dr. Trimen's conclusions. Some interesting information is also given respecting the cultivation of jalap in Jamaica, and several other similar subjects.

* * *

As a consequence of the proposal referred to last week, as having been put forward in Massachusetts, to make the United States Dispensatory the authoritative standard as to the quality of drugs, a remonstrance, signed by the President and all the living ex-Presidents of the Massachusetts Medical Society, has been presented to the Senate and House of Representatives, urging that "the United States Pharmacopœia should be the only standard for the preparation and sale of drugs and medicines," and protesting against any present alteration of the Adulteration Act in force in the State.

* * *

According to the *Weekly Drugs News* four separate robberies have been effected in Denver by a man, whose method of operating was first to rouse a pharmacist after business hours and then to present a loaded revolver instead of a prescription. It is satisfactory to learn that the largest haul made by the miscreant only amounted to fifty dollars and a box of cigars; but probably this loss will be sufficient to engender caution in the local pharmacists who may in future be summoned by the night bell.

* * *

It is reported that a patent has been taken out in Germany for an electric process of preparing metallic aluminium, by which it will be possible to produce it at about one-fourth of the present cost.

* * *

At the next meeting of the Chemical Society, to be held on Thursday, May 1, a paper will be read on "Benzoylactic Acid and some of its Derivatives" (Part I.), by W. H. Perkin, jun., Ph.D., and one on "Fluorene," by W. R. E. Hodgkinson.

* * *

The last meeting of the session of the Manchester Pharmaceutical Association will be held at the Owens College (Medical Theatre, Oxford Road entrance), on Tuesday evening next, April 29, at 7·30 p.m., when a paper will be read on "Coal: The Products of its Distillation and the Manufacture of Coal Gas" (illustrated with experiments and the oxhydrogen lantern), by A. W. Duncan, F.C.S., and F. C. J. Bird.

* * *

A meeting of the School of Pharmacy Students' Association will be held an Thursday, May 1, at 8 p.m., when a paper on "Blood" will be read by Mr. Charles Shapley, and a Report on Materia Medica will be made by Mr. W. Elborne.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

At a meeting of the Board of Examiners for England and Wales, held on Wednesday, April 23, 1884, the report of the College of Preceptors on the examination held on April 8th was received.

Three hundred and seventy-five candidates had presented themselves for examination, of whom *two hundred* had failed. The following *one hundred and seventy-five* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

Annis, Ernest George ....Leicester.
Appleby, Geo. Henry Vane ...Sunderland.
Appleton, Arthur ....Driffield.
Armitage, George..................York.
Arrandale, James William......Denton.
Askew, Frederic ....Workington.
Aspinall, Hortensius ....Liverpool.
Bailey, Willis ....Eastry.
Balmford, John Thomas........ Longwood.
Barden, Tedbar.....................Dewsbury.
Bartholomew, Edwin Robert ...Ludlow.
Barrett, Edith ....Daventry.
Barrett, William Louis .... Portsmouth.
Beattie, James B...................Fife.
Beck, John Frederick ....Honiton.
Blakemore, John Bowen.........Oakengates.
Blayney, William H. .... Haslingden.
Blissett, Francis Homan ....Bristol.
Brett, George ....Louth.
Brookes, John Humphrey ......Chesterfield.
Burgess, Llewellyn Ernest ......Aberavon.
Burnett, George ....Great Broughton.
Butterfield, Thomas A. C. ......Keighley.
Carpenter, Albert Hemsley ...London.
Carron, Herbert Burgess ......Leyton.
Caunt, John William ....Derby.
Clark, James........................Thornhill.
Collins, Joseph ....Catterick.
Cook, Harry ....Barrow-in-Furness.
Cooke, Charles Fowler............Sileby.
Cooper, Frederick William......Brightlingsea.
Corfe, Robert ....Maidstone.
Croft, Duterau ....Middleham.
Crosdale, Robert Morgan ......Oldham.
Cross, Edward Robert............Scarborough.
Dalziel, Charles Michie ....Aberdeen.
Darlington, Thomas...............Haslington.
Davies, John Albert ....Aberystwith.
Dewey, Thomas Henry ....Merton.
Draper, Arthur Longfellow......Brigg.
Durno, Alexander Emslie ......Aberdeen.
Edwards, Edward..................Brecon.
Edwards, Edward..................Cardiff.
Edwards, Walter ....London.
Emett, Thomas.....................Fulwood.
Enness, Walter Frederick ......London.
Ettles, Wm. James McCulloch.Elgin.
Evans, Alfred Philip ....London.
Evans, Francis Richard A........West Bromwich.
Ferguson, Thomas ....Stirling.
Ford, Frederick Charles ....Kilsby.
Freeman, John......................Tetbury.
Gartside, Charles ....Oldham.
Gelling, John Alexander.........Douglas.
Gifford, James ....Blackburn.
Gilderdale, Frederick ....Wakefield.
Goodwin, James ....Nuneaton.
Gourlay, John ....Montrose.
Greenhalgh, Thomas Earnest ...Blackpool.
Greenwood, William Russell ...Howden.
Gross, Walter Henry ....Northampton.

Hall, Robert ....Market Rasen.
Halmshaw, William................Brigg.
Harbottle, Bernard ....Alnwick.
Harding, Charles Thomas ....London.
Harries, Benjamin ....Llandilo.
Harrison, Arthur Neville ....Dowlais.
Harwood, Thomas William ...Driffield.
Haynes, Edward Thomas ....Oxford.
Hearne, William Gustavus.......Redhill.
Hedley, Charles Richard..........Newcastle-on-Tyne.
Herrington, Edmund William..Reading.
Hill, Malcolm ....Glasgow.
Hodder, George William..........Frome.
Holgate, Herbert......................Catterick.
Hounam, Christopher ....Langholm.
Hutchin, Llewellyn Albert Jas.Saffron Walden.
Hutton, Frank Danks...............Dunfermline.
Jenkins, William ....St. Dogmaels.
Jones, Hugh Kyffin..................Mochdre.
Jones, Lewis............................Aberdovey.
Jones, Thomas John ....Holyhead.
Jones, William.........................Aberystwith.
Kenderdine, Alfred George ...Stafford.
Kent, Thomas Oliver ....Wye.
Kent, Wm. Hy. Plaisted ....East Molesey.
Kidd, Walter John ....Halifax.
Kinnear, James Arthur ....Dundee.
Kirkby, Thomas Henry ....Marshchapel.
Langford, Frederick Charles ...London.
Leech, Charles Richard ....Cambridge.
Lloyd, Benjamin Caradoc ....Flint.
Lloyd, Richard Edward ....Garston.
London, Walter Augustus ....Redditch.
Longstaff, William Edwin ....Silloth.
McCardell, James......................Glasgow.
McIntyre, Francis Gibb ....Glasgow.
McKerrow, William James ...Aberdeen.
McLaren, Frederic Donald.......Beverley.
Maggs, Arthur Samuel ....St. Leonards on Sea.
Marshall, Rupert Henry..........Walsall.
Matthews, Henry Gilbert ....London.
Mawer, William Fred..............Grimsby.
May, James ....Musselburgh.
Middleton, Richard Watson ...Ilkley.
Millar, James Herd..................Edinburgh.
Miller, Richard ....Preston.
Minet, Alfred ....London.
Mingay, Adolphus Alfred ....Burton-on-Trent.
Mitchell, John Albert..............Bradford.
Nettleton, George William.......Brighouse.
Nidd, John Henry ....Boston.
Northwood, Herbert Wm. W...Arundel.
Ogilvie, James Hay..................Aberdeen.
Oliphant, Edward ....Grange.
Ord, Bertram Thomas.............Gateshead.
Ough, Lewis............................Plymouth.
Owen, Griffith Charles ....Carmarthen.
Palmer, George William...........Ely.
Palmer, James ....Oxford.
Pearson, Ernest ....Cromford.
Perrett, Frederick James ....Weston-Super-Mare.
Peterkin, Charles John ....Elgin.
Phillips, Thomas ....St. Clears.
Pinckney, Charles Edward.......Peterborough.
Pole, William ....Shetland.
Ramsden, Thomas Prince ....Pontefract.
Rideal, Frank ....Hyde.
Robertson, Alexander ....Elgin.
Robertson, Thomas Cannon ...Oban.
Robin, Hugh Millar ....Perth.
Roe, George ....London.
Rugg, Walter James ....London.
Scorgie, John ....Ellon.
Scott, William Robert.............Galashiels.
Scowby, Joseph Newsome ....Sheffield.
Shillcock, Sydney.....................Bromley, Kent.
Silversides, Richd. B. Garbutt Darlington.
Sim, David ....Dundee.
Smith, Edward Charles ....London.
Smith, Harry George .... Downham Market.
Smith, Robert ....Forres.
Southall, Harold William ....Birmingham.
Southall, John Edmund ....Birmingham.
Stansfield, John Mills ....Birkdale.
Stewart, Hawthorn ....Ayr.
Streatfield, Edward Henry.......Maidstone.
Stubbins, Henry ....Brigg.
Sturton, Charles Hubert..........London.
Taylor, Richard Noble.............Barrow-in-Furness.
Tharratt, George ....Louth.
Thomas, Owen Edward ....Bangor.
Thomson, Robert Greig ....Buckhaven.
Tupholme, John James ....Spilsby.
Turpin, Ernest ....London.
Tweedie, Thomas Shortridge ...Annan.
Vincent, William ....Truro.
Vinden, Frederick William.......London.
Voisin, Ernest Osmond B. ....Jersey.
Walker, James ....Aberdeen.
Walker, William Henry ....Willenhall.
Wansbrough, Edwin George L.. Barrow-in-Furness.
Ward, Oswald Thomas ....Diss.
Watson, William Henry..........Spennymoor.
Webster, Thomas Findlater ...London.
Werner, Emil Alphonse ....Dublin.
Wheeldon, Edwin.....................Warrington.
Wight, William ....Alnwick.
Willoughby, Samuel Walton ...Plymouth.
Wilson, John Henry ....Coventry.
Wilson, John Woolhouse ....London.
Woodruff, Thomas ....Stalybridge.
Woodward, William ....London.
Young, Edward Francis ....Portishead.
Young, George Herbert ....Brigg

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates. Examined.	Passed.	Failed.		Candidates. Examined.	Passed.	Failed.
Aberdeen	14	9	5	Jersey	2	1	1
Birmingham	17	8	9	Lancaster	6	5	1
Brighton	4	1	3	Leeds	17	9	8
Bristol	9	5	4	Lincoln	11	6	5
Cambridge	7	5	2	Liverpool	15	5	10
Canterbury	4	2	2	London	54	30	24
Cardiff	12	4	8	Manchester	24	9	15
Carlisle	7	4	3	Newcastle-on-T.	9	5	4
Carmarthen	13	6	7	Northampton	3	1	2
Carnarvon	10	4	6	Norwich	7	1	6
Darlington	8	4	4	Nottingham	12	4	8
Douglas	3	1	2	Oxford	2	2	0
Dundee	8	5	3	Peterborough	3	1	2
Edinburgh	26	6	20	Sheffield	6	2	4
Exeter	8	2	6	Shrewsbury	5	3	2
Glasgow	17	7	10	Southampton	4	1	3
Guernsey	1	0	1	Truro	2	2	0
Hull	12	9	3	Worcester	2	0	2
Inverness	5	3	2	York	6	3	3

The questions set for examination were as follows:—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. Translate into English either A (Cæsar) or B. (Virgil).

The Candidate must not attempt both.

A. CÆSAR.

(i.) Ita ancipiti proelio diu atque acriter pugnatum est Diutius quum nostrorum impetus sustinere non possent alteri se, ut coeperant, in montem *receperunt;* alteri ad impedimenta et carros suos se *contulerunt.* Nam hoc toto proelio, quum ab hora septima ad vesperum pugnatum sit, aversum hostem videre nemo potuit. Ad multam noctem etiam ad impedimenta pugnatum est, propterea quod pro vallo carros objecerant, et e loco superiore in nostros venientes tela *conjiciebant,* et nonnulli inter carros rotasque, mataras ac tragulas subjiciebant nostrosqui vulnerabant.

(ii.) Hoc proelio trans Rhenum nuntiato, Suevi, qui ad ripas Rheni *venerant,* domum reverti *coeperunt;* quos Ubii, qui proximi Rhenum incolunt, perterritos insecuti, magnum ex his numerum *occiderunt.* Caesar, una aestate duobus maximis bellis confectis, maturius paulo, quam tempus anni postulabat, in hiberna in Sequanos exercitum deduxit: hibernis Labienum praeposuit; ipse in citeriorem Galliam ad conventus agendos profectus est.

II. Grammatical Questions.

(*For those Candidates who take Cæsar*)

1. Give the principal parts of the verbs in italics.
2. Decline *impetus, impedimenta, aestate,* and *maximis bellis.*
3. Give the three degrees of comparison of all the adjectives in the above extracts.
4. What is the difference between *in montem* and *in monte?*
5. What do you know of *Labienus?* Who were the *Suevi* and *Sequani?*

B. VIRGIL.

I. Translate into English :—

(i.) Aeole (namque tibi divum pater atque hominum rex
Et *mulcere dedit* fluctus, et *tollere* vento),
Gens inimica mihi Tyrrhenum navigat aequor;
Ilium in Italiam portans, victosque Penates:
Incute vim ventis, submersasque obrue puppes,
Aut *age* diversos, et *disjice* corpora ponto.
Sunt mihi bis septem praestanti corpore nymphae,
Quarum, quae forma pulcherrima Deïopeiam
Connubio jungam stabili, propriamaque dicabo.

(ii.) At domus interior regali splendida luxu
Instruitur, mediisque parant convivia tectis.
Arte laboratae vestes, ostroque superbo;
Ingens argentum mensis, caelataque in auro
Fortia facta patrum, series longissima rerum,
Per tot ducta viros antiqua ab origine gentis.

II. Grammatical Questions.

(*For those Candidates who take Virgil.*)

1. Give the principal parts of the verbs in italics.
2. Decline throughout *vis, rerum, domus* and *praestanti corpore.*
3. Give the three degrees of comparison of all the adjectives in extract (ii.)
4. Give the case and construction of *tibi, vento, ventis, Deïopeiam propriam* (extract i.)
5. Who was *Aeolus?* Where was *Tyrrhenum aequor?* and what were *Penates?*

(*For all Candidates*).

III. Translate into Latin :—

1. This life of ours is short, but that one is immortal. 2. We often walked in the garden in order that we might refresh ourselves. 3. The generals were punished because they had not buried the bodies. 4. I wish to learn where the camp of the enemy is. 5. We must pray that all things may be well.

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*)

1. A gentleman, whose average expenditure is £3. 4*s.* 9½*d.* per week, saves every calendar month £15. 7*s.*; find his annual income.

2. Reduce to its simplest form

$$\frac{5\frac{5}{6}}{7\frac{7}{8}} \text{ o } 3 \times \frac{1-\frac{1}{10}}{7\frac{7}{8}-5\frac{5}{6}}$$

3. Divide 9·614 by ·0000019; and $\frac{2\frac{1}{5}}{5\frac{1}{2}}$ by $\cdot 00\dot{3}$.

4. Reduce 11 cwt. 19 lbs. to the decimal of 10 tons 1 cwt. 6 lbs.

5. If 1 decalitre of wheat makes 6 kilog. 68 decag. of bread, how much wheat will be required to make 59 myriag. 1 kilog. 788 gr. of bread of the same quality?

6. Twenty navvies can dig a trench 160 metres long, 2 m. broad, and 1 m. 2 decim. deep, in 8 days; in how many days will twenty-four navvies dig a similar trench 90 m. long, 1 m. 80 centim. broad, and 1 m. 6 decim. deep?

7. How many pieces (12 yards each) of paper, 1 ft. 9 in. wide, would be required for a room measuring 37 ft. 7 in. by 27 ft. 9 in. and 13 ft. 6 in. high; and what will it cost at 7½*d.* a yard.

ENGLISH.

(*Time allowed—from* 3 *p.m to* 4.30 *p.m.*)

1. Enumerate the personal pronouns, simple and compound.

2. Give illustrations of the use of the verbs *set* and *sit*; and mention any similar pairs, with their past tenses and past participles.

3. Analyse the following sentence:—

"No surly porter stands, in guilty state,
To spurn imploring famine from the gate."

4. Parse fully the following sentence:—

"O yes, I have felt a proud emotion swell,
That I was British born."

5. Punctuate the following passage, and, where necessary, put in capital letters:—at any rate i made up my mind to be so dreadfully industrious that i would leave myself not a moment's leisure to be low-spirited for i naturally said esther you to be low-spirited you and it really was time to say so for i yes i really did see myself in the glass almost crying as if you had anything to make you unhappy instead of everything to make you happy you ungrateful heart said i.

6. Write briefly the life of some eminent English statesman or soldier (*one* only) of the present century, *or* give a short outline of recent events in the Soudan.

Provincial Transactions.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A lecture was delivered at the rooms of the above Association on Wednesday evening, April 9, by Mr. G. M. Winter, on "Benzine Derivatives." Mr. J. J. Edwards presided.

The lecturer, having explained the nature of hydrocarbons and carbohydrates, said it was with the former class of bodies he was about to deal; he briefly demonstrated the chemistry of the paraffin, olefine, and acetyline series. Passing to the benzine series he explained the manufacture, chemistry, and properties of benzine and toluine. In the second part of the lecture he dealt with the chemistry of the alcohols and amines. The lecture, which was illustrated with numerous diagrams, was listened to with marked attention, and at the conclusion a hearty vote of thanks was accorded to the lecturer.

LIVERPOOL REGISTERED CHEMISTS' TRADE ASSOCIATION.

The ninth annual meeting of the Registered Chemists' Trade Association of Liverpool was held at the Royal Institution, Colquitt Street, on Thursday, April 3, 1884, the President, Dr. C. Symes, in the chair.

The following Annual Report of the Committee was presented as follows:—

"In placing before the members of the Association a *résumé* of the proceedings during the ninth year of its existence, the Committee have to remark that various important matters affecting the general interests of the trade have arisen, to which they have given careful attention. Intimation was received towards the close of last session of Parliament that the Medical Acts Amendment Bill would be brought before the House, and that it was desirable a clause should be inserted giving pharmacists a position upon the Pharmacopœia Committee. Immediate action was taken in the matter, resulting in a petition—to which two hundred and fifty signatures were attached in favour of such clauses—being sent to the senior member, Mr. Whitley, for presentation to Parliament. Letters pointing out the advantage of having on the Committee those who possessed a practical knowledge of this work were also written to Lord C. J. Hamilton and Mr. S. Smith, asking their favourable consideration of the proposed amendments, from whom replies promising support were received. Owing to the press of business this Bill was postponed until the present session; it is now passing through Committee and further action may be necessary. That the Members of Parliament should be more fully informed of our requirements, the Secretary was requested to obtain and forward to them Professor Attfield's addresses, delivered at Southampton and Southport. This has been done, and copies have been sent to the representatives of Liverpool, Western Division of Lancashire and Birkenhead. Attention having been directed in the recent poisoning case to the sale of fly papers containing arsenic, it was thought desirable in the interests of the trade to issue a circular cautioning chemists against the sale of such papers. The Benevolent Fund of the Pharmaceutical Society having strong claims upon us collectively as well as individually, a donation of £2 2*s*. has been forwarded by the Treasurer from the funds of our Association. The annual supper took place on November 15, 1883, accompanied with excellent music and recitations. It was considered one of the most successful of the series. Continued demand for 'The Liverpool Price List' has necessitated a re-issue. The sixth edition is now in the hands of the printer, and will be ready for sale during the present month. The Committee are pleased to report an increased number of members, showing that the steady and progressive work of the Association is being appreciated. The Treasurer's statement of accounts, duly audited, shows a balance of £19 9*s*. 2*d*., exclusive of £2 7*s*. 6*d*. due for Price Lists, in favour of the Association."

The Treasurer's financial statement, duly audited, having also been read, it was proposed by Mr. J. Woodcock, seconded by Mr. Turner, and carried,—"That the report and financial statement be adopted, and that the Secretary be instructed to have them printed and a copy sent to every chemist in Liverpool, Birkenhead and neighbourhood."

Mr. J. Woodcock proposed, Mr. J. J. Smith seconded, the election of Dr. Symes as President, which was carried unanimously.

The retiring members of the Committee, Messrs. Ellithorne, Hocken, Parkinson, A. Redford, Turner, and Warhurst, were re-elected, and Mr. G. Alexander was elected to fill the place of Mr. W. Parry.

Votes of thanks to the officers for their services in the past year having been passed, the proceedings terminated.

MANCHESTER PHARMACY STUDENTS' ASSOCIATION.

A meeting of chemists' assistants and apprentices took place at the Young Men's Christian Association, Peter Street, Manchester, on Tuesday, March 11, to consider the advisability of forming an association for the benefit of the junior pharmacists and apprentices of the city and suburbs. The unanimous opinion being that such an association was desirable, the business of drawing up rules and electing officers was immediately proceeded with, it being also resolved to ask Mr. A. H. Jackson, B.Sc., to accept the presidency of the Association.

At a subsequent meeting, held (by permission of the Council) in the Materia Medica Museum, Owens College, Mr. Alfred H. Jackson was elected President.

The following form the Committee for the ensuing year:—

President, A. H. Jackson, B.Sc.; Vice-Presidents, W. Elborne, A. W. Duncan; Honorary Treasurer, J. W. Hughes; Committee, F. A. Astley, C. H. Griffiths, J. E. Milford, A. B. Rhodes; Reporters, W. Kirkby (Botany), A. W. Duncan, F.C.S. (Chemistry), W. Elborne (Materia Medica), F. C. J. Bird (Pharmacy); Honorary Secretary, F. C. J. Bird, 8, Herbert Street, Cheetham.

NOTTINGHAM CHEMISTS' ASSOCIATION.

The Pharmaceutical Chemistry Class of the above Association, which has been under the able tuition of Professor Clowes, D.Sc., F.I.C., having just concluded a most successful term at the University College, the students were put through a practical and written examination, occupying two evenings, by their teacher.

The following are the names of those who have been successful:—

Prize and Certificate	1st. Mr. John F. Liverseege.
Certificates	2nd. Mr. James Stanley.
	3rd. Mr. Geo. W. Harris.
	4th. Mr. Edwin Roe.
	5th. Mr. Chas. J. Fryer.
	6th. Mr. F. C. Hemming.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, April 17. Dr. W. H. Perkin, F.R.S., President, in the chair.

The following certificates were read for the first time:—Messrs. W. Alabaster and E. L. C. Muspratt.

During the evening a ballot was held, and the following gentlemen were declared by the Scrutators, Dr. Miller and Mr. Louis, duly elected Fellows of the Society:—Messrs. J. P. Battershall, W. D. Borland, J. C. Bose, W. D. Crumbie, A. F. Dimmock, H. G. Greenish, W. J. Grey, J. Gaskell, J. W. Pratt, A. G. Perkin, W. H. Perkin, jun., and G. H. Wainwright.

Dr. Percy F. Frankland then read a paper—

On the Influence of Incombustible Diluents on the Illuminating Power of Ethylene.—The present communication forms a sequel to a paper read by the author "On the Illuminating Power of Ethylene when Burnt with Combustible Non-Luminous Diluents" (*Chem. Soc. Journ.*, Jan., 1884). In all cases the gases were consumed from a Referee's burner. Great care was taken to ensure the purity of the ethylene and the diluents (carbonic anhydride, nitrogen, oxygen and atmospheric air) employed. The author records his observations in a series of tables and curves. He sums up the principal results as follows:—Mixtures of ethylene, with the incombustible diluents, carbonic anhydride, nitrogen, aqueous vapour and atmospheric air, possess a lower illuminating power than pure ethylene. In all mixtures of ethylene with either carbonic anhydride, nitrogen or aqueous vapour, the intrinsic luminosity of the ethylene is reduced. In mixtures of ethylene with atmospheric air the intrinsic luminosity of the ethylene remains unimpaired until the air forms about 50 per cent. of the mixture. Mixtures of ethylene with oxygen in insufficient quantity to form an explosive mixture, possess a greater illuminating power than pure ethylene, the intrinsic luminosity of the ethylene being greatly increased. The disilluminating effects of carbonic anhydride, nitrogen and water vapour are due partly to dilution and partly to refrigeration, *i.e.*, the cooling occasioned by the introduction of inert gas into the flame. This refrigeration is proportional to the specific heats of the gases, but in the case of carbonic anhydride and aqueous vapour, it is augmented by the absorption of heat, which takes place in the dissociation of the aqueous vapour, and in the reduction of the carbonic anhydride to carbonic oxide. Of the four diluents, carbonic anhydride, nitrogen, aqueous vapour, atmospheric air, the first is the most and the last is the least prejudicial to the illuminating power; nitrogen and atmospheric air, however, become more equalized in their effects, as the proportion in which they are present increases, complete disillumination of the ethylene being effected by the same proportion of each.

Mr. Cross then communicated a paper—

On Trichloropyrogallol. By C. S. S. WEBSTER.—Messrs. Cross and Bevan found that by the action of chlorine upon lignose and bastose chlorinated derivatives were obtained, similar in properties and composition to the derivatives obtained by the action of chlorine upon various astringent substances of natural origin; but while the latter are made up for the most part of compounds which are aromatic in the strict sense of the word, the former contain no compounds of this order, but are converted into such under the action of chlorine. These authors also found that the amorphous chlorinated derivative from bastose had certain features of resemblance to the mairogallol of Stenhouse and Groves. The author of the present paper was therefore induced to reinvestigate the formation of this mairogallol. He finds that the reaction by which it is formed is divisible into two stages, which can be separated. In the first a trichloropyrogallol is formed, and it is this compound which subsequently undergoes condensation to the C_{18} derivative in question. This body, $C_6Cl_3(HO)_3 3H_2O$, was prepared as follows:—To 5 grams of pyrogallol 12 c.c. of strong acetic acid are added, the mixture is kept cool and a rapid current of dry chlorine is passed through; in about half an hour the new compound separates as a semi-solid mass of fine needles. The reactions of this body are almost identical with those of tribromopyrogallol, giving a deep blue coloration with baryta water, etc. The author has also prepared mairogallol, leucogallol, xanthogallol and tribromopyrogallol, and confirms the statements of Stenhouse and Groves in almost every particular. He has, however, improved the yield of these substances by slightly modifying the original processes.

The Secretary then read the following papers:—

The Synthesis of Galena by Means of Thiocarbamide. By J. EMERSON REYNOLDS.—Some time since the author noticed that when sulphur urea was heated with an alkaline solution of lead hydrate the lead sulphide was thrown down in a specular layer. In the present paper he gives the best method of obtaining this specular coating on glass, brass, etc. Two solutions are used; one contains 90 grams of sodium hydrate and 75 grams of lead tartrate in a litre of water, the other contains 17 grams of sulphur urea in a litre. Equal volumes of the two solutions are mixed and heated in a clean beaker; at about 50°, a specular layer, which is at first silvery and translucent, forms on the vessel; it thickens as the temperature rises and becomes opaque, resembling a brilliant face of a crystal of native galena. The excess of the sulphide separates out after boiling a short time as a very dense easily washed precipitate having the appearance of very finely powdered galena. The author hopes to be able to utilize this separation for analytical purposes. The coating adheres with considerable tenacity to glass, brass, etc., and when the patent rights which control the production of ammonium sulphocyanide lapse this galena plating may be advantageously applied to many useful purposes. Two glass vases, one coated externally, the other internally, and a piece of brass tube plated with galena were exhibited.

Dr. Armstrong said that the author gave no proof that this coating really consisted of galena, *i.e.*, crystallized lead sulphide.

On the Analysis of Woodall Spa. By W. T. WRIGHT.—Woodall lies about midway between Lincoln and Boston. In 1811 a boring was made for coal which was abandoned at 277 yards owing to the rising of a spring. This spring has since acquired some reputation as a medicinal remedy for gout, rheumatism, etc. Its properties are apparently due to the bromine and iodine which it contains. The spring was analysed by Dr. Frankland in 1875. The author gives a very complete analysis of the water. It contains 11113·73 parts per million of chlorine, 49·7 of bromine, and 5·21 of iodine. The spring is much richer in iodine and bromine than any other in this country. The author also gives a short account of the geological structure of the district.

On the Critical Temperature of Heptane. By T. E. THORPE and A. W. RÜCKER.—In a previous paper one of the authors carefully determined the superficial tension of heptane, which was in c. g. s. units at 0° 22·19. From this number the critical point of heptane was calculated to be 281°. Pawleski has shown that a constant difference exists between the critical temperature and boiling points of strictly homologous compounds. This difference is in the case of hexane 182·3°. Normal heptane boils at 98·4° which, added to the constant 182·3°, gives 280·7° as the critical point of heptane.

The Society then adjourned to May 1.

Parliamentary and Law Proceedings.

PROSECUTION UNDER THE 17TH SECTION OF THE PHARMACY ACT.

At the Peterborough Petty Sessions, on Wednesday, April 9, before C. J. Sturge, Esq. (Chairman), and Messrs. Whitwell and English, Henry Bellamy, licensed hawker, Padholme Road, Peterborough, was charged with having unlawfully sold, on March 25 last, at the parish of Werrington, to Alfred Wright, Assistant Secretary to the Chemists and Druggists' Trade Association of Great Britain, a certain poison, to wit, laudanum (the same being a preparation of opium), and not labelled with the name and address of the seller of the same, in contravention of the Pharmacy Act, 1868.

Mr. Henry Glaisyer, Solicitor to the Association, Birmingham, conducted the prosecution, and Mr. J. A. Percival, Peterborough, appeared for the defence.

Mr. Glaisyer, in opening the case, explained that there was a large amount of illegal trading being carried on, and that in the interest of the public as well as the trade the Association was doing its utmost to suppress this breaking of the law. He went on to state that defendant travelled about the country selling drugs, and that on the day in question Mr. Alfred Wright visited Werrington, a village about four miles from Peterborough, where he met defendant with his van, which was fitted up as a chemist's shop, hawking drugs from house to house. He (Mr. Wright) purchased, amongst other articles, some laudanum, which was a preparation of opium, and came within the Act relating to poisons. It might be contended that the defendant was employed by a properly qualified chemist, but he called the attention of the Bench to the fact that it was the seller, *i.e.*, the one who regulated and controlled the sales, who was liable. In this case such a person was Bellamy.

Mr. Alfred Wright said he was Assistant-Secretary to the Association, and resided in Birmingham. On the 25th of March last he went to the village of Werrington, about four miles from Peterborough, and purchased from the defendant, who was travelling with a van fitted up as a chemist's shop, half an ounce of laudanum. The bottl was labelled—"Laudanum—'Poison'—Arthur Carlton, Dispensing Chemist, 18, Long Causeway, Peterborough." He had analysed the poison in question, and found it to be a preparation of opium. The name of the defendant was on the van, and it was he who personally supplied him with the poison.

The Chairman: If it had been sold at Mr. Carlton's shop it would have been all right?

Witness: Yes.

In cross-examination witness stated that the name of A. Carlton, Chemist and Druggist, Peterborough, also apppeared upon the van.

Mr. J. A. Percival, for the defence, contended that the sale by defendant was on the same level as any sale by an apprentice or any other person in Mr. Carlton's legitimate employment, and that there was nothing in the Act which enforced defendant to sell in the shop only and not outside.

Mr. Arthur Carlton said defendant was in his own employment and travelled for him, but was not a qualified chemist. The articles sold were labelled with his (witness's) name and address, and the drugs were made up in his shop.

In cross-examination by Mr. Glaisyer, witness said Bellamy had complete control of the business conducted by him, and received from him (witness) a fixed salary and commission on sales. Bellamy was not a qualified chemist and druggist.

Re-examined by Mr. Percival: Bellamy had been in witness's employment since 1882, and was previously a chemists' porter. He had also been three years in a surgery and four years with a chemist.

Mr. Glaisyer, in addressing the Bench, quoted in detail the case of Templeman *v.* Trafford, after which, at the request of the magistrates, handed them the report of the trial. He also called their attention to the fact that even if Mr. Carlton was the seller the Act required that the buyer and seller should be introduced to each other, which was impossible when the poison was being hawked four miles off.

The Bench retired to consider their decision, and, on returning into Court, the Chairman said that they had given the case careful consideration, because it was a very fine point. Following, however, the case of Templeman *v.* Trafford in the Law Courts Reports, they held that the defendant was the seller of the poisons. The Act was framed to protect people buying them, and, if a man went four miles away from the shop, strictly he was the seller under the Act and he must be convicted. At the same time he did not believe defendant intended breaking the law. The penalty would be the minimum of 6*s.*

Mr. Glaisyer applied for the costs of the Trade Association's witness.

Mr. Carlton said it was usual for the Association to pay their witnesses.

The Chairman: Is that so?

Mr. Glaisyer answered that it was sometimes so.

Mr. Carlton: It should certainly be so in this case, especially as I am one of the members of the Society.

The ordinary Court costs only were added to the penalty.

Review.

MEDICAL GUIDE TO CONTREXÉVILLE. (VOSGES). By Dr. DEBOUT D'ESTRÉES, Médecin Inspecteur des Eaux. J. and A. Churchill. London.

This little book, which is dedicated to Doctor Garrod, is a translation of the author's French manual adapted to English readers. Contrexéville is a village which once formed part of the kingdom of Lorraine, and which now belongs to the department des Vosges, and to the district of Mirecourt. The soil is essentially calcareous; and it contains certain mineral springs which it is the object of the writer to bring prominently into notice and to introduce to the British public.

More than a century ago the place was visited by patients suffering from gravel and diseases of the bladder; and also by those afflicted with gout and disorders of the liver.

Of late great improvements have been effected; a bath establishment has been erected; a "pavilion" has been built; and the visitor in search of health will find all the accessories which are so liberally provided in similar continental resorts.

There are six springs which have been carefully *captured* (that is rendered available for treatment), of which the chief one, the Source de Pavillon, is under Government protection. A spring called la Souveraine does not seem to be in favour, its recomendation being free access to the fountain and the low price of the bottled water. Analysis determines the springs to be of a calcareous alkaline nature, of moderate strength, lithium being present; whilst iron with a trace of arsenic appears in the sediment of the *sources* specially recommended. The Source du Prince has long enjoyed a local reputation in chronic affections of the eye.

Owing to their chemical composition the use of the waters of Contrexéville is clearly indicated for gout. Alkalines (says Professor Charcot), and above all lithium, administered in small well diluted doses, have a remarkable effect on gout. They delay the paroxysms; they sometimes dissolve and reduce the deposits already formed and give more flexibility to the joints. Such results are claimed by Dr. D'Estrées for his favourite springs, and the diluted manner in which the alkaline salts are exhibited is advanced as the explanation of their success when the stronger waters of Carlsbad or Vichy have failed.

Reasoning from the teachings of analysis he proceeds to show their beneficial action in cases of gravel, stone, vesical catarrh, diseases of the prostate, infantile incontinence of urine, and hepatic colic; and he extends their application to the treatment of diabetes. Poor Madame de Sévigné, when she went to Vichy, was bled and purged on her arrival, and began the first day of her cure by swallowing twelve glasses of the water from the spring of the Grande Grille. Such heroic practices have disappeared from Vichy and elsewhere; thirty glasses are no longer taken in a day, and in this anæmic age a little more blood in the system is rather wanted than its abstraction.

It is a subject of regret to Dr. D'Estrées that the late Emperor Napoleon III. did not carry out his intention in 1866 of visiting these healing springs.

Of Contrexéville it has been said by another writer, that it is the annual rendezvous of the cleverest men, the wittiest talkers, and the most noted *gourmets* that one common malady can assemble. Its therapeutic advantages are warmly advocated in this Guide, which is free from that style of direct advertisement too common in publications of this nature.

Obituary.

Notice has been received of the death of the following:—

On the 24th of February, Mr. Richard Clay, Chemist and Druggist, Market Place, Cromford. Aged 70 years.

On the 25th of February, Mr. Hugh Cowan, Chemist and Druggist, High Street, Thurso. Aged 69 years.

On the 26th of February, Mr. William Cartwright, Chemist and Druggist, Hessle Road, Hull. Aged 44 years.

On the 7th of March, Mr. John Copeland, Chemist and Druggist, Cleveland, Somerset. Aged 56 years.

On the 7th of March, Mr. Joshua Laverty, Chemist and Druggist, New North Road, London. Aged 34 years.

On the 8th of March, Mr. Thomas Parnell, Chemist and Druggist, Oakham. Aged 60 years.

On the 16th of March, Mr. John Tily, Chemist and Druggist, Sevenoaks. Aged 68 years.

On the 21st of March, Mr. Robert Falconer, Chemist and Druggist, Nairn. Aged 60 years.

On the 21st of March, Mr. Fawcett Bowerbanks, Chemist and Druggist, Market Street, Cockermouth. Aged 58 years.

On the 21st of March, Mr. Walter Charles Bucknoll, Chemist and Druggist, Malden Road, Kentish Town. Aged 69 years.

On the 24th of March, Mr. Frank William Steel, Pharmaceutical Chemist, Fish Street Hill, London. Aged 37 years.

On the 24th of March, Mr. James Wood, Chemist and Druggist, Stonehaven, Kincardineshire. Aged 65 years.

On the 29th of March, Mr. William Frederick Blake, Pharmaceutical Chemist, High Street, Stroud, Gloucestershire. Aged 65 years. Mr. Blake had been a Member of the Pharmaceutical Society since 1856, and for many years held the office of Local Secretary.

On the 4th of April, Mr. Samuel Hunt, Chemist and Druggist, Market Hill, Sudbury. Aged 41 years. Mr. Hunt had been a Member of the Pharmaceutical Society since 1871.

On the 5th of April, Mr. Benjamin Johnson, Chemist and Druggist, Arkwright Street, Nottingham. Aged 45 years.

On the 7th of April, Mr. William Martin, Chemist and Druggist, Market Harborough. Aged 42 years. Mr. Martin had been a Member of the Pharmaceutical Society since 1869.

BOOKS RECEIVED.

On the Formation of Uric Acid in Animals: its Relation to Gout and Gravel. By P. W. Latham, M.A., M.D. Cambridge: Deighton, Bell and Co. 1884. From the Author.

Experimental Chemistry for Junior Students. By J. Emerson Reynolds, M.D., F.R.S. Part III. Metals and Allied Bodies. London: Longmans, Green and Co. 1884. From the Publishers.

Numerical Exercises in Chemistry. By T. Hands, M.A., F.R.A.S. London: Sampson Low and Co. 1884. From the Author.

The Cinchona Barks Pharmacognostically Considered. By Professor Flückiger, Translated with some additional Notes, by Fred. A. Power. London: J. and A. Churchill. 1884. From the Publishers.

A Treatise on Chemistry. By H. E. Roscoe, F.R.S., and C. Schorlemmer, F.R.S., Vol. III. The Chemistry of the Hydrocarbons and their Derivatives, or Organic Chemistry, Part II. London: Macmillan and Co., 1884. From the Publishers.

Correspondence.

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

Standard Galenical Preparations.

Sir,—The paper on "Extract of Nux Vomica," by Mr. Schacht, which is printed in your last issue, seeks to maintain certain opinions that call for some reply from me. First, let me thank Mr. Schacht for the manner in which he has expressed his dissent from certain propositions that I have advanced, and let me hope that in the remarks I am about to make there may be found that same spirit of courteous criticism which pervades all that Mr. Schacht has said on the other side.

The main point in the paper referred to resides in the apparently decided opinion that Mr. Schacht holds upon the general question of standard galenical preparations, the official recognition of which I have advocated, and in the special case of nux vomica Mr. Short and I have proved the feasibility of producing. We have defined a standard preparation of nux vomica as a preparation that "contains a definite and constant quantity of total alkaloid." The first objection supposed by Mr. Schacht to obtain against the adoption of this definition is stated in the following words:—"There is no doubt that a large portion of the medical activity of the drug does depend upon the alkaloids it contains, but I am acquainted with no proof that all the rest is inert." This sentence will pass very well for a paraphrase of a passage in the paper upon "Tincture of Nux Vomica," which I contributed, in conjunction with Mr. Short, to the Southport meeting of the Pharmaceutical Conference:—"It will be at once conceded that the important feature in a typical tincture of nux vomica is, or should be, uniformity in alkaloidal strength: the other constituents, though doubtless valuable, are of secondary importance." That is to say, the other constituents, principally fixed oil and fat, are not potent poisons, an increase in the dose of which to the extent of a grain or two would lead to fatal results. The next objection Mr. Schacht raises is that "if we are to standardize at all, we should standardize each potential element by itself and not a mixture of elements, one of which is of undetermined power." Theoretically this will be at once admitted, but, practically, I ask who has yet determined the quantitative relation of strychnine to brucine that is therapeutically the most active? We know that strychnine is a most potent toxic agent; the exact physiological action of brucine we are as yet unacquainted with, but we do know that, as an alkaloid, it is much less toxic than strychnine is. Having in view the production of a preparation of nux vomica that shall be, as far as possible and feasible, constant in therapeutic action, two courses are open to us. First, to make the proportion of the strychnine alone constant, and, second, to make the proportion of total alkaloid constant. The first course, besides being at the present time impracticable, would lead us to disregard the physiological activity of brucine, including its possible effect upon the action of strychnine. The alternative remains and strongly recommends itself, namely, to render the entire quantity of alkaloidal constituents constant and definite. Mr. Schacht urges against this, that the proportion of strychnine to brucine in the total alkaloid is naturally subject to variation, and he exhibits a table of results, under the impression that they lend support to this objection. But I would point out to Mr. Schacht that the table which he reproduces from a paper on "Extract of Nux Vomica," by Mr. Short and myself, is a table of analyses showing the proportion of strychnine and brucine in commercial extracts of nux vomica, no two of which have probably been prepared by precisely the same process. In fact, I have since learnt that in reference to four of them this is actually the case, and in one instance an entirely different solvent was used for extracting the nux vomica. To prove the statement that the proportion of strychnine to brucine in nux vomica is inconstant, a statement which at present we can neither affirm nor deny, it is necessary to make a series of analyses of the original seeds, which has not yet been done, but I hope soon will be by Mr. Short and myself. Even when this has been settled it will no doubt still be considered for many reasons preferable to make the standard "total alkaloid." I regret to notice from Mr. Schacht's concluding passages in reference to the "15 per cent. standard" that he yet fails to see the point of my remarks which were made in reply to the self-same objections at the Evening Meeting of the Pharmaceutical Society in February last, but as these have been fully reported in your Journal of February 9, I shall not reiterate them now. I would only remark that since this time the processes which Mr. Short and I have proposed for the preparation of standard galenical preparations of nux vomica have been tried by many pharmacists, both wholesale and retail, and have been found to be practicable and successful on the small and large scale. "If a sample comes out below the standard" it must assuredly be rejected for medical use; but such a result could only ensue when the details of the process were not faithfully adhered to. So far I have heard no valid objections to the official recognition of standard galenical preparations, while the position of the question has been greatly strengthened by the adhesion, among others, of so eminent a scientific pharmacist as Professor Redwood, who has not only advocated, but also devised a process for the preparation of a standard liquid extract of cinchona.

The production of standard galenical preparations of potent drugs, which, in the majority of cases, needs the expenditure of a vast amount of preliminary scientific work, marks out a distinct line of progress and research in the pharmacy of the future—I mean, I think so.

WYNDHAM R. DUNSTAN.

ESTIMATION OF TOTAL ALKALOIDS IN EXTRACT OF NUX VOMICA.

Sir,—Mr. G. F. Schacht, in a paper published last week, describes a modification of Dragendorff's indirect process for estimating a mixture of strychnia and brucia.

Mr. Schacht prepares a volumetric test solution of potassio-mercuric iodide of such a strength that (to quote his own words) "each c.c. of this solution precipitates 0·00184 gram of mixed strychnia and brucia."

There are no details given in illustration as to how this constant factor (0·00184) is obtained in operating on a solution containing a mixture of strychnia and brucia in unknown proportions. Perhaps Mr. Schacht will record the details, as his process (if found reliable) appears more convenient than the quantitative method of Messrs. Dunstan and Short.

A careful manipulator, able to work out an algebraic simultaneous simple equation, should find no great difficulty in Dragendorff's process as detailed in his 'Plant Analysis,' the chief source of error being the rather uncertain composition of the precipitate.

8, *Torrington Place, W.C.* GEORGE SMITH.

SPIRIT OF NITROUS ETHER.

Sir,—Some months since, in commenting upon the proceedings of the Pharmaceutical Conference, you mentioned (referring to a paper of mine) the "interminable subject of sweet spirit of nitre."

Upon opening the Journal for April 12, and seeing two prominent articles upon this subject, I naturally thought that now, at least, the question was to be finally settled. Perhaps it was my own fault, due to too great expectation induced by the source of these papers, that I was disappointed, but such, I am sorry to say, was the case.

Of the first paper, viz., the one by Mr. MacEwan, I have only two remarks to make; the first is that the figures given under the head of "Diminution of Separation Volume" seem very instructive, because, if correct (which I have no reason to doubt), they show that the details of the manufacture are of the utmost importance.

During winter, Mr. MacEwan has found a greater loss of "ethereal liquid" in two months than was sustained by the samples shown by me in Southport in seven months, chiefly summer.

Moreover, these samples, now nearly fourteen months old, I find to separate nothing appreciable less than they did then.

They have, however, not been unstoppered since that time as far as I am aware. The second point is Mr. MacEwan's method of estimating the acidity, which I believe to be incapable of accurate results, as decinormal soda solution immediately decomposes sweet spirit of nitre; indeed, any alkali does so more or less rapidly.

Mr. Dott states that I consider aldehyde to be the active ingredient, and this I must most positively contradict. I said that I considered we had as much right to impute the activity to aldehyde as to nitrous ether, and gave my reasons for believing that Mr. Rimmington's argument in favour of the notion that nitrous ether produced the effects noticed, would apply with equal, if not greater, force to aldehyde. I never, however, stated or believed that aldehyde was the active principle, although I do now believe the activity is probably due to some polymeric form of aldehyde, such as paraldehyde or some nitro compound of it.

Mr. Dott's comparison between the action of aldehyde forming acetic acid in the blood, and vinegar in the stomach,—rather a stretch,—is unfortunate in the face of the fact that acetic acid or combinations containing it (such as oxymel simplex, oxymel scillæ, etc.) are constantly used in similar cases as sp. æth. nit., and not unfrequently in conjunction with it. Christison gives, amongst other actions of actic acid, the following:—stimulant, diaphoretic, and diuretic.

The same actions are imputed by the same author to sp. æther. nit., with the single addition of antispasmodic.

The medical authority quoted by Mr. Dott does not seem to have investigated the subject himself, and his views are similar to those taught forty years ago, and more or less accepted since, for the simple reason that no better theory has been advanced. The best proof, however, of their not being true is the fact that the sp. ætheris nitrosi of the Edinburgh Pharmacopœia, which, no doubt, contained, to say the least, a much larger proportion of the nitrous ether than any other, has not remained in demand and was, indeed, recommended by Christison forty years ago in the same dose as now employed with the present article.

That a nitro compound such as nitro-glycerine should decompose into a nitrite (and something else) in the blood is not surprising; but, I would ask, is diuresis the most marked result of the action of nitro-glycerine in the system?

I am very sorry that Mr. Dott has not been more successful with the hydric sulphide process, which is the only one which has yet occurred to me as likely to estimate the nitrous ether and nothing else; but he perhaps gave it up because it did not "go as it ought," or in other words, the spirit did not contain what it was expected to do.

With regard to the process finally adopted by Mr. Dott for the estimation of nitrous ether, he will find that I suggested at Southport (*Ph. J.*, Nov. 17, 1883, p. 392) practically the same thing; but I omitted the acid as unnecessary, because the preparation contains something (not aldehyde, as that is not present in sufficient quantity) which so decomposes as to render the acid unnecessary.

This something, which Mr. Dott entirely ignores but which I believe to be more probably the chief ingredient wanted, is consequently so far estimated at the same time, by my method. I may say that at Southport I stated that the test I had suggested was only a comparative one, as with different proportions of water different results would be obtained, but that with the same quantities the results were constant. This remark was not in the paper and was not reported.

I have only, in conclusion, to hope that this subject may remain "interminable" until some satisfactory conclusion has been arrived at.

Liverpool. A. C. ABRAHAM.

PHARMACY AT THE ANTIPODES.

Sir,—As your correspondent "Inquirens" solicits information as to the prospects of pharmacists at the Antipodes, I will briefly lay before your readers my experience on the subject, gained during a travel which I took nearly two years ago through Victoria, New South Wales, Tasmania, and New Zealand.

Businesses in the large towns are conducted in much the same style as in England, and from what I was informed are rather more remunerative than here. Higher prices are charged for nearly all things, but expenses are heavier as drugs, chemicals, sundries, etc., have to be imported. There is a fair amount of trade to be done in the up-country townships, but it is of a mixed character and would require some previous special experience.

I should certainly advise any young pharmacist intending to settle in Australia or New Zealand to take an assistantship first and acquire a knowledge of the special requirements of the trade. I was informed that situations are easily obtainable by pharmacists possessing the Minor or Major qualification, and that the remuneration is very good.

173, *Marylebone Road, N.W.* A. P. LUFF.

F. T.—The term "patent medicine" is commonly applied to preparations that are liable to pay stamp duty, although they may not be the subject of a patent. The selling of such articles necessitates the taking out a "patent medicine licence."

Lex.—We have not made any such statement, but our opinion upon the subject will be found in the *Pharmaceutical Journal* for June 9, 1883, p. 1025.

G. W. H.—(1) The specimen sent is *Geranium molle.* (2) *Leontopodium alpinum* (Compositæ).

COMMUNICATIONS, LETTERS, etc., have been received from Dr. Hager, Messrs. Dott, Gorrie, Inquirer.

DR. REDWOOD'S PROCESS FOR LIQUID EXTRACT OF CINCHONA.

BY A. J. COWNLEY.

The great difference between the opinions expressed in reference to the process suggested by Professor Redwood for the preparation of liquid extract of cinchona bark, in the course of the discussion that took place after the reading of his paper, is sufficient evidence that there is room for further investigation of the subject, and this view was indorsed by the impression entertained by one of the speakers, "that they knew very little about bark." In any case it appeared desirable to ascertain how far the process now suggested by Professor Redwood as a substitute for the one which is official in the present British Pharmacopœia is calculated to realize the objects which he has defined as being most important and whether it is a substantial improvement on the existing process. I have therefore carried out some experiments to determine these points, and have obtained results that I will now proceed to describe.

As regards the kind of cinchona bark operated upon, I have acted upon Professor Redwood's decision that East Indian succirubra bark is the best to be used for preparing a liquid extract, and though not fully agreeing with this opinion, have not now ventured to offer any objection to it, since I am not aware that the "previous observations"* which led Professor Redwood to that decision have yet been made public. Some difficulty was experienced, however, in selecting for the purpose of my experiments "red cinchona bark of good average quality." In the absence of any criterion to serve as a guide in this respect and having regard to the extreme variability of this kind of bark,—the contents of alkaloids ranging from less than one per cent. up to more than ten per cent.,—as well as the absence of any definite or recognizable relation between the external characters of a sample and the amount of alkaloids contained in it, I concluded that it would be best to operate upon bark of previously ascertained alkaloidal contents, and to choose such as contained a medium percentage, as shown by the following figures:—

	Per cent.		Grains per lb.
Quinine	2·1		147
Cinchonidine	1·6		112
Cinchonine	2·03	or	$142\frac{1}{4}$
Amorphous alkaloid	1·00		70
Total alkaloids	6·73		$471\frac{1}{4}$

Liquid extract made from this bark by a process capable of effecting the entire removal of the alkaloids, and standardized so that 1 fluid ounce would correspond to 1 ounce of the bark, ought, therefore, in accordance with the above figures, to contain about $29\frac{1}{2}$ grains of total alkaloid per fluid ounce, with the several alkaloids in the following proportions:—

	Grains.
Quinine	9·2
Cinchonidine	7·0
Cinchonine	8·9
Amorphous alkaloids	4·4
Total alkaloids	29·5

This would be rather more than 5 per cent.—the proportion recommended by Professor Redwood; but for the purpose in view the bark was considered to be sufficiently near to the proper standard.

In operating upon one pound of this bark in the manner directed, I found that when 10 pints of liquid had passed through, the percolate still gave a precipitate when mixed with caustic soda in excess; the operation was therefore continued until the percolate had ceased to give this reaction. On reaching that point $13\frac{3}{4}$ pints of liquid had passed through. This percolate was sensibly acid, even while thus dilute, and when evaporated down to one pint was much more strongly acid. On cooling and diluting the liquor with water it deposited some brown flocculent material, which, when separated by filtration, washed and dried, was found to weigh $27\frac{1}{4}$ grains and to contain 1·1 grain quinine with traces of the other alkaloids. The filtered liquid evaporated to dryness left a residue of solid extract weighing $4\frac{1}{4}$ ounces, which was found on analysis to contain 12·96 per cent. total alkaloid.*

According to the directions given by Professor Redwood in his paper for preparing the liquid extract from this solid extract, it is easy either to obtain a preparation that shall contain 5 per cent. total alkaloid, or one containing in a given bulk exactly as much total alkaloid as the corresponding weight of bark operated upon. But to fulfil both these conditions it would be necessary to use bark containing exactly 6·25 per cent. total alkaloids. In the present case, for instance, 1 ounce of the bark contained nearly $29\frac{1}{2}$ grains of total alkaloids, and by dissolving to the volume of a fluid ounce as much extract as contained that quantity of total alkaloids ($227\frac{1}{2}$ grains), of course the fluid ounce of liquid extract would to that degree correspond to 1 ounce of the bark it was made from, and would contain 6·73 per cent. of total alkaloid. To bring it nearer to Professor Redwood's standard of 5 per cent., $168\frac{3}{4}$ grains of the dry solid extract was dissolved to the volume of one fluid ounce, and on analysis the product gave:—

	Grains.
Quinine	5·89
Cinchonidine	5·90
Cinchonine	5·69
Amorphous alkaloid	4·39
Total	21·87 = 5 per cent.

* Clearly there is a growing "fashion" in favour of red bark. We may, however, take the opportunity here of remarking that among the various recommendations of Indian succirubra bark, the one put forward by Professor Bentley, of its being "the sole bark recognized in the German Pharmacopœia," seems to be scarcely in accordance with the qualifying term "*præcipue*," which is used in that work.—ED. PHARM. JOURN.

* I was unable to obtain satisfactory results in the analysis of this extract according to the method directed by Professor Redwood. On treating 20 grains of the extract with caustic soda, a slimy precipitate was thrown down, and the liquid became so thick that it could not be filtered readily. After washing and drying this precipitate, it weighed only 0·92 grain, though it was only in part alkaloid, while the quantity of alkaloid was found by another method to be 2·59 grains. Part of this deficiency was in all probability owing to the viscous state of the extract solution when mixed with caustic soda, but in part it was a consequence of the solvent action of the water present. This was ascertained by operating upon a quantity of dry quinine sulphate containing 2·59 grains of alkaloid dissolved in one fluid ounce of water, and mixed with three fluid drams soda liquor and washing the precipitate so obtained. The dried precipitate obtained weighed only 1·97 grain showing a loss of 0·62 grain.

By comparing these results with those furnished by the analysis of the bark operated upon, it will at once be seen that the relative proportions of the alkaloids are different as compared with the original bark, and that there is in the extract a relative deficiency of quinine, together with a relative preponderance of amorphous alkaloid. There was, therefore, some reason to infer that the extract did not adequately represent the bark from which it was made, inasmuch as it contained a smaller proportion of the most valuable and important alkaloid quinine, and a much larger relative proportion of the less valuable amorphous alkaloid, which is by some considered to be objectionable from a medicinal point of view. In addition it will be seen that the quantity of solid extract requisite to make one fluid ounce of liquid extract representing one ounce of the bark, was very much larger than the quantity obtained from one ounce of bark, or 227½ grains instead of 115½ grains.

This leads to a consideration of the further desideratum, that in preparing liquid extract "the bark should be exhausted of its alkaloids by the process adopted," and it must be pointed out that as yet no evidence has been furnished that the suggested process is capable of effecting such a result. The device just referred to, of taking as much solid extract as contains a desired quantity of total alkaloids in order to make a certain bulk of liquid extract, is one very safe to rely upon for standardizing the amount of total alkaloid in the latter preparation; but since it has no kind of connection with the entire removal of the alkaloids from the bark used, the efficacy of the process in this respect must be tested in another way. In order to obtain some evidence on this point the total quantities of the several alkaloids in the solid extract above referred to were computed on the basis of the analysis and compared with the quantities contained in the bark from which it was made, as follows:—

	One pound of bark contained Grains.	4¼ ozs. of solid extract contained Grains.	Deficiency.
Quinine	147	64·57	82·43
Cinchonidine . .	112	64·70	47·30
Cinchonine . . .	142¼	62·30	79·95
Amorphous alkaloid	70	48·03	21·97
	471·¼	239·60	231·65

It is evident from these figures that there was not only a large deficiency in the amount of total alkaloid, but that the quantities of the individual alkaloids showed dissimilar deficiencies, and that, in short, while only one-half of the total alkaloids had been extracted from the bark it was chiefly in regard to the more important alkaloids that this loss was most considerable. Evidently, therefore, the proposed treatment with hydrochloric acid does not furnish a preparation that can be considered to represent cinchona bark in such a manner that a fluid ounce shall contain all the valuable medicinal properties of an ounce of that drug.

In making liquid extract by this process the bark consumed is only half represented as regards total alkaloids, for, as already shown, it would be necessary to take the solid extract from nearly two ounces of bark to make one fluid ounce of liquid extract containing as much total alkaloid as one ounce of the bark, while beyond this the total alkaloid in the liquid extract so produced would be much inferior, as regards the relative proportions of its constituents, to that actually contained in the bark itself.

To obtain further confirmation of this result the residual bark was submitted to analysis, and it was found to contain 4·49 per cent. total alkaloid. The following table gives a general *résumé* of these results, from which it will be seen that the residual bark contained nearly as much alkaloid as had been extracted by the process and that as regards the relative proportion of quinine it contained it was even better than before treatment:—

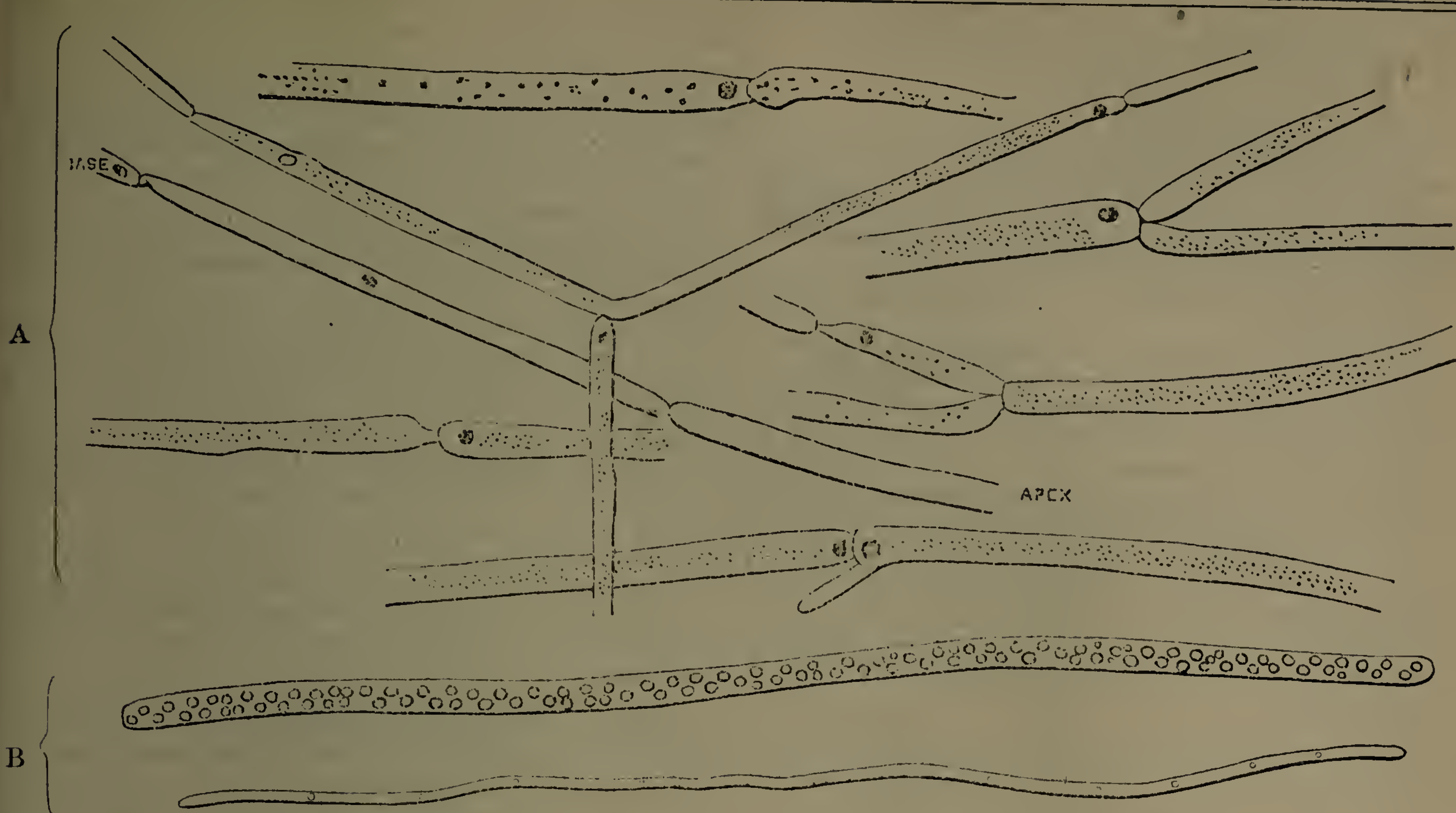
	One pound of the bark contained Grains.	Precipitated by water 27·3 grains. Grains.	Solid extract of red cinchona 4¼ ozs. Grains.	Residual bark contained Grains.
Quinine . . .	147	1·1	64·57	81·33
Cinchonidine .	112	—	64·70	47·30
Cinchonine . .	142·25	—	62·30	79·95
Amorphous alkaloid . . .	70	—	48·03	21·97
	471·25	1·1	239·60	230·55

BEGGIATOA ALBA: THE SO-CALLED "SEWAGE FUNGUS."

BY ALFRED W. BENNETT, M.A., B.SC., F.L.S.,
Lecturer on Botany at St. Thomas's Hospital.

Under the name of "sewage-fungus," a peculiar organism is familiar to sanitary engineers as occurring abundantly and universally in the effluent water from sewage-works, forming dense flocculent greyish-white masses attached to the bottom and sides of the channel or to ordinary green algæ. Under the microscope it is seen to consist of an immense quantity of colourless threads, with but little or no chlorophyll, full of granular protoplasm, and containing a number of bright strongly refractive granular particles. This is *Beggiatoa alba*, Vauch., an interesting and remarkable organism.

The best description and drawing with which I am acquainted are by Zopf ('Die Spaltpilze,' Breslau, 1883, p. 76); but the specimens I have had an opportunity of examining differ somewhat from the typical form. Zopf describes the filaments as varying greatly in diameter, from 1 to 5 mm., as being unbranched and unseptated, and as characterized by the presence of strongly refractive globular particles, which have been determined by Professor Cohn of Breslau and Professor Cramer of Zürich to consist of pure sulphur. I find the filaments to be copiously branched, either dichotomously or laterally, and septated, either at the bases of the branches or elsewhere, and the cells to be frequently remarkably constricted above and below the septa. Still these low organisms are so often variable in points of structure of this kind, that further evidence of the constancy of these differences would be required before establishing a distinct species. The globules of sulphur I find most commonly situated one immediately below each septum; but sometimes towards the centre of a cell or more generally diffused. The systematic position of *Beggiatoa* is somewhat obscure. Zopf places it without hesitation in the Schizomycetes, with which it agrees in the absence of chlorophyll, and in a capacity for assuming different conditions, of which the ordinary form may be regarded as the leptothrix state. It also has corre-



A. *Beggiatoa alba* or sp. nov. observed in effluent from Sewage Works at Hertford.
B. *Beggiatoa alba*. From Zopf's figure in the 'Encyklopædie der Naturwissenschaften.' } Multiplied about 500 diams.

sponding bacillus, bacterium, coccus, and spirillum conditions. On the other hand it is certainly closely allied to the Oscillatorieæ through *Crenothrix*, if this genus is to be retained; and if at certain times of the year it develops chlorophyll, which I think is probably the case, there would be no good characters by which to distinguish it from that class. If the trifurcate division of Thallophytes, which is a modification of Sachs's, is adopted, into algæ, fungi, and protophytes, it will come under the third and lowest class.

The source of the sulphur contained in this organism is a very interesting question. It is a prevalent idea among sanitary engineers that the presence in water of the "sewage-fungus" is a sure indication of partially decomposed sewage. But this would seem to be not necessarily the case. Zopf describes it as occurring in the effluent water from manufactories, especially sugar factories and tanneries, and in thermal sulphur springs, as well as in drains. Luerssen ('Die Kryptogamen,' Leipzig, 1879, p. 24) gives as its habitat putrid water, noisome ditches, the effluents of manufactories, and mineral springs, especially all thermal sulphur springs, as those of the Alps and Pyrenees, Aix-la-Chapelle, baths at Vienna, etc. I have myself seen what I have no doubt to be *Beggiatoa alba* in large quantities on the waste ground about alkali works near Jarrow-on-Tyne. It therefore has probably the power of extracting the sulphur not only from decomposing organic matter, but also from mineral sulphates dissolved in the water; though the absence of chlorophyll would indicate that it is dependent on decaying organic substances for its carbon. Luerssen states that it has the power of developing sulphuretted hydrogen out of the sulphates in the water, and that water from thermal springs at Landeck containing this organism, preserved in a closed glass bottle for four months, contained from 5·07 to 7·24 cubic centimetres to the litre of sulphuretted hydrogen, as against 0·92 to 1·65 cubic centimetres per litre in the fresh water. But it is difficult to attribute this production of H_2S to the *Beggiatoa* in connection with the fact that it undoubtedly has the power of separating free sulphur. There can be no doubt that neutral sulphates are decomposed by organic matter in the water with separation of sulphuretted hydrogen or formation of sulphides; as is shown by the constant presence of protosulphide of iron in water containing decaying vegetable matter. But as sulphides contain a larger percentage of sulphur than sulphates, it is difficult to reconcile this process with the simultaneous elimination of free sulphur. Supposing that both sulphides and sulphites are found in the water, we might get free sulphur from the mutual decomposition of sulphurous acid and sulphuretted hydrogen, thus:—

$$2H_2S + SO_2 = 2H_2O + S_3.$$

In the locality where I had the opportunity of examining the *Beggiatoa* there is abundance of sulphates provided for its nutriment. The sewage of Hertford is carried into the river Lea after being treated by a modification of the process known as Anderson's, consisting essentially in precipitation by sulphate of alumina, lime, and protosulphate of iron; and it was from the open channel which conducts the water, after being so treated, into the Lea, that I obtained my specimens.

The growth of the so-called "sewage-fungus" must undoubtedly be regarded as evidence of the presence in the water of an abnormal amount of sulphates, derived either directly from sewage or from the substances used in precipitating it, or in other ways in manufactories. But there seems no reason to believe that it will itself have any injurious effect on the water. It is difficult to see how the sulphur, once set free, can again combine with hydrogen to form sulphuretted hydrogen as long as the organism is growing in the water. Indeed if allowed to accumulate, and periodically removed, it may tend to purify the water by abstracting from it some of the undue proportion of sulphur. Further examination of this interesting organism, and especially careful analyses of the ash, would be very desirable.

IMPROVEMENT IN THE EXTRACTION OF SULPHUR.*

BY CAMILLE VINCENT.

Sulphur is found in superficial deposits, resulting from volcanic eruptions, forming so-called "solfatares," or else in deep beds associated with marl, bituminous limestone, gypsum, celestine, etc., forming so-called "soufrières," which are the most important deposits of sulphur.

The principal "soufrières" are in Sicily and in continental Italy.

The ore is obtained in the simplest possible way, generally with a pick, and transported on the backs of the natives. The metallurgy of this ore consists in the partial combustion of the sulphur; the heat given off from the flame is sufficient to melt the entire mass and in this way the liquid sulphur is produced, which is then collected. In Sicily the sulphur is treated in a furnace to which the name of "calcarone" is given. This consists of an inclined circular bed, upon which the mineral is placed, and bounded by walls. The pile thus formed is covered with a sufficiently thick layer of the exhausted material in order to prevent the too active combination of the sulphur.

During the preparation of the pile, at suitable distances passages are left, in which fagots or bundles of wood are placed. The calcarone being thus prepared, the wood is lighted and the entrance of the air is so arranged as to prevent a too rapid increase of the combustion and a too great increase of temperature. After the operation has been continued for some time, the heap is cooled at certain points; then it is cooled at several other points until the fire is completely extinguished. By this process large quantities of sulphurous acid are produced, and especially is this the case when the wind influences the combustion and makes the cooking of the furnace difficult. This method of procedure is unhealthy and is productive of considerable damage by preventing all agricultural pursuits within a given radius, thus making it necessary to limit the length of time allowed for its production. It is, indeed, forbidden in Italy to burn the sulphur from the 1st of July to the 31st of December. The first six months of the year only are reserved for this work.

These calcaroni do not yield more than 50 and in certain cases 60 per cent., at most, of the amount of sulphur contained in the ore. The remainder serves as fuel and quantities of it pass off as sulphurous acid.

The crudeness of this process had for a long time been the cause of numerous researches, with a view of devising a method for the extraction of sulphur in a more rational and cheaper manner by employing some other fuel.

Attempts have been made by using hot air, by using steam under pressure, by superheated steam, and finally by the use of carbon disulphide for dissolving out the sulphur. All of these processes have had for their object the more rapid and complete extraction of the sulphur contained in the ore as well as to avoid the production of the sulphurous acid, and so to allow the continuance of the extraction during the entire year.

The first of these processes consists in filling chambers of masonry or kilns with the ore and in passing through the sulphur a current of hot gas, coming from a hearth fed by wood or by coal. In this way it is possible to prevent the formation of a considerable portion of the sulphurous acid, but the operation only takes place slowly and the heating of the mass is very irregular. A large amount of fuel is required; the manual labour is increased, so that the economy realized is of no importance.

The use of steam seemed at first to afford the best solution of the question, as the operation is very simple, very rapid, and the sulphur obtained is of the very best quality. The result is a product superior to that obtained with the "calcarone," and it does not produce any sulphurous acid.

But it has been found that these advantages were to a great extent counterbalanced by the expense of purchasing and preservation of the necessary materials used in conducting the process, as well as the large expense required for fuel.

The necessary plant consists of steam boilers and autoclaves for the receipt of the ore and other various accessories.

The water which is used for feeding the boilers is always bad and produces incrustations, so that this forms a serious objection to the use and to the taking care of this apparatus. Finally, the proportion of fuel is considerable, on account of the large consumption of steam required for the heating of the ore, and by the radiation of the apparatus where surfaces are exposed.

This process, therefore, is not applicable in all cases, as the results, although superior to those of the "calcaroni," are not commensurate to the expense required for the purchase of fuel, the increase of manual labour, the deterioration of the apparatus, and of the consequent diminution of the capital.

The treatment of the ore by carbon disulphide, although theoretically very rational, presents such objections when used that it may just as well be regarded as impracticable. We find this compound volatilizes so easily that its management becomes very difficult, and dangerous as well, and that the expenses of the process are largely increased. Besides, a particular article is essential, which is quite expensive of itself.

All these difficulties have prevented the different processes thus far described from coming into general use, as had been expected, and the sulphur is still almost entirely extracted by the fusion in the calcarone.

About 1805, M. Thomas made attempts to extract the sulphur from its ore by immersing the ore in saline solutions heated up to a convenient temperature. Later on, in 1867, Balard suggested the use, for the same purpose, of the mother-liquors of saline marshes, rich in magnesium chloride. Finally, in 1868, Deperars took out an Italian patent for the extraction of sulphur by immersing the mineral in a solution heated up to 10° or 20° above the freezing point of this body, thereby effecting the separation of the earthy material. The liquid curd was a solution of calcium chloride.

The apparatus which was patented consists of a spherical boiler or chamber of cast metal, capable of holding 2000 litres, having a discharge stop-cock, and above this is a vertical cylinder into which, by means of a crane, a perforated basket of sheet iron filled with the ore is lowered and allowed to rest on the grate.

The apparatus is fitted into a furnace, so that the boiler may be directly heated, while the cylindrical portion becomes surrounded with the heated gases as they pass on to the chimney. The basket, filled with the ore, lowered through the cylinder, becomes immersed in the solution of calcium chloride which is heated up to 130°. The sulphur melts and collects in the lower portion of the boiler, from which it is drawn off by the discharge-cock and received into moulds. When it is ascertained that the ore is freed from the sulphur, the basket is elevated by means of the crane and immediately lowered into a cylinder filled with water, heated in the centre of the furnace, in order to wash the residue, and thus to preserve the saline solution with which it has become covered. This water serves to counterbalance the evaporation in the extraction apparatus.

At this time it was difficult to obtain calcium chloride at reasonable prices at the locality where the sulphur was extracted. Besides, other difficulties followed in the carrying out of this process, so much so, that in 1867 the patent was abandoned and has since become public property. Quite recently this process has been taken up by De la Tour Dubrenil, and put into practice with considerable success.

* From the *Bulletin de la Société Chimique de Paris*, xl., 528. Reprinted from the *Oil, Paint and Drug Reporter*.

To-day, calcium chloride has become very cheap, in consequence of the great development of the soda ash industry by the ammonia process. At present it can be transported from long distances, and its cost delivered on the ground of the sulphur mines in Sicily should not exceed 9 francs by the hundred kilograms (220 lbs.). The apparatus used by De la Tour Dubrenil may be described as consisting of two rectangular boilers made of sheet iron, having a capacity of about 2 cubic metres (2 metres by 1·30 metres and ·75 metres in height). The bottom of these boilers inclines one-tenth. They are mounted on a furnace so that each one of them can in turn be heated by the same hearth, which is fed by either lignite, coke or coal. The ore is piled or heaped up in one of the boilers, a solution of calcium chloride so concentrated that it will not boil below 120° is poured in and heat applied. The sulphur melts little by little, and on opening a valve at the bottom the liquid is collected directly in moulds.

The entire operation with the ore in rocks lasts about two hours. Towards the end of the operation the sulphur will no longer flow when the valve is opened. The bath of chloride is then turned off into the adjoining boiler, which has been previously charged with ore, half of the liquid is poured off by means of the connecting cock between the two boilers, the remainder is received into a vat situated under ground and is elevated by means of a pump.

The residue is quickly washed in order to remove the calcium chloride with which it is impregnated, and the diluted liquid thus obtained serves to compensate for the evaporation of the bath. As soon as possible the heat is applied to the second boiler already charged, and the exhausted ore removed from the first one in order to prepare for a new charge.

The work is so accomplished that the operation may be practically considered a continuous one.

The sulphur obtained in this way contains not more than ·001 to ·002 per cent. of impurities, while that obtained from the "calcarone" contains up as high as 2 to 3 per cent.

Besides, the residue does not retain more than 4 to 5 per cent. of sulphur by this process. In this process, certain of the ores become completely disintegrated, and in consequence in the powdered sulphur there were frequently found portions of earthy matter. De la Tour Dubrenil was, therefore, obliged, in order to obviate this great difficulty, to completely modify their apparatus.

The new arrangement which has been adopted can be applied to the treatment of all varieties of ores.

The boilers are arranged horizontally and divided through the centre, that is lengthwise, by a large drain, which alone has the desired slope in order to permit the flowing off or draining off of the sulphur. On the edges of this drain two vertical gratings of iron are arranged which hold the ore on each side and allow the centre to be entirely free. These gratings are made of bars of iron 2 millimetres in thickness and 25 millmetres long, and placed 3 millimetres apart. In consideration of this new arrangement it is possible to break all kinds of ore in this apparatus. In fact, even powdered mineral, such as the *débris* resulting from grinding, which is very rich, and which is designated in Sicily by the name of *sterri*. This *débris*, which up to the present time has lain neglected on the ground where the mineral is treated, can now with great facility be made to yield this sulphur in this apparatus.

This *sterri* is always richer than the general portion of the ore mined, because during the grinding or breaking up of the mineral the rock breaks and naturally divides according to the layers which are rich in sulphur, as they offer the least resistance. In consequence of its friability, the sulphur becomes partially reduced into dust, which thus forms a large portion of the *débris*.

At the Tronica Mine, in the Province of Caltanisetta, of Sicily, the ordinary mineral yields 20 per cent. of sulphur by the treatment in the calcium chloride bath, while the "sterri" from the same mine gave 72 per cent.

The ordinary run of ore in Sicily yields 12 to 13 per cent. of sulphur, with the "calcarone" reaching 15 to 17 per cent. in certain mines.

In comparative tests made with the same ore, 10 to 12 per cent. of sulphur were obtained in the treatment with "calcarone," and 19 to 23 per cent. by fusion in the calcium chloride bath.

It has been noted for some time back that very rich ores gave bad results when treated in the "calcarone:" in most cases the combustion is too rapid, and the sulphur becoming brown and pasty by the overheating flows only with difficulty.

It is necessary, therefore, in treating such ores to mix them with inert substances, and the yield in such cases does not correspond with the original richness.

On the other hand, the rich ores can be treated very advantageously by the chloride bath. From the results obtained by De la Tour Dubrenil, after treating a large quantity of "sterri," it was found that 12 fr. 75c. was about the price for the extraction of a ton of sulphur in cases where the average yield of the ore was 33 per cent. of the original weight. The price of the treatment of a charge of the apparatus, which is about 1000 kilograms, may be figured as follows:—

35 kilos of fuel (from coal mixed with lignite)	fr. 1.05
14 kilos of calcium chloride, at 9 fr. the 100 kilos	1·25
Labour	1·25
Contingencies and other expenses 20 per cent.	0·70
Total	4·25

That is, in order to obtain a ton of sulphur it is necessary to charge the apparatus three times, which places the price of extraction at 12 fr. 75c. An operation with the "sterri" requires an hour and a quarter for fusion, a quarter of an hour for running the sulphur out, and finally, an hour and a half to wash the residue, collect the solution, empty the boiler, and to replace the movable gratings in their original positions.

De la Tour Dubrenil have already placed quite a number of their apparatus in operation principally for the treatment of these "sterri." There are three at the Tronica Mine, in the Province of Caltanisetta, two at the Grottarossa Mine in the same province, two at Permie, near Recalmute, two at the Crocca Mine.

The process which we have just examined has several important advantages, among these are the following:—

First. The extraction of the greater portion of the sulphur from ores of all kinds, even from "sterri," the use of a small amount of fuel, or at least of a fuel which is inexpensive. Second. A continuous extraction having but little effect upon the atmosphere. Third. The suppression of sulphurous acid, thus making it possible to extract the sulphur continuously throughout the year. Fourth. The treatment of the ore in proportion to the mining and the shipping of the sulphur at times favourable to its transportation.

DETECTION OF CHLORINE, BROMINE AND IODINE.*

BY C. THOMPSON.

In the *Chemical News* (vol. xlviii., p. 296) there appeared a process by Mr. Jones, for detecting chlorine, bromine and iodine in presence of each other. The process was

* Report on Analytical Chemistry read before the School of Pharmacy Students' Association.

as follows:—"Place a small quantity of the mixture to be tested in a good sized test-tube, add a few pieces of manganese dioxide and then a little water. Add now 1 drop of dilute sulphuric acid (1 part acid to 10 parts of water), a brown tinge indicates the presence of iodine. Boil the mixture and confirm the presence of iodine by the violet vapours in the upper part of the tube. Continue the boiling till these vapours cease to appear, then add another drop of sulphuric acid and boil again until they cease. If necessary, repeat this addition of acid and boiling until violet vapours have entirely ceased. Now add about 2 cubic centimetres of the dilute acid and boil again; brown vapours indicate bromine, Continue the boiling until the vapours no longer smell of bromine, then add another cubic centimetre of dilute acid and boil again. When the vapours no longer smell of bromine, allow the tube to cool thoroughly, add an equal bulk of strong sulphuric acid and warm; a green gas bleaching a piece of moist red blotting-paper at the mouth of the tube indicates chlorine Occasionally some more bromine comes off on the addition of the strong sulphuric acid, but if so, it is soon got rid of and is succeeded by the chlorine, which is chiefly evolved on heating the mixture. As, moreover, red blotting-paper is far more quickly acted on by chlorine than by bromine there can be no difficulty in distinguisning between the two." Mr. Jones also adds that he has found this process to compare very favourably with others. This process is somewhat similar to that recommended by Vortmann, except that sulphuric acid is the active agent instead of acetic acid. Mr. Barnes has shown that unless very great care is exercised, Vortmann's process is not trustworthy; so that it would not at first sight seem likely that Mr. Jones's process in which sulphuric acid is to be used would answer much better.

Experiments tend to confirm this statement. If there be a large excess of iodide over that of the bromide present in the solution or mixture to be tested, or if, *vice versâ*, the bromide be in excess, then this result seems to follow in nearly every instance; viz., that the vapour of that halogen which is present in a very small quantity relatively to the quantity present of the other halogen is likely to be overpowered by the vapour of the latter. When relying only on the colour of the vapour it was found that when the proportion of the iodide to the bromide was less than 1 to 14, the iodine could not be detected, and even when paper moistened with starch solution was used, there was no indication of iodine if the proportion was less than 1 to 20. As regards detecting bromine, following the process, and relying on the colour of the vapour only, it was found that the bromine could not be detected if the proportion between the bromide and iodide present was less than 1 to 15; when filter-paper moistened with iodide of potassium and starch solution was used, it was possible to detect the bromine so long as the proportion between the bromide and the iodide is not less than 1 to 22.

When the chloride is present in small quantities relatively to the iodide and bromide, or more especially if it be the bromide which is in excess, it is not easy to detect it by this method; for when the bromide is in large excess it is not all driven off by the addition of the dilute sulsulphuric acid, so that when the strong acid is added the remainder comes off and takes along with it the chlorine.

As a rough way of detecting the presence of either one or of all three of the halogens, when present in fair quantity relatively, this process will answer, more especially if the colour of the vapour be not alone relied on, but filter-paper moistened with starch solution for the iodine and with iodide of potassium and starch solution for the bromine be used.

As a delicate test for detecting the presence of small quantities of either one of the three halogens in presence of the other two it is not to be relied on.

THE SO-CALLED BISMUTH BREATH.*

BY WILLIAM REISERT, PH.G.

Bismuth oxynitrate, when taken into the human system, often imparts to the breath a very perceptible, and disagreeable garlic-like odour, which is very annoying, not only to the person who has taken the salt, but particularly disagreeable to the persons with whom he may come in contact. This odour has been attributed by writers to be caused by impurities in the bismuth salt, such as arsenic and tellurium, and some have asserted that the chemically pure bismuth salt itself produces the odour. The subjoined experiments will add to the already known facts concerning the cause of the production of this odour, namely, the ingestion of tellurium, which element occurs as an impurity in many samples of bismuth oxynitrate.

Chemically pure sesquioxide of bismuth was prepared by dissolving the commercial oxynitrate in chemically pure nitric acid, and precipitating with an excess of water. This operation of redissolving and reprecipitating was repeated twice, and the precipitate was then strongly heated in a porcelain crucible to convert it into bismuth sesquioxide, and at the same time to volatilize any arsenic which might have been contained in the substance. Tests for arsenic and tellurium in the resulting sesquioxide failed to denote their presence.

The bismuth sesquioxide thus purified was administered to five persons under the same, and under different conditions as to dose and time. From 0·5 to 1·0 gram was given three times daily for six days. No garlic-like odour could be recognized in the breath.

To investigate the action of arsenic in the production of this odour in the breath, arsenious oxide was taken by myself, in doses of 0·003 gm. after each of the three daily meals for three days. On the fourth day, on account of the griping pain produced in the abdomen, and a violent diarrhœa, only two doses were taken. There was not the slightest garlic-like odour perceptible in the breath.

Tellurium is comparatively rare, and is contained in many of the ores of bismuth. The mineral tetradymite contains as much as 49·79 per cent., wehrlite, 29·74 per cent., and joseite, 15·93 per cent. of the element. In a sample of metallic bismuth from Bolivia, Schneider† found 0·14 per cent. of tellurium. Brownen‡ found tellurium in the commercial bismuth oxynitrate, but it was not present in large quantity. On account of difficulties in its separation from bismuth, it often occurs as an impurity in the commercial bismuth oxynitrate, yet in most cases the quantity present is very minute. If more care were used in the preparation of the commercial oxynitrate, less would be heard of the so-called bismuth breath. Repeated precipitation and washing will entirely remove the obnoxious element.

As early as 1824 the odour produced by the ingestion of tellurium compounds was noticed by Gmelin.

In 1853 Hansen§ investigated the cause of the production of the odour. This investigator experimented upon himself and a friend, and upon dogs, with potassium tellurite. This salt, in doses of 0·030 to 0·080 gm., taken by himself an hour before each meal, gave the garlic-like breath within a few minutes after the first dose, and this odour soon became so strong that he had to seclude himself from society. He continued the doses during seven days, his friend continued the doses for two days with similar effect, and noticed the odour in his breath for eight days afterward.

It is also stated that Wöhler, when investigating the volatile telluride of ethyl, noticed this same odour in his breath, and one night, when perspiring freely, the odour

* From the *American Journal of Pharmacy*, April, 1884.

† *Journ. f. Prakt. Chem.*

‡ *Pharm. Journ.*, October 16, 1875; *Amer. Journ. Phar.*, 1876, p. 133.

§ Liebig's *Annalen*, lxxxvi., p. 208.

of the perspiration was almost unbearable. In the experiments on dogs the garlic-like breath was perceptible after one minute. Hansen quotes Gmelin as having in 1824 given tellurous acid to a dog and a rabbit. The rabbit only was killed, and on dissection gave off a garlic-like odour.

Sir J. Simpson* records a case in which a divinity student inadvertently swallowed a dose of tellurium, which was followed by the evolution of such persistent odour that for the remainder of the session the patient had to sit aside from his fellow students.

The experiments in this direction made upon several friends, and also upon myself are as follows:—

Tellurous oxide (TeO_2) was prepared by treating metallic tellurium with nitric acid, evaporating to dryness and igniting the product. Some of the resulting tellurous oxide was taken by myself in doses of 0·005 gm. each. Three doses were taken on May 8, 1883, at 1, 4, and 7 o'clock p.m. In fifteen minutes after the first dose the breath had a strong garlic-like odour, and in an hour a metallic taste was observed. An hour after the second dose the urine and sweat had the garlic-like odour, which was also observed in the fæces on May 12. The metallic taste was observed for seventy-two hours, and the garlic-like odour in the urine for three hundred and eighty-two hours, in the sweat for four hundred and fifty-two hours. in the fæces for seventy-nine days, and in the breath it was still present, though very faintly, after two hundred and thirty-seven days.

In order to determine the smallest quantity of tellurous oxide which would be required to produce the garlic-like odour the following solutions were made:—

I. 0·001 gm. of tellurous oxide was dissolved in potassium hydrate and sufficient distilled water to obtain 100 cubic centimetres. 5 c c. contain 0·00005 gm. tellurous oxide.

II. 0·00025 gm. of tellurous oxide was dissolved with the aid of a little hydrochloric acid in sufficient distilled water to make 100 c.c. 5 c.c. are equal to 0·0000125 gm. of tellurous oxide.

III. Made like the preceding, but diluted to 200 c.c. 5 c.c. are equal to 0·00000625 gm. tellurous oxide.

IV. 0·0001 gm. tellurous oxide, sufficient hydrochloric acid and water to measure 100 c.c. 5 c.c. are equal to 0·000005 gm. tellurous oxide.

V. Like the preceding, but diluted to 500 c.c. 5 c.c. are equal to 0·000001 gm. tellurous oxide.

VI. 100 c.c. of solution V. was diluted with 100 c.c. of distilled water; each c.c. represents 0·0000001 gm. tellurous oxide.

These solutions were given to a number of young men; but no one was experimented upon a second time.

I. After one dose of 5 c.c. of this solution, the garlic odour became perceptible in the breath in thirty-five minutes and lasted about seventy-five hours.

II. Three doses of 5 c.c. each were taken after three succeeding meals. The odour was noticed in the breath thirty minutes after taking the third dose, and continued about sixty-six hours.

III. Five doses of this solution of 5 c.c. each were taken after five succeeding meals, when the odour was soon noticed, and lasted about ninety hours.

IV. After six doses of 5 c.c. each, the odour was quite distinct; three additional doses were taken and the odour lasted ninety-six hours.

V. Five doses of 5 c.c. each were taken after five consecutive meals; the odour was noticeable in forty-five minutes and lasted seventy-three hours.

VI. After one dose of 5 c c. the garlic odour was perceptible in seventy-five minutes and lasted about thirty hours.

Smaller quantities of this solution were then given, namely, 1 c.c. to each of two young men, 2 c.c. to two persons and 3 c.c. each to three persons; but no garlic-like odour could be detected.

* Blyth, 'Manual of Chemistry,' Lond., 1879.

The nature of the compound which possesses this garlic-like odour is, as yet, not understood, although Hansen attributes the odour to be caused by a volatile organic compound of tellurium like the telluride of ethyl, which is given off by the lungs and skin. Both methyl and ethyl telluride have a garlic-like odour.

In this investigation the breath of myself, which was exceedingly strongly impregnated with the garlic-like odour, was for several hours passed through a tall column of distilled water contained in a wash bottle, and the water afterward tested for compounds of tellurium, but not even a trace of this element could be found. However, from the minute quantity of the element which is required to produce this odour one would hardly expect to find by qualitative testing even the merest trace of the element in the breath. Necessarily, the presence of tellurium in such a minute quantity in the great majority of samples of the bismuth oxynitrate would prevent its detection by any of our chemical tests. From this failure to detect tellurium most likely have arisen the many statements* of its non-presence in the commercial bismuth oxynitrate. The physiological test seems to be the most delicate, as it has been shown that in this way as little as 0·0000005 gm. or $\frac{1}{125000}$ of a grain of tellurous oxide, equal to 0·0000004 gm. or $\frac{1}{160000}$ of a grain of the metal, may be detected.

In these experiments idiosyncrasy seems not to have had any influence at all. Every one to whom the tellurium compound was administered in sufficient quantity was affected with the garlic-like odour.

CINCHONA ROBUSTA.

The following passage concerning this hybrid appears in the recently issued 'Report on Kew Gardens for 1882':—"In the Kew Report for 1881, pp. 25, 26, I referred to the hybrid between *succirubra* and *officinalis*, which seems in the East first to have made its appearance in Ceylon, and thence to have been introduced by seed into the Sikkim plantations.

"This form has, during 1882, given rise to a rather protracted correspondence with the Madras Government. Mr. Cross, who was employed by the India Office to convey the Columbian barks from Kew to Southern India, insisted that the two supposed hybrid forms grown on the Nilgiris, under the names of *pubescens* and *magnifolia*, were not hybrids but distinct species, of which the seed had been sent by himself from the slopes of Chimborazo. After some shifting of opinion he seems finally to have settled down to the statement that *magnifolia* was the cinchona called in the Chimborazo bark district 'Pata de Gallinazo,' that *pubescens* was true *succirubra*, and that the *succirubra* of the Madras plantations was *micrantha* (grey bark).

"In all these identifications his recollections of plants seen no less than twenty years before seem to have misled him. Unfortunately, his views were, to a certain extent, adopted by the eminent quinologist, Mr. Howard, and it therefore became necessary to critically examine them, as such gigantic errors in nomenclature could not but very seriously affect the future policy of administration of the Madras Cinchona plantations.

"Under instructions from the Madras Government, very copious and carefully prepared sets of all the cinchonas cultivated in the Nilgiris were despatched to Kew, both by Colonel Beddome and by Surgeon-Major Bidie, the Superintendent of the Madras Central Museum. They were very thoroughly examined, and there appeared no valid reason for disputing the accepted names under which the plants had been grown or for adopting those assigned to them by Mr. Cross.

"The authentic specimens of the Pata de Gallinazo, collected by Spruce, and described by him in his official report, are preserved in the Kew Herbarium. They have been subsequently identified at Kew by Spruce

* Dr. Squibb, *Ephemeris*, Sept. 1882.

(confirmed by Howard) with *C. erythrantha*, Pav., and Triana, the most recent monographer of the genus, has referred this species as well as Spruce's specimen to *C. pubescens*, Vahl. Neither the *magnifolia* nor *pubescens* of the Nilgiri plantations can in any way be confounded with *Cinchona pubescens*, Vahl, but are, no doubt, as has always been contended, marked members of the variable series of hybrids which appear to invariably arise in plantations where *officinalis* and *succirubra* are cultivated in proximity.

"Mr. Cross's other two conclusions proved equally baseless. As, however, these questions of synonymy had excited a good deal of perplexity in Ceylon as well as in Southern India, I suggested to the Government of Madras that Dr. Trimen, the Director of the Royal Botanic Garden, Peradeniya, should be invited to visit the cinchona plantations of the Madras Government, in order to bring about if possible some uniformity of nomenclature in the forms and species of cinchona cultivated both in Ceylon and Madras. This he accordingly did, and he has given the results of his exhaustive study of the whole question in a very able and lucid report (dated June 30, 1883) which, representing as it also does, the opinions arrived at by the Kew staff, appear to me to finally dispose of the whole subject. Both the names *pubescens* and *magnifolia* Dr. Trimen, for reasons which he gives, proposes to discard in favour of *robusta*, which is in use on some estates in India, and 'is now commonly employed in Ceylon for the trees in question.' Dr. Trimen describes those he saw on the Nilgiris in the following words:—'I found the forms to be just those so common in Ceylon plantations. Generally robust well grown trees, larger, hardier, and healthier than either the *officinalis* or *succirubra*, among which they were scattered and often flourishing where neither of them can thrive. Botanically, there was the same range of variety, the extreme form in one direction, with its dark green smoothly shining leaves, closely approaching some of the large-leaved forms of *C. officinalis*; and that in the other direction with its larger, paler, thinner leaves more or less pubescent beneath, so close to the hairy form of *C. succirubra* as to be often with difficulty distinguished from it. Between these, as regards colour and pubescence, were many intermediates, though undoubtedly, with a little ingenuity, the whole can be thrown into two groups.'

"He further adds:—'We have direct testimony of its origin. I am assured by planters of credit that they have grown both glabrous and pubescent *robusta* from seed of ordinary *officinalis*, and that it is by no means unfrequent for seedlings of them to appear in seed-beds on estates where no trees but *officinalis* and *succirubra* occur. I have myself seen seedlings of *robusta* self-sown where there are no parent trees of the sort whence they could have been derived; and at one time I was inclined to regard it merely as a variety of *officinalis*. There are, I think, grounds for believing that *succirubra* generally supplies the pollen, and is therefore the male parent, both in the case of *robusta* (*succirubra* and *officinalis*) and *anglica* (*succirubra* and *cal saya*).'"

AMERICAN MUSK.*

BY R. S. CRISTIANI, PHILADELPHIA.

There has been a good deal of literature on this subject for two or three years past, much of which has been written by myself, and which has, I believe, attracted some notice both here and in Europe, for to obtain a good substitute for the very costly Tonquin musk has long been an object of great importance in all business countries, and the principal object of my writings has been to place the article in commerce, that all who desire it may know where to procure it.

The style "American Musk" is a title I have given it, as the animal from which it is obtained is indigenous to this country. This is the well-known rodent, the musk-rat (*Fiber Zibetica*), which frequents the streams and marshes of nearly all the States and Canada, having habits similar to the beaver. The musky secretion is found in two small sacs situated below the anus and near the genital organs. It usually adheres to the skin when removed, and is collected in a very indifferent way, if not thrown away as worthless by those who handle the pelts, as it is desirable they should be as free as possible from the odour.

This animal, when plentiful, is trapped for its skin—the fur being quite fine and soft—and shipped in large quantities to Europe, where they have great skill in dressing and dyeing furs, and it is made to imitate more expensive goods, such as seal, otter, etc. The winter and spring are the seasons that this trapping mostly occurs, and the spring is the only season when a supply of the musk pods can be obtained.

I have mentioned that there has not been any systematic attempt made to collect and prepare this valuable substance, except by myself, and with my many duties I have not been able to give it the attention it certainly deserves; yet I have had much correspondence on the subject here and from Europe, and especially from London, where there has arisen some demand for the article, owing principally to my efforts, but my time to devote to the subject has been limited and many opportunities to forward the subject unavoidably neglected. One reason why this valuable article is neglected, is the great ignorance of the persons who collect it, as they fail to take off the sacs carefully and often leave a quantity of membrane and fat adhering to them. Moreover, they have no knowledge of a proper mode of preparation to prevent decay, and the attack of insects, etc., so that the article would keep and be fit for sale at all seasons, for when the weather moderates they often find it unfit for use and worthless. Preservation is all important, if this musk is to be an article of commerce, and I think it soon will be; but it can scarcely be expected that such will be the case if it can only be procured two or three months in the year.

Let it not be supposed that I claim for the American musk all the properties of the true musk, far from it, for that valuable drug stands at the head of all analogous substances, having qualities that are not found in any known substance. But as a substitute in many manufactures, such as toilet soaps, and some secondary articles of perfume—and perhaps some flavours—I know of no article that is as good a one, and in soaps particularly it is invaluable, I having furnished it to some of our large manufacturers for some seasons.

The object of my present article is to call more attention to the collection of the musk-rat pod, in the States and Canada, as the season will soon open for the trappers, and the pelts will arrive at the usual centres in the late winter or early spring, and that those who deal in and handle them may see a source of profit in saving the odorous sacs. Should those who are interested in the article want further facts, they can correspond with me.

* From the *Canadian Pharmaceutical Journal*, April.

AMERICAN DRUGS.*

BY J. MOELLER,

Botanist and Microscopist of the Imperial Forest Institute, Mariabrunn, near Vienna.

(*Continued from page 865.*)

TONGA.

Coarsely cut, partially pulverized stalks of two different and easily distinguishable plants. The mixture has a strong odour reminding one of fenugreek.

The greater bulk of this drug consists of irregularly-shaped fragments of the stalk of a plant, seldom exceeding 2 cm. in length, sometimes, perhaps, as thick as a man's finger, very light and porous on the cut or broken surfaces or barkless portions, covered with a cork-coloured or dark brown bark; or of round stalks of the thickness

* Reprinted from the *Therapeutic Gazette*.

of a quill and ribbed lengthwise; or of flat pieces of bark, which, to judge from their size and form, evidently belong to said fragments. A glance at the horizontal section of one of these pieces with a magnifying glass proves distinctly that the varied shaped component parts belong to one and the same monocotyledonous species. The stem is composed of closely arranged bundles of dense fibres and covered by a comparatively thin bark traversed by hard, whitish streaks. This part of the drug has a specific odour and a delicate taste, slightly reminding one of vanilla.

Microscopic Characters.—The peridermis consists of five to eight rows of flat cells, some of which are thin-walled, the majority, however, being thickened almost to obliteration. The cells of the bark parenchyma are large and thin-walled, scarcely 0·5 mm. broad and covering but a small area. In older plants they reach 2 millimetres in width and have numerous irregularly disposed fibres which are, each of them, distinguished by a well-developed bast bundle presenting a kidney-formed section, in the concavity of which, which always faces inwards, are a small number of narrow tracheæ. A few isolated, spindle-shaped, strongly solidified bast fibres, 0·025 mm. in diameter, are to be found irregularly distributed amongst the parenchyma. The vascular bundles of the plant are

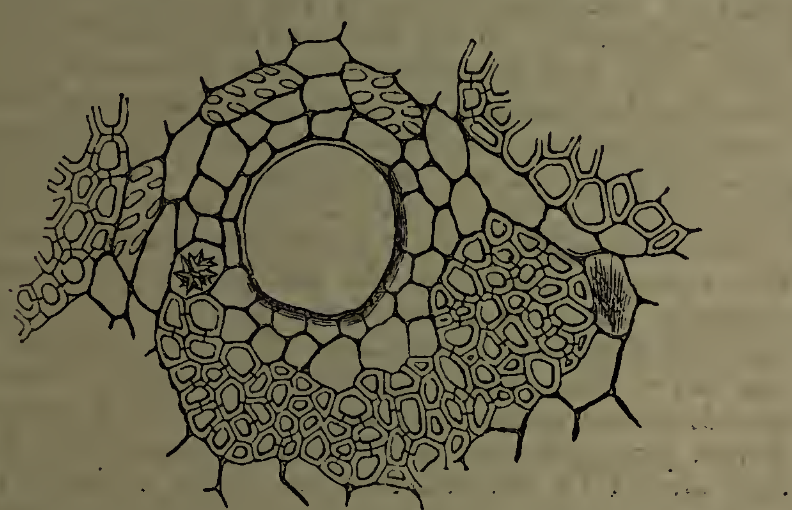


Fig. 14.—Vascular bundle from the central portion of the stalk of *Rhaphidophora Vitiensis.*

distinct from the peripheric fibres owing to the different location of the bast and the greater development of the wood, in which occurs a single vessel, or more seldom a pair of vessels, distinguished by a broad lumen (0·15 mm.). Raphidæ and glandular ducts are found within the principal parts of the stem and especially in the bark parenchyma.

This ingredient of the tonga is derived, as Holmes (*Pharm. Journ. and Trans.*, 1880, p. 889) had first suspected, and as has since been repeatedly proved, from a species of Aroid found in the Fiji and New Hebrides Islands, and known under the name of *Raphidophora vitiensis*, Schott. It is a variety of the *Raphidophora pertusa*, Schott, *Monstera pinnatifida*, C. Koch, found on the coast of Coromandel, in Ceylon, Java, Timor, and in those parts of Australia which lie within the tropics. N. E. Brown, in *Gardner's Chronicle*, designates *Epipremnum mirabile*, Schott, *Raphidophora lacera*, Hassk., as the plant from which this ingredient of tonga is obtained; but this is probably an error, since the latter variety has hitherto been found in Java only, while we know that tonga was first produced and brought from the Fiji Islands. These two varieties are, however, closely allied. They belong to the forms of Araceæ which A. Engler distinguishes by their double-rowed leaves, by their branches ending in a flower, and in each vegetation period springing afresh from the shoulder of the leaf again to a flower. The Raphidophora of the Fiji Islands, called by the natives "nai-yalu" or "walu," is a creeper whose vines, to judge from the fragments thereof as found in commerce, attain the thickness of a man's thumb, at least.

The other and less bulky component part of this drug, consists of small particles of bark, seldom as large as a finger-nail, and not more than 1 millimetre in thickness. The outer side of this bark is scaly, and in colour it varies from an ochre yellow to a tile-brown hue; the inner side is dark brown and wrinkled. It is a fine-grained, brittle bark, showing a chocolate-coloured section sprinkled with bright spots or points, and is wholly insipid and odourless.

Microscopic Structure.—The corky layer, which is no thicker than paper, is composed of cubic cells, with walls almost always very thin on the inner side, but occasionally thickened. This coating lies immediately contiguous to

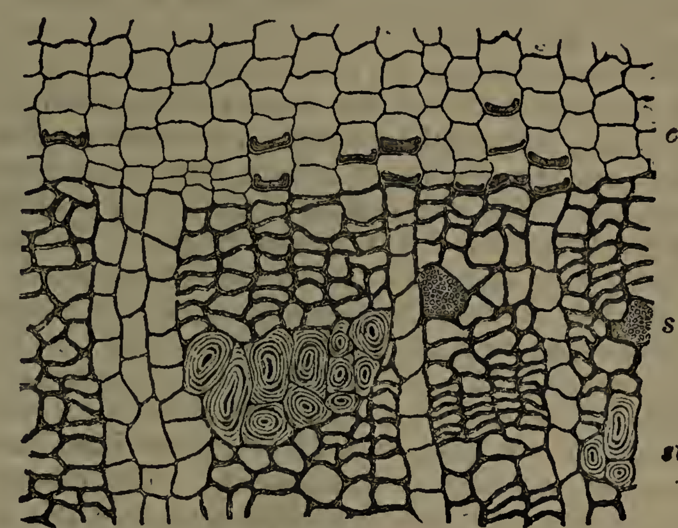


Fig. 15.—Section through the bast of *Premna Taitensis*. *c*, cork; *s*, sieve-plate; *st*, stone-cells.

the inner bark, which is traversed by one- to three-seried medullary rays, the alternating spaces between which seldom exceeding 0·5 mm. The bast rays consist of alternately arranged layers of parenchyma and sieve tubes; the membranes of both are dense, present an almost gelatine-like appearance, and are wholly devoid of bast fibres. On the other hand, groups of parenchyma often become sclerotic, which change is frequently accompanied by a moderate increase of their elements, the form of which, however, is not materially changed. The density of the walls of these, although formed of the most delicate layers, increases to an almost complete solidification, but they are still perforated by numerous minute pores, visible only under a very powerful microscope. Where the stone cells of neighbouring groups come in contact with each other, which, by the way, but seldom occurs, the medullary ray passing through them becomes sclerotic. Nearly all the medullary ray cells, as also many of those of the bast-parenchyma, are heavily charged with crystal sand or rhaphides. The sieve-tubes are somewhat more open; their transverse plates are occasionally to be seen in the section of the bark itself. (See Fig. 15.)

Mueller says that this ingredient is the bark of the *Premna taitensis*, DC. (*Pharm. Centralb.*, 1881, p. 548), a species of the Verbenaceæ found on the Society Islands, and called "aro" by the natives, and in this he is corroborated by its anatomical structure. (Compare Tectona, J. Mueller, 'Anatomy of the Barks,' p. 176.)

The plant is a shrub or small tree, the smaller twigs of which are somewhat sticky; its leaves, which grow to the length of 8 cm., are oviform, shortly acuminate, heart-shaped at the base, smooth and naked on both surfaces, and shiny on the upper side. The stem of the leaf, as also that of the blossom, is, to some extent, hairy. The flowers are very small and arranged in large groups at the end of the twigs on which they are found. The calyces are slightly cup-formed, almost double-lipped. The small whitish blossom contains four stamens attached to the tube. The fruit is a pea-formed berry, containing one seed.

It is and has long since been well known, that the leaves of certain other varieties of *Premna* (*e.g.*, *P. fœtida*, Reinw., *P. integrifolia*, L.) are used as food, particularly for flavouring purposes, in the Sunda and Molukka Islands and in East India.

In view of the variations (see Gehe and Co's Commercial Report, September, 1880) in the samples of this drug on its introduction, it is perhaps necessary for me distinctly to state that the samples of tonga which I have at various times received from America have always been found to be exactly alike and to contain invariably the two ingredients mentioned alone, and never leaves.

The London doctors, Ringer and Murrell, first recommended this drug as a remedy for neuralgia (see *Pharm. Centralb.*, 1881, p. 30) and it soon attained great notoriety.*

The *Lancet*, March, 1880, says that Sydney Ringer received this remedy from a Mr. Ryder, who brought it from the Fiji Archipelago, stating that a certain European, who had married the daughter of a chief, had learned the secret from his father-in-law, in whose family it had been an heirloom for some two hundred years—the old story, with slight variations, so often told before, of drugs our knowledge of which first came from the missionaries. This first sample of tonga was subjected to a chemical analysis by Gerrard (*Pharm. Journ. and Trans.*, 1880, p. 849), the sole one as yet reported. The fibres contain a volatile alkaloid, to which possibly it owes its virtues, such as they are, and which for the present we may call "tongin." The most important parts of the bark are, pectin, glucose, a little ethereal oil and fat.

Tonga has not been able to firmly establish itself in Germany as an anti-neuralgic remedy. The *Pharmaceutische Centralb.*, of December, 1881, says that this much-lauded medicine had even then become nearly forgotten in that country. In reply to this *The Therapeutic Gazette*, 1882, p. 40, says, rather mischievously, that the German faculties cannot be blamed for declining to handle a drug of the composition of which they know but little, if anything. Faculties are certainly not noted for experimenting with drugs of this nature, but should it appear that the drug under consideration has merit, we may entertain the certain hope that this obstacle to its full investigation will be overcome in due season.

GINGER BEER PLANT.†

BY W. G. SMITH.

The Editor of the *Gardeners' Chronicle* has several times been requisitioned by correspondents (mostly anonymous) for a scientific description of the "Ginger Beer Plant." The correspondents want to know its botanical name and native country. The writer of this note has also been tormented weekly, almost daily, on the same subject for two or three years. Every one has been asking him for the "regular Latin or Greek name" of the "Ginger Beer Plant." Benevolent old ladies, clergymen and officers of the Blue Ribbon Army, have called upon him, or written for a scientific explanation, hoping to make the "Ginger Beer Plant" a boon to the poor. One person wished to feed paupers with it; another hoped by its means to knock all the publicans on the head; a third to send it in barrels for the army in the Soudan. When such persons have been told it is merely a form of German yeast they have turned away disappointed and disgusted. Something more must evidently be done for this rum shrub, of which I have recently had application for slips, rooted cuttings and seeds.

The last letter sent to the *Gardeners' Chronicle* was to this effect:—"I cannot learn anything more about it than that it is an American plant. Cannot find out where it is procured—only how to make it. Empty the contents of the small bottle into the wine-bottle. Bruise about half an ounce of ginger, two tablespoonfuls of white sugar, put in a jug, pour boiling water over it, let it stand till nearly cold, then put the plant in the bottle of ginger, sugar, and water. Cork it tight, and when it begins to ferment the cork will fly out. The plant will grow if fed every day, and soon be enough for two bottles. It is best to empty it once a week into a pan and wash it with cold water, then put it in the bottle again."

To the unaided eye the Ginger Beer Plant looks like a lump of paste, and when placed under the microscope it is seen to consist of more than one of the yeast fungi, in a mucilaginous medium. It belongs to the group of fungi termed Saccharomyces, of which there are many species, the one used for beer being *S. cerevisiæ*. Mr. Berkeley, Mr. Hoffmann, Mr. Huxley, and many other gentlemen, British and foreign, have written about yeast in its different forms and conditions.

The "Ginger Beer Plant," like all other yeast fungi, excites fermentation in sweet solutions and sets free carbonic acid gas.

As all the correspondents insist on this "American plant" being a new species I propose to humour them by calling it *Zingibeerophora spumacephala*!.

* The name "Tonga" had previously been applied to a narcotic extract (see *Pharm. Centralb.*, 1881, page 100) derived from *Datura sanguinea*, R. and P.

† From the *Gardeners' Chronicle*.

LIVAROT CHEESE.*

One of the most popular cheeses in France, and one which is not only profitable in its manufacture but well adapted to our dairy farmers, is the Livarot, and the following is the description given of it by Mr. Long in one of his South Kensington lectures:—The cheese takes its name from the town of Livarot in the department of Calvados, which is the principal centre of its manufacture. To the workmen it is almost indispensable. The milk taken from the cow is creamed on the following day, and poured into large wooden tubs holding about fifty gallons, being then brought to the temperature which it possessed on leaving the cow. The rennet is then added—in summer one, and in winter two dessert-spoonfuls being required for six gallons of milk (as a rule this rennet is made on the premises, several calves' stomachs being cured together),—and for each a large spoonful of salt and three glasses of water are added. In one or two hours the coagulation is complete, when the curd is broken up and laid upon rushes or a clean cloth. Before placing in the moulds it is indispensable that the curd should be reduced to small cubes no larger than lumps of sugar. The curd is placed in the circular wooden moulds after having been left to drain for a quarter of an hour. In these moulds it completely drains and attains a proper consistence. This result can be obtained in three or four hours when it is warmed, but the quality of the cheese will be impaired, and it must not be left too long in the moulds—one to four days, according to the season of the year and the temperature. The moulds are turned over one hour after the curd has been placed in them, this operation being repeated half a dozen times before the cheeses are released. The cheeses are salted with the hand, and left for four or five days on inclined wood or stone tables, and then taken to the *hâloir* or market. The *hâloir* is an apartment with windows let into opposite walls, through which a current of air passes for the purpose of desiccating the cheeses placed in various stages upon lath racks, which have been previously covered with straw. The cheeses are left in this place for fifteen to thirty days, and then taken to the cave, all the apertures of which are closed and a uniform temperature kept. In consequence of the gas given off from the cheese the walls are not made of brick or stone, but of mortar mixed with chopped hay. The cheeses, placed on planks, are turned twice weekly in winter, and three times weekly in summer, being slightly wetted each time with pure water, and salted afresh where necessary. At the end of eight or ten days in the cave they are placed on their edges on a species of sedge to assist the process of drying. They remain in the cave for three to six months, according to their size, and when packed for transmission to market are coloured with annatto. It requires about five pints of milk to make a cheese, September and October being the months chosen in which to make them. Several manufacturers of these cheeses make from 5000 to 8000 dozen in a season.

* From *The Grocer*, April 26, 1884.

The Pharmaceutical Journal.

SATURDAY, MAY 3, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

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

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CHEMISTS' ASSISTANTS IN FRANCE.

For some past a Parliamentary Commission, appointed by the French Chamber of Deputies, has been engaged in an investigation as to the causes which have led to the present industrial crisis in France and increased the number of the unemployed. In the course of the inquiry the Commission has taken the evidence of representatives of various callings, and amongst others of the officials of the Chambre Syndicale des Elèves en Pharmacie. By the courtesy of a correspondent we have been supplied with a copy of the evidence of the President of this Association, M. Parisot, and as an extremely intelligent statement of the condition of a large class of pharmacists' assistants in France, as well as an expression of the views of his *confrères* as to the causes that have contributed to the disadvantages under which they consider they labour and the methods available for their alleviation, it naturally proves to be very interesting. The evidence consists partly of a written reply to what appears to have been a series of printed interrogatories addressed to the Association in common with other similar bodies, and partly of a supplementary *vivâ voce* statement which M. Parisot was allowed to make before the Commission.

M. Parisot premises that the general industrial crisis in France affects pharmacy as it does all other callings, but he expresses the surprise with which he has observed, in following the evidence given before the Commission, that all the callings officially represented were better remunerated than pharmacy, whilst they had fewer hours of labour. He estimates that the three thousand *élèves en pharmacie* in Paris receive on an average, when neither boarded nor lodged, 190 francs per month. For this they serve, on an average, fifteen hours a day, besides being liable to night duty, for which they receive no extra pay. It will be remembered by those who have read Mr. Möller's interesting account of modern pharmaceutical study,* that in France the pharmaceutical student, after passing the required examination in the "classical" schools, has to serve three years in a pharmacy, after which, if he is in a position to do so, he proceeds to the three years' course in a school of pharmacy and the obtaining of a diploma. But it appears that in a considerable number of cases the pupil, from want of means or for other reasons, does not go on at once for a diploma and as he is still only an *élève* he obtains no amelioration of his position while acting as an assistant, notwithstanding his increased practical experience. It is estimated by M. Parisot that in Paris there are from one hundred and twenty to one hundred and fifty *élèves* unoccupied and about two hundred who have been compelled to accept situations of much lower value than they are capable of filling. But it was admitted that the number of *élèves* not in a situation is affected by the fact that some of them necessarily leave their employment to attend the courses of lectures.

When we come to the causes to which the *élèves* attribute what they consider to be their present unsatisfactory condition, it is pleasant to find that there is no disposition manifested to raise trivial complaints against the employers as a class, but rather to find an explanation in circumstances that are unfavourable alike to employers and employed. It is worthy of note also that some of these circumstances are similar to those that have largely affected chemists and druggists in this country. During the last ten years, M. Parisot says, the pharmacies in Paris have increased in number and decreased in value. Some of the new comers, in order to attract a connection, have sold specialties at a discount sometimes amounting to 25 per cent. Besides this, the hours during which pharmacies are kept open have been augmented, so that whereas before 1870 most of these establishments were not opened before half-past seven in the morning and were closed at half-past nine at night, they are at present opened at seven in the morning and are not closed until eleven at night. Nevertheless, M. Parisot said he could refer to a dozen houses, which, although they have been conducted with the greatest care, have decreased in value during this time by two-thirds. So far as the *élèves* are concerned they appear to look for an improvement in their position in some enlargement of the field in which they may seek employment. The desire expressed to the Commission in their name is that a diploma of "chemist" should be instituted, which would allow *élèves* who do not possess the means for the purchase of pharmacies to enter manufactories of chemical products and other works as foremen, or in any other capacity in which their special knowledge and training could be utilized. To some onlookers this will appear like placing an unwarranted amount of faith in a name, for it is not quite clear why an *élève* who possesses capacity for such an appointment should not take one, if available, without waiting for a diploma. Another portion of the evidence, which, we confess, appears to us rather puerile, is that wherein a part of the depression under which *élèves en pharmacie* suffer is attributed indirectly to the unfair com-

* See *Pharmaceutical Journal*, [3], xii., 397.

petition of German chemical manufacturers. If it be true that certain products are regularly purchased in France and sent to Germany for manipulation, to be afterwards re-imported into France at a price 20 per cent. below their original cost, there might be reasonable ground for suspecting a fraud, but it would be a fraud that French chemists should be competent to detect and protect themselves from. Moreover, one of the cases mentioned as an illustration of the dishonesty of the foreign manufacturer,—that of the sophisticated quinine supplied to the hospitals,—appears to be singularly unfortunate, since, unless we are mistaken, the fraud was traced to the French contractor, who was convicted of the offence and sentenced to a term of imprisonment that has hardly yet expired.

THE USE OF METHYLATED SPIRIT IN MANUFACTURES.

The arrangement, based upon the experiments made by Professors Graham, Hofmann, and Redwood, under which persons carrying on in this country manufacturing industries involving the use of spirit of wine have now for nearly thirty years been exempted from the payment of duty upon the spirit they use, if it be previously mixed with methylic alcohol in certain proportions, has been such a decided boon that the withdrawal of it could hardly be contemplated with equanimity. In the United States, however, manufacturers have since the war of secession been under the disadvantage of using spirit upon which they have had to pay a tax equal to five or six times its actual original value. For various reasons the plan adopted in this country has been deemed impracticable there; probably one of the most forcible being that as at least one-half of the whole spirit revenue has been derived from alcohol used for manufacturing purposes the consequent loss seemed to be too great to incur. But the prosperity consequent upon peace has encouraged American financiers to contemplate even this eventuality, and for the last year or two the subject has been under the consideration of the Congress. Indeed, the question just now appears rather to lie between permitting the use of methylated spirit duty free and the abolition of the spirit duty in the United States altogether. Obviously either of these steps would be of vast importance to chemical manufacturers, and it is not surprising to find one so eminent as Dr. Squibb discussing the *pros* and *cons* of the question. In doing so he refers to some of the disadvantages attending the adoption of the artifice of methylating as a means of preventing fraud on the revenue, and he evidently uses them to enforce the argument for a total abolition of the duty. Fortunately or unfortunately, this latter course does not come within the range of the probabilities in British finance; nevertheless some of the points mentioned by Dr. Squibb have an important bearing upon the conditions under which manufacturers are allowed to use duty-free spirit in this country.

Referring to a Bill which has been introduced into the House of Representatives, having for its object to exempt from duty any spirit to which a definite percentage of methyl alcohol has been added, Dr. Squibb points out that it appears to be based upon the theory that methyl alcohol once added to clean spirit spoils it permanently and irrecoverably for drinking purposes. This, of course, is a fallacy, for it has long been known, as Dr. Squibb points out, that the methyl alcohol can be taken out with comparative ease, and that obstacles to the cleaning of methylated spirit so as to render it capable of being used as a beverage are dependent rather upon the honesty or fears of the manufacturer than upon any inherent difficulty in the operation. Indeed, the possibility of cleaning methylated spirit is recognized in the fact that the law forbids it to be done. In this country it is believed that the law-abiding spirit, confirmed perhaps by the vigilance of the Excise authorities, is sufficient practically to secure obedience to such a prohibition. But Dr. Squibb has evidently strong misgivings as to whether such an end can be attained in the United States, for he believes that many manufacturers would buy the methylated spirit, clean it sufficiently for their purposes at an expense of a few cents a gallon and take the risk of detection and a penalty following. To use his own words, "With a not uncommon disregard for law and indifference to crime, and with sufficient cunning and care, such practices could be easily carried on to any extent, and so long as the cleaned spirit was used strictly for arts and manufactures it would be argued that the intent of the law would be fulfilled and no harm done." But in view of the fact that spirit of wine containing the full proportion of methylic alcohol is utterly inapplicable for many purposes in the arts and manufactures, such practices would interfere with the business of honest manufacturers and tend to diminish their profits, because they would have to compete in business with less scrupulous opponents.

So far the questions raised by Dr. Squibb, although of indirect interest to other countries, affect principally the citizens of the United States, who are quite competent to decide them without obtrusive advice. But it will be evident that their decision may exercise a far-reaching influence upon the manufacture of chemicals throughout the world. Doubtless American manufacturers have for several years past been heavily handicapped in their operations, as compared with continental European manufacturers, who have had an untrammeled supply of duty-free spirit, or even with British manufacturers working under some restriction. This disadvantage has been so great, that notwithstanding the high existing protective duties it has been possible sometimes to beat Americans out of their own markets. But it will hardly be consistent with the reputation of United States enterprise if such a condition of affairs survives either a partial or a total abolition of the spirit duty; indeed we should rather expect to find that the European manufacturers are encountering fresh and vigorous rivals in the other markets of the world.

At the annual meeting of the Pharmaceutical Society of Victoria last month it was resolved to take advantage of the passing of a "Companies' Statute" recently, "for the registration of scientific and literary associations and societies," to incorporate and register the Society under the title of the "Pharmaceutical Society of Australasia." In virtue of this registration the Society will become a body corporate, with perpetual succession, just as if it were incorporated by Royal Charter or by an Act of Parliament, and will be able to hold property in its own name without the intervention of trustees. Speaking upon this subject in his annual address, and evidently referring to the more inclusive range of the new title, the President expressed an opinion that under the new constitution, with its wide scope, there was no reason why the Society should not, in a few years, occupy a position as high and important as that of the Pharmaceutical Society of Great Britain. We hope the anticipation may be verified.

* * *

A few weeks ago we mentioned (before, p. 675) that the New Zealand Government had issued an Order in Council requiring that every retail sale of strychnia or arsenic should be preceded by the production by the purchaser of a statutory declaration as to the purpose for which the poison was required, and that a meeting of pharmacists to discuss the subject was to be held in Dunedin. We learn now that as the result of a representation by the Pharmacy Board the Order has since been withdrawn. When the fact was brought under the cognizance of the colonial Premier that as a consequence of the Order the payment of half-a-crown stamp duty and the services of a justice of the peace had become the indispensable preliminaries to the purchase of a shillingsworth of poison the absurdity of the position was admitted and the obnoxious order cancelled.

* * *

We have received a copy of the first part of a new quarterly journal, entitled 'Drugs and Medicines of North America,' which is to be "devoted to the historical and scientific discussion of the botany, pharmacy, chemistry and therapeutics of the medicinal plants of North America, their constituents, products and sophistications," and will be conducted by Messrs. J. U. and C. G. Lloyd, of Cincinnati. The plants treated of in this part are *Clematis virginiana*, *Thalictrum dioicum*, *Thalictrum anemonoides*, *Anemone nemorosa* and *Anemone patens*, all Ranunculaceous plants, from which it would appear that there is an intention to proceed by natural orders. The work is freely illustrated with well-executed uncoloured drawings of the plants and parts of them, as well as diagrams showing their microscopical structure, and bids fair to be a most valuable addition to the literature of the materia medica.

* * *

In reviewing the subject of pulsatilla, Messrs. Lloyd state that the United States *Anemone patens*, var. *Nuttalliana*, is so nearly like the foreign allied species that there is no reason why the future supply of the drug for that country should not be derived from the native plant, especially as the European species collected for medicinal use differ from each other as widely as from the variety of the species indigenous to America.

* * *

The new number of *The Asclepiad* contains a variety of interesting articles, and among them a paper, by Dr. Richardson, on John Keats, who is claimed as "an Esculapian poet." The paper is illustrated by a beautifully executed portrait of the poet in his twenty-third year, the original picture from which it is taken being in the possession of Mr. Buxton Forman.

* * *

In a paper recently read before the Hygienic Society of Berlin, Herr Miller reported the results of his endeavours to determine the nature of the ferment occurring in the mouth to which he is disposed to attribute the setting up of caries in the teeth. He stated that he had found the ferment to exist in the saliva and that it appeared to result from the growth of two forms of lactic acid fungi, which may prove to be reducible to a single species. In comparative tests as to the agents best suited to stop the development of the organisms and the consequent formation in the mouth of acid, to the action of which on the enamel of the teeth he considers the caries to be due, he found that a solution of corrosive sublimate, 1 in 500,000, checked the formation of acid, and a solution of 1 in 100,000, completely destroyed the organisms. He therefore thinks that a solution of corrosive sublimate, not strong enough to be dangerous, would be found a very effective mouth wash. The spores of the organisms were found to remain capable of development after an hour's boiling in a solution of meat extract. The organisms were also destroyed by solution of potassium permanganate, 1 in 1000; solution of carbolic acid, 1 in 500, and salicylic acid, 1 in 125, whilst the development of acid was checked by solutions of half these strengths.

* * *

The tariff law of the United States has provided still another nut for the superior officials to crack. A dispute appears to have arisen in respect to the essential oil of bitter almonds, which the importers claim to be covered by the term "almond oil," and therefore to be on the free list, whilst the custom house "appraiser" holds that it is liable to pay an import duty of 25 per cent. as an essential oil.

* * *

The next meeting of the Society of Chemical Industry will be held on Monday next, May 5, at 8 p.m., in the Chemical Society's Rooms, Burlington House. The papers to be read are: "On the Composition and Illuminating Power of Coal Gas," by Dr. Percy Frankland; and "On the Estimation of the Illuminating Power of Gas Burners, especially those of large size," by Mr. W. J. Dibdin.

* * *

The next meeting of the Chemists' Assistants' Association will be held on Wednesday, May 7, at 9 p.m., when a paper on "Tartar Emetic" will be read by Mr. C. Thompson.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

April 16, 17, 18, 23, 24 *and* 25, 1884.

Present on the 16th, 17th and 18th—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Southall, Tanner, Taylor and Thresh.

Present on the 23rd and 24th—Mr. Carteighe, President; Mr. Atkins, VicePresident; Messrs. Barnes, Benger, Brady, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Southall, Tanner, Taylor and Thresh.

Present on the 25th—Mr. Carteighe, President; Mr. Atkins, VicePresident; Messrs. Barnes, Benger, Brady, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Southall, Tanner, Taylor and Thresh.

Dr. Greenhow attended on the 17th, 18th, 23rd, 24th and 25th, on behalf of the Privy Council.

MAJOR EXAMINATION.

16*th.*—*Eight* candidates were examined. *Three* failed. The undermentioned *five* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Ashton, Frederick William .. Market Harborough.
Cule, Taliesin ....Merthyr Tydvil.
Dobson, George Turner ....Holsworthy.
Granger, Harold ....Nottingham.
Neve, Annie ....London.

23*rd.*—*Seven* candidates were examined. *One* failed. The undermentioned *six* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Jones, Morgan Isaac ....Aberdare.
Luxmoore, Charles Mann ....Bristol.
Marshall, Sam ....Hyde.
Milford, James Emery ....Bath.
Spilsbury, James .... Stafford.
Wood, John ....Leighton Buzzard.

MINOR EXAMINATION.

16*th.*—*Twenty-one* candidates were examined. *Fifteen* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Atherton, Henry Charles ....Tunbridge Wells.
Atkinson, William George ....Ulverston.
Blyton, Thomas Bage ....Manchester.
Burgess, Thomas ....Liverpool.
Callaway, George Frederic.......Ipswich.
Dunn, George Marchant..........London.

17*th.*—*Twenty-seven* candidates were examined. *Eighteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Carter, Benjamin........ ....Falmouth.
Chifney, George Pearmain ....Mildenhall.
Deck, Arthur Albert ....Cambridge.
Dunn, Isaac George................Chard.
Eastes, Ernest John................Deal.
Edgar, Frederick George..........Southsea.
Evans, Daniel Thomas ....Llandyssul.
Fowle, Sydney ....London.
French, Herman ....Milton next Gravesend.

18*th.*—*Twenty-six* candidates were examined. *Fifteen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Freshney, John Wm. Septimus.Lincoln.
Golding, Frank Oliver... ....London.
Groves, Thomas ....Bridport.
Hacon, Elizabeth Constance ...London.
Hall, Reuben ....Bath.
Hallawell, Joseph Lefebore ...Ayr.
Hare, George Edward............Nottingham.
Harrison, Thomas ....Birmingham.
Hickley, Arthur Mackenzie ...London.
Hodgson, George ....Doncaster.
Hudson, Thomas Herbert ......Leeds.

23*rd.*—*Twenty-two* candidates were examined. *Fifteen* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Jenkins, Thomas ....Aberdare.
Lewis, Thomas ....Llagain.
McDiarmid, Fraser ....Deal.
Madge, Thomas William ......Shaldon.
Marlar, John Frederick ....Halstead.
Mathias, James Russell Hy. ...Tenby.
Smith, Albert ....Stalybridge.

24*th.*—*Twenty-five* candidates were examined. *Sixteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Moss, Thomas Abbot ....Carlisle.
Owen, John ....Sheffield.
Paul, Ernest ....Windsor.
Pierce, Robert Wynne Charles.Bangor.
Ridley, Henry ....Ipswich.
Roberts, Robert ....Llangynidr.
Russell, Harry Edward ....London.
Smith, Joseph De Carle ....Norwich.
Taylor, John Williams ....Norwich.

25*th.*—*Twenty-five* candidates were examined. *Fifteen* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggist:—

Scholes, William Isaac ....Pendleton.
Skoulding, William George ...Oakham.
Spurway, Edgar ... .Kidderminster.
Stewart, Robert McAll ....Penryn.
Sutcliffe, John Arthur............Halifax.
Tennant, Alfred ....Lancaster.
Timbury, Alfred Jeffries.........Leominster.
Tugwell, Ernest Harry ....Greenwich.
Verdon, Levinons ....Knighton.
Worfolk, Alfred Egbert ....Knottingley.

MODIFIED EXAMINATION.

16*th.*—*One* candidate was examined, and was declared qualified to be registered as a Chemist and Druggist:—

Bassett, John ....Leominster.

PRELIMINARY EXAMINATION.

25*th.*—The undermentioned certificates were received in lieu of the Society's examination:—

Certificate of the College of Preceptors.

Allin, Charles James ....St. Albans.

Certificate of the University of Aberdeen.

Farquharson, Alex. McDonald.Aberdeen.

Certificates of the University of Cambridge.

Emery, Alfred ....London.
Fuge, Harry Dixon ....Matlock Bath.
Minter, Albert Edward ....Balham.

Certificate of the University of London.

Barclay, John ....Birmingham.

Certificates of the University of Oxford.

Roberts, Thomas ....Llanfyllin.
Stubbs, Frederick..................Birkenhead.
Wynne, William Arthur.........Mold.

Provincial Transactions.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The usual monthly meeting was held in the Institute Room, Shakespeare Street, on Friday evening, April 25. In the unavoidable absence of the President, through illness, the chair was occupied by Mr. Wilford, Vice-President.

There was hardly such a good attendance as usual.

The Secretary, Mr. C. A. Bolton, read the reports received from Professor Clowes, D.Sc., F.I.C., of the Pharmaceutical Chemistry Class, held at the University during the past winter; it was of a most satisfactory character, 50 per cent. of the candidates who presented themselves for examination having succeeded in satisfying the examiner.

Mr. Major, B.A., F.R.G.S., B.Sc., then delivered a most instructive and interesting lecture upon "Epidemics." An epidemic was defined as a disease attacking a large number of people and being spread by infection. It was distinguished from an endemic by the latter being confined to one place, as the malaria around Rome and the leprosy of the Sandwich Islands. Epidemics are produced by germs, the largest of which are not more than $\frac{1}{6000}$th of an inch in diameter. The difference of philosophers as to the source of these germs was mentioned. On the one side, Pasteur, Huxley and Tyndall, hold that they must be produced by pre-existing life; the other side (Bastian and others), that they may be produced from inorganic substances; the experiments by which they arrived at their conclusions being pointed out and explained. The lecturer then alluded to the folly of people being careless of catching such diseases as scarlatina on the grounds "we shall have to take it some time and the sooner the better." Nothing could be more erroneous or misleading, as less than 50 per cent. of the population ever have these diseases at all and the greatest fatality is amongst young children from one to five years old, for this reason, these germs attack the mucous membrane and this, in children, is very delicate and most susceptible to their influence. Consumption was treated of and the new remedies of inhalation recently brought into prominence by the faculty explained. It was also remarked that consumption occurred much less on mountain tops and at the sea side, on account of the large amount of ozone present in the atmosphere. Statistics were alluded to to show that consumption increases with the density of population per square mile. Methods of propagating the disease were treated in detail. Garments and woollen fabrics so very often proving means of carrying the germs from one part to another, reason urged that the safest and best course was to destroy them. The lecturer then gave some most potent arguments in favour of cremation, urging that quick decay was much better than the present slower one. The reason why milk is such a very suitable medium for carrying disease germs was explained to arise from the fact that it is of such a character as to be one best suited for increasing the number of germs to a rapidly alarming extent as well as at the same time increasing their activity.

A most cordial vote of thanks was passed to the lecturer on the motion of Mr. W. H. Parker, seconded by Mr. A. Middleton.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

Some New Optical Instruments and their Arrangements.

On Monday, the 28th ult., the first of two Cantor lectures upon "Some New Optical Instruments and their Arrangements" was delivered by Mr. J. Norman Lockyer. He commenced the lecture by stating three rather startling facts: that there is at present no manufactory of optical glass in England; that, as far as he knows, there is only one such manufactory in the world; and that it will most probably be closed within a period of six months. Two centuries ago it was considered almost impossible to construct a telescope for the purpose of taking astronomical observations, owing to the great focal length of the lens; the minimum focal length being about 100 feet, the expense of mounting must have been enormous. Hooke had avoided the necessity of shifting the telescope in order to obtain views of different celestial bodies, by the construction of a movable mirror, with which light could be thrown into the telescope from any point in the heavens; this idea, however, remained dormant till 1869. Two discoveries about that time led to its application. Liebig found that it was possible to add a film of silver to the polished surface of glass, by means of the admixture of two solutions, one consisting of nitrate of silver and ammonia, the other of nitrate of silver and Rochelle salt; Fougot at the same time was able to construct a perfect optical plane on geometric principles. During the lecture Mr. Norman Lockyer remarked upon the custom of opticians making mirrors thin, as being less affected by temperature. He was himself of opinion that the thickness of small mirrors should be about one-fifth of their diameter, but should be reduced to one-seventh when of a large size. As to weight he considered that a mirror of 5 feet in diameter and one-seventh the thickness should weigh about a ton. Remarking that up to the present no means had been contrived to enable telescopic observations of the stars to be taken with comfort, and at the same time allow of a view of every part of the sky, the lecturer mentioned that two movable domes are in the course of construction in Paris with this object, the larger one having a diameter of rather over 60 feet. They are hemispherical in shape, and the principal material used in their construction steel. The machinery is so arranged as to allow not only the dome and telescope, but also the observer's chair to move in unison; a circular rim floating in a trough supports the whole dome, and so slight is the friction that it may be easily turned by a child. The liquid used as the floating medium consists of a solution of magnesium chloride of a certain density, which freezes at $-35°$ C., and does not attack the galvanized iron of which the trough and rim are constructed. Should this floating system fail the dome would only fall 1 or 2 millimetres and would then be worked by an ordinary circular railway. The great drawback to this arrangement is the expense of the structure of the dome, which amounts to three times that of the telescope. The lecturer himself favoured an instrument invented by M. Laville, which he considered gave better results. This instrument mainly consists of a telescope, bent about the middle at an angle of 90°, the light being reflected by a mirror placed in the right angle; another movable mirror, at the extreme end of the telescope, enables observations to be taken of stars in different meridians, whilst the telescope can itself be moved to obtain views of the equatorial stars, thus ensuring views of all parts of the sky without the necessity for a "finder." An objection has been raised to this instrument on account of the loss of light arising from the double reflection of the mirrors, and consequently a loss of definite view, but Mr. Lockyer states that this loss, if at all appreciable, could be remedied by a slight enlargement of the aperture

Parliamentary and Law Proceedings.

The Ontario Pharmacy Act, 1884.

ASSENTED TO MARCH 25, 1884.

Her Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

1. This Act may be cited as "The Pharmacy Act, 1884."

2. The Ontario College of Pharmacy, incorporated by the Act passed in the thirty-fourth year of Her Majesty's reign, and chaptered 34, is hereby continued.

3. The Ontario College of Pharmacy shall have power to acquire and hold real estate, not exceeding at any time in annual value five thousand dollars, and the same, or any part thereof, may alienate, exchange, mortgage, lease, or otherwise charge or dispose of as occasion may require, and may erect buildings for the purpose of accommodating lecturers on chemistry or pharmacy, or for a library, pharmaceutical museum, or specimen room for the use of the members and associates of said College; and all fees payable under this Act shall belong to the said College for the purposes of this Act.

Pharmaceutical Council.

4. There shall be a Council of said College, to be called the Pharmaceutical Council, which shall consist of thirteen members, who shall be elected as hereinafter provided, and shall hold office for two years, and the said Council shall, subject to the laws thereof, have sole control of the real and personal property of the College, and have authority to grant certificates of competency to conduct the business of a chemist or druggist, and to be registered subject to the provisions of this Act.

5. Any member of said Council may at any time resign by letter directed to the registrar of said College: and in the event of any vacancy occurring, the remaining members of the Council shall fill up such vacancy from the members of the College.

6. An election of members of the said Council shall be held on the first Wednesday in July in every second year, and the persons qualified to vote at such election, shall be such persons as are members of the said College.

7. The Council shall, at their first meeting, elect from among themselves a president and vice-president, and shall appoint a registrar and such other officers as the said Council may consider necessary.

Certificates of Competency.

8. The said Council shall hold at least two sittings in every year, on the first Wednesday in February and first Wednesday in August, for the purpose of granting certificates of competency, at such places as they may by resolution appoint, of which due notice shall be given for at least one month in the *Ontario Gazette*, and at least two newspapers in the City of Toronto.

9. The Council of the said College shall, subject to the supervision and disallowance thereof by the Lieutenant-Governor in Council, have authority to prescribe the subjects upon which candidates for certificates of competency shall be examined, to establish a scale of fees not to exceed 10 dollars, to be paid by persons applying for examination; and to make bye-laws, rules and orders for the regulation of their own meetings and proceedings, and those of the College; and for the remuneration and appointment of examiners and officers of the said College; and for the payment of remuneration or indemnity to the members of the said Council in attending its sittings, or in attending upon the business of the said College; and in respect to any other matters which may be requisite for the carrying out of this Act; provided always, that no more than 5 cents per mile for travelling expenses, or more than 4 dollars per day for such days only as he shall be in actual attendance upon the business of the College, including going to and returning from such sitting, be allowed to any member for such expenses and remuneration.

10. The examinations of the College may be conducted by the members of the Council, or by persons appointed by them.

Who may apply for Certificates.

11. Subject to the rules, regulations and bye-laws of the Ontario College of Pharmacy, the following persons and no others may be admitted as candidates for certificates of competency:

(*a*) Any person who shall furnish to the Council of the said College satisfactory evidence of having, in pursuance of a binding contract in writing for that purpose, served as an apprentice to a regularly qualified pharmaceutical chemist for a term of not less than three years.

(*b*) In case any person who has apprenticed himself as aforesaid, shall by reason of the death, failure in business, or removal of his employer, or from any other cause satisfactory to the said Council, be unable to complete his apprenticeship with such employer, such person shall be at liberty, when and as often as this may happen, to enter into a new contract to complete the remainder of his unfulfilled term with any other regularly qualified pharmaceutical chemist.

(*c*) Nothing in this section shall apply to any person who had, prior to the passing of this Act, begun his apprenticeship with a regularly qualified pharmaceutical chemist without such binding contract in writing.

Preliminary Examinations.

12. Every person who may hereafter be desirous of becoming apprenticed as aforesaid, shall, before the term of his apprenticeship begins to run for the purpose of this Act, furnish to the registrar of the College a certificate or other evidence satisfactory to the Council, showing that prior to the commencement of such apprenticeship he had passed an examination entitling him to admission to a high school, college, collegiate institute, or to the fourth form of a public school for the Province of Ontario; provided that apprentices who have commenced their apprenticeship out of the Province shall give satisfactory evidence of having had equal qualifications to the aforesaid at the time when their apprenticeship was entered upon.

Registration.

13. It shall be the duty of the registrar to make and keep a correct register, in accordance with the provisions of this Act, as shown in schedule "B," of all persons who may be entitled to be registered under this Act, and to enter opposite the names of all registered persons who have died, a statement of such fact, and from time to time to make the necessary alterations in the addresses of persons registered under this Act, and shall cause to be printed and published on or before the fifteenth day of June of each year, an alphabetical list of the members who were on the first day of June of that year entitled to keep open shop as pharmaceutical chemists.

14. Any person having passed such examination as aforesaid to the satisfaction of the Council, shall be entered upon the roll of registered chemists and druggists and shall become a member of the College.

15. All persons who, on the fifteenth day of February, 1871, were in business as chemists and druggists, or chemists, druggists, or apothecaries, upon their own account, or in partnership with any other person, or who had before said day served an apprenticeship of three years, and acted as a druggist's assistant for one year, shall be entitled to be registered under this Act, upon production to the registrar of such evidence of their having been so engaged, as the Council of the said College may require, and upon payment of a registration fee of 10 dollars; provided, that applications for such registration be made within twelve months from the passing of this Act.

16. No name shall be entered in the register except of persons authorized by this Act to be registered, nor

unless the registrar is satisfied by proper evidence that the person claiming is entitled to be registered; and any appeal from the decision of the registrar may be decided by the Council of the said College, and any entry proved to the satisfaction of the Council to have been fraudulently or incorrectly made, may be erased from or amended in the register by order of the Council.

17. Upon any person being registered under this Act, he shall be entitled to receive a certificate in the form of schedule "D" or to the like effect, under the corporate seal of the said College, and signed by the registrar.

18. There shall be payable to the registrar of the said College, for the uses of the College, on the first day of May of each year, by every person registered and carrying on business as a pharmaceutical chemist, the sum of 4 dollars; provided that in case such person shall carry on such business in more than one locality, the further sum of 4 dollars shall be payable by him, as aforesaid, for each such additional place of business, and provided also, that all employees or assistants who manage or have charge of such additional places of business, shall be legally qualified pharmaceutical chemists.

19. Any person registered under this Act, and no other person, shall be entitled to be called a pharmaceutical chemist, and no other person except a pharmaceutical chemist, as aforesaid, or his employee or employees, shall be authorized to compound prescriptions of legally authorized medical practitioners; but no person shall be entitled to any of the privileges of a pharmaceutical chemist, or member of the said College, who is in default in respect to any fees payable by him by virtue of this Act.

20. Upon a resolution of the Council of the said College being passed, declaring that any person in consequence of his conviction for any offence or offences against this Act, is, in the opinion of the Council, unfit to be on the register under this Act, the Lieutenant-Governor in Council may direct that the name of such person shall be erased from such register, and it shall be the duty of the registrar to erase the same accordingly.

21. Every pharmaceutical chemist carrying on business on his own account shall display his certificate in a conspicuous position in his place of business.

22. Every person having been registered under this or any former Act, as a pharmaceutical chemist, shall, on retiring from business as such chemist, give the registrar notice in writing of the same, and in default thereof he shall remain liable for his annual registration fee; provided, that it shall be lawful for any such person to resume the business of chemist and druggist at any time after retiring therefrom as aforesaid, upon giving notice in writing to the registrar of the College of his intention so to do, and upon payment to him of the then current annual registration fee.

Preparation of Compounds.

23. All compounds named in the British Pharmacopœia shall be prepared according to the formula directed in the latest edition published "by authority" unless the College of Physicians and Surgeons of this Province select another standard, or unless the label distinctly shows that the compound is prepared according to another formula.

Sale of Poisons.

24. No person shall sell or keep open shop for retailing, dispensing, or compounding poisons, or sell or attempt to sell any of the articles mentioned in schedule "A" to this Act, or assume or use the title of "chemist and druggist," or "chemist," or "druggist," or "pharmacist," or "apothecary," or "dispensing chemist," or "druggist," in any part of the Province of Ontario, unless such person is registered under this Act, and unless such person has taken out a certificate under the provisions of section 18 of this Act, for the time during which he is selling or keeping open shop for retailing, dispensing, or compounding poisons, or assuming or using such title; provided, that nothing in this Act contained shall be taken to prevent the sale, by persons not registered in pursuance of this Act, of Paris green, London purple, and other arsenical insecticides, so long as such articles are sold in well secured packages distinctly labelled with the name and address of the seller and marked "Poison," and a record of such sales is kept as required under the provisions of this Act.

25. The several articles named or described in schedule "A," shall be deemed to be poisonous within the meaning of this Act, and the Council of the Ontario College of Pharmacy, hereinbefore mentioned, may from time to time by resolution declare, that any article in such resolution named ought to be deemed a poison within the meaning of this Act, and thereupon the said Council shall submit the same for the approval of the Lieutenant-Governor in Council, and if such approval is given, then such resolution and approval shall be advertised in the *Ontario Gazette*, and on the expiration of one month from such advertisement the article named in such resolution shall be deemed to be a poison within the meaning of this Act, and the same shall be subject to the provisions of this Act, or such of them as may be directed by the Lieutenant-Governor in Council.

26. No person shall sell any poison named in the first part of schedule "A" either by wholesale or retail, unless the box, bottle, vessel, wrapper, or cover in which such poison is contained is distinctly labelled with the name of the article and the word "poison," and if sold by retail, then also with the name and address of the proprietor of the establishment in which such poison is sold; and no person shall sell any poison mentioned in the first part of schedule "A" to any person unknown to the seller unless introduced by some person known to the seller; and on every sale of any such article the person actually selling the same, shall, before delivery, make an entry in a book to be kept for that purpose, in the form set forth in schedule "C" to this Act, stating the date of the sale, the name and address of the purchaser, the name and quantity of the article sold, the purpose for which it is stated by the purchaser to be required, and the name of the person, if any, who introduced him, to which entry the signature of the purchaser shall be affixed.

Offences and Penalties.

27. No person shall wilfully or knowingly sell any article under the pretence that it is a particular drug or medicine which it is not in fact, and any person so doing (besides any other penalties to which he may be liable) shall be subject to the penalties prescribed by section 28 of this Act.

28. Any person transgressing any of the provisions of this Act, or selling any poison in violation thereof, shall for the first offence incur a penalty of 20 dollars and costs of prosecution, and for each offence committed subsequent to such conviction, a penalty of 50 dollars and costs of prosecution, to be recovered in a summary manner, before one or more justices of the peace or police magistrate, on the oath of one or more creditable witnesses, one moiety to belong to the prosecutor and the other to be paid to the registrar for the use of the College.

29. In any prosecution under this Act it shall be incumbent upon the defendant to prove that he is entitled to sell or keep open shop for compounding medicines or retailing poisons, and to assume the title of Chemist and Druggist, or other title mentioned in section 24 of this Act, and the production of a certificate purporting to be under the hand of the registrar and under the seal of the said College, showing that he is so entitled, shall be *primâ facie* evidence that he is so entitled.

30. No person selling articles in violation of the provisions of this Act shall recover any charges in respect thereof in any Court of Justice.

Act not to affect Medical Practitioners.

31. (1) Nothing in this Act contained shall extend to or interfere with the privileges conferred upon legally qualified medical practitioners by any of the Acts relating to the practice of medicine and surgery in this Province, and they may be registered as pharmaceutical chemists without undergoing examination; nor shall anything in this Act prevent any person whatsoever from selling goods of any kind to any person legally authorized to carry on the business of an apothecary, chemist and druggist, or the profession of a doctor of medicine, physician or surgeon, or veterinary surgeon, nor prevent the members of such professions supplying to their patients such medicine as they may require, nor interfere with the business of wholesale dealers in supplying poisons or other articles in the ordinary course of wholesale dealing.

(2) Nothing in this Act shall prevent any member of the College of Physicians and Surgeons of Ontario from engaging in and carrying on the business of an apothecary, chemist, or druggist without registration, under the provisions of this Act.

32. Upon the decease of any person legally authorized and actually carrying on the business of chemist and druggist at the time of his death, it shall be lawful for the executor, administrator or trustee of the estate of such person to continue such business if and so long only as such business is *bonâ fide* conducted by a pharmaceutical chemist registered under this Act, provided such executor, administrator or trustee continues to pay the annual registration fee of 4 dollars.

Honorary Members.

33. It shall be competent for the Council of the said College to elect as honorary members such persons as may be eminent for their scientific attainments; but such honorary members shall not as such be entitled to vote at elections or carry on the business of pharmaceutical chemists.

34. All persons approved of by the Council of the said College, who hold diplomas from the Pharmaceutical Society of Great Britain, or certificates from any pharmaceutical college in the Dominion of Canada or elsewhere, may be registered as members of the Ontario College of Pharmacy without the examination prescribed by this Act.

35. The Pharmacy Act, chapter 145 of the Revised Statutes of Ontario, is hereby repealed.

Schedule "A."

(*Secs.* 24, 25 *and* 26.)

PART I.

Acid, hydrocyanic (prussic).
Aconite and compounds thereof.
Antimony, tartrate of.
Arsenic, and all the compounds thereof.
Atropine.
Conia, and the compounds.
Corrosive sublimate.
Digitaline.
Ergot.
Hemp, Indian.
Morphia, and its salts and solutions.
Oil, cedar.
Strychnine, and nux vomica.
Savin and preparations of.
Varatria.

PART II.

Acid, oxalic.
Belladonna and the compounds thereof.
Beans, Calabar.
Cantharides.
Carbolic acid.
Chloral hydrate.
Chloroform and ether.
Conium, and the preparations thereof.
Croton oil and seeds.
Cyanide of potassium.
Euphorbium.
Elaterium.
Goulard's extract.
Hyoscyamus and preparations.
Hellebore.
Iodine.
Opium with its preparations, including laudanum, etc., but not paregoric.
Pink root.
Podophyllin.
Potassium, iodide of.
Potassium, bromide of.
St. Ignatius' beans.
Santonine.
Scammony.
Stramonium and preparations.
Valerian.
Verdigris.
Zinc, sulphate of.

Schedule "B."

(*Sec.* 13.)

Name.	Residence.	Qualification.	Remarks.
A.B.	Kingston.	In business for three years prior to Feb. 15, 1871.	Dead.
C.D.	Hamilton.	Examined and certified, July 12, 1871.	Erased by order of the Lieut.-Governor, dated October 14, 1875.
E.F.	London.	Served apprenticeship and as assistant.	

Schedule "C."

(*Sec.* 26.)

Date.	Name of purchaser.	Name and quantity of poison sold.	Purpose for which it is required.	Signature of purchaser.	Address of purchaser.	Name of person introducing purchaser.

Schedule "D."

(*Sec.* 17.)

I hereby certify that *C. D.* having first passed the examination prescribed by the Pharmaceutical Council, *or* having on the 15th day of February, 1871, been in business as Chemist and Druggist on his own account, *or* having, prior to the 15th day of February, 1871, served an apprenticeship of three years and acted as druggists' assistant for one year (*as the case may be*), was on the day of duly registered as a Pharmaceutical Chemist, and is authorized to carry on the business of Chemist and Druggist in the Province of Ontario, from the day of A.D. 18 to the day of

(Signed)

E. F.,

Registrar of the Ontario College of Pharmacy.

[Corporate Seal.]

CRIMINAL POISONING WITH STRYCHNINE.

At the Newcastle Spring Assizes, on Saturday last, before Mr. Justice Hawkins, Sarah Jane Holmes was charged with feloniously killing and murdering John Holmes Burns. It appeared from the evidence that the prisoner had been living with a man called Burns, and during that time went under his name. The man having left her she seems to have enticed his little boy to her home and administered strychnine to him, taking some herself at the same time. The child died shortly afterwards. The following is the evidence given as to the purchase of poison by the prisoner:—

Robert Stobbs said he was a chemist carrying on business at 26, Sackville St., North Shields. On Mar. 1 the prisoner came to his shop and asked for a packet of vermin-killer. He asked her name, and she told him it was Mrs. Burns. She signed the book "Nance Burns, 38, Church Way." The vermin-killer was a powder he prepared himself. It contained strychnine, about 14 per cent. of the whole. The weight of the packet he sold her was 12 grains.

Cross-examined: She told him she wanted it for killing mice.

James Williamson said he was a chemist, and carried on business at 11, Union Street, North Shields. The prisoner came to his shop on March 25, last, and asked for a 6*d.* packet of Battle's vermin-killer, with which she was supplied. He made an entry of the sale in the poison book in the name and address of the prisoner, "Nance Burns, 38, Church Way." The packet was labelled "Poison." On the 17th ult. he supplied Detective John Riddell with a packet of the vermin killer, which was, externally, precisely the same as that sold to the prisoner.

Peter C. Reid said he was an apprentice to Mr. J. F. Hogg, chemist, Tyne Street. He remembered prisoner coming to the shop on April 1, and asking for a 6*d.* packet of Battle's vermin killer. On being supplied with a packet she signed the name "Nance Burns, 38, Church Way."

The prisoner was convicted and sentenced to death.

Obituary.

JOHN CHARLES BRAITHWAITE.

Many of our readers will learn with the regret due to personal acquaintance of the death at Twickenham, on Wednesday last, of Mr. John Charles Braithwaite, at the age of sixty years, after an illness lasting only a few days.

Mr. Braithwaite was born near Hereford, and served his apprenticeship to the General Apothecaries' Company of Liverpool, where he afterwards remained as assistant-chemist. He entered as a student in the School of Pharmacy, Bloomsbury Square, in the session 1847–48. He passed the Major examination in 1848, and afterwards succeeded to the post of demonstrator in the Society's laboratory, an office he discharged until 1860. After this he was, for a short time, chemist to the General Apothecaries' Company, of Berners Street, but in 1862 he gave up this post and devoted the whole of his time to teaching until the year 1877, when his failing health compelled him to relinquish this vocation. In consequence of this his means were much reduced, and this having become known to his friends he was nominated for election as an annuitant of the Benevolent Fund, and was elected in 1877.

Although no longer taking an active part in pharmacy Mr. Braithwaite's interest in the calling with which he had been so long connected continued, and the memory of the kindness he had received from many of his old pupils was preserved to the last.

Notice has also been received of the death of the following:—

On the 13th March, Mr. Samuel Kirkpatrick, Chemist and Druggist, East Reach, Taunton. Aged 56 years.

On the 5th April, Mr. James Edmunds, Chemist and Druggist, Newport, Mon. Aged 43 years.

On the 10th April, Mr. George Starke, Chemist and Druggist, Reading. Aged 78 years.

On the 14th April, Mr. William Eddie, Chemist and Druggist, Aberdeen, Aged 58 years.

On the 20th April, Mr. William Fleming Grayson Benson, Chemist and Druggist, Liverpool. Aged 55 years.

On the 20th April, Mr. Thomas Walton, Chemist and Druggist, Stanhope. Aged 62 years.

On the 21st April, Mr. William Henry Cuthbert, Chemist and Druggist, Willesden. Aged 54 years.

On the 23rd April, Mr. Robert Tully Watkins, Chemist and Druggist, Oxford. Aged 40 years.

On the 24th April, Mr. Joseph Bradley Shillcock, Pharmaceutical Chemist, Bromley. Aged 71 years. Mr. Shillcock had been a Member of the Pharmaceutical Society since 1842.

On the 26th April, Mr. Joseph Johnson, Chemist and Druggist, The Pavement, Merton. Aged 54 years. Mr. Johnson had been a Member of the Pharmaceutical Society since 1872.

On the 28th April, Mr. Edward Percival Guest, Pharmaceutical Chemist, Brentwood, Essex. Aged 56 years. Mr. Guest had been a Member of the Pharmaceutical Society since 1865.

Correspondence.

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

Spirit of Nitrous Ether.

Sir,—I observe a letter on the above subject from Mr. A. C. Abraham, which demands some notice, though its tone certainly cannot be commended. Passing over the preliminary sneer regarding "the source of these papers," and leaving Professor Hay and Mr. MacEwan to look after themselves, I shall refer to those points which more directly concern myself.

Now, I should at once express my sincere regret if I had misrepresented Mr. Abraham's views, but I do not find I have said anything meriting such a positive contradiction as he gives. Mr. Abraham's words are these—"He [Mr. Rimmington] forgets that acetates are *known* to do what he only suggests as a function of the nitrous acid and so fails to appreciate the value of the aldehyde, which we may fairly assume will be converted into acetic acid and afterwards into an acetate *when it reaches the blood*; where its action is required. I believe we have as much right to say that aldehyde is the active ingredient as to credit nitrite of ethyl with being such." This is just the opinion which I wish to condemn. Nitrites are powerfully diuretic; acetates are not; yet we are asked to believe that a minute amount of aldehyde may be the source of the physiological activity of spirit of nitrous ether. Mr. Abraham now believes that "the activity is probably due to some polymeric form of aldehyde, such as paraldehyde or some nitro compound of it." What grounds have we for such a supposition? The fact is, Mr. Abraham "believes" and "imagines" a great deal too much.

Regarding the next paragraph in Mr. Abraham's letter, I can only say that it is sheer nonsense, as there can be no doubt that acetic acid is absorbed into the blood from the stomach; while to take *oxymel scillæ* as an example of the diuretic action of acetic acid is peculiarly foolish. Mr. Abraham proceeds to say—"With regard to the process finally adopted by Mr. Dott for the estimation of nitrous ether, he will find that I suggested at Southport practically the same thing; but I omitted the acid as unnecessary, because the preparation contains something (not aldehyde, because that is not present in sufficient quantity) which so decomposes as to render the acid unnecessary. This something, which Mr. Dott entirely ignores, but which *I believe to be more probably* [the italics are mine] the chief ingredient wanted, is consequently so far estimated at the same time." I plead guilty to having ignored "this something," and I cannot comprehend how it is "estimated at the same time." Of one thing I am certain, that "this something" does *not* render the addition of acid unnecessary, unless perhaps the sample itself should be very acid. Possibly "this something" is only another name for *free acid*. I repudiate the idea that I was anticipated in any way by Mr. Abraham at Southport. In my paper, I did not refer to his method of employing iodide of potassium as a test (in which there is nothing new) because any reference could only have been condemnatory. Mr. Abraham then described (not for the first time) a process which is worthless; I have described a process which has at least some value.

David B. Dott.

Spirit of Nitrous Ether.

Sir,—Mr. Abraham, in his letter to the Journal of April 26th, is pleased to comment on two points of my paper on the above subject. On the first point, namely, "Diminution of the Separation Volume," he states that I found a greater loss in two winter months than he found in seven months, chiefly summer. Well, I have to remark on this statement that the loss which I record in specimen α was observed after twenty-two days, and in the case of β after seven days, not two months as stated by Mr. Abraham, who must have imagined this period. Moreover, the loss which Mr. Abraham records in his paper ('Year-Book of Pharmacy,' 1883, p. 553) was from "3-4" per cent. when fresh to 3 per cent. at three months, and 2 per cent. at seven months. Specimen β of my paper was carelessly stored for the purpose of showing how such conditions affect the quality of the spirit, so that I need not put Mr. Abraham's specimen in comparison with it. But specimen α was stored in the best attainable conditions of an ordinary pharmacy, and so kept, the separation volume decreased from 2 per cent. to 1·33 per cent. in twenty-two days; this specimen may fairly be compared with Mr. Abraham's, and by this comparison we find that the difference between 2 and 1·33 is less than that between "3-4" and 2, not greater, as stated by Mr. Abraham. These are small matters, no doubt, but they show that Mr. Abraham is exceedingly careless in his statements of fact.

He is very decided about the second point on which he remarks. He says that he believes my method for determining acidity "to be incapable of accurate results, as decinormal soda solution decomposes sweet spirit of nitre; indeed, any alkali does so more or less rapidly." This statement is a fair index of the manner in which he brings knowledge and wits to bear upon this subject. On this second point he entirely neglects to take into account the elementary chemical fact that during the titration the alkali unites with the free in preference to the combined acid (and this is the very basis of the method), so that decomposition of the nitrous ether, or of the aldehyde, is impossible in the circumstances.

While taking Mr. Abraham's remarks in good part, I cannot avoid expressing the thought that his utterance of inaccurate and misleading criticism is inexcusable and unjustifiable.

In a concluding sentence, I wish to remark that the statement that "any alkali decomposes sweet spirit of nitre more or less rapidly" should rather be written "more or less slowly." (I look upon the statement more as a generally accepted one rather than as an expression of Mr. Abraham.) Thus the U.S.P. allows twelve hours for the saponification of 10 c.c. with 1·5 gram of caustic potash; Dupré allows similar quantities to stand over night, and Muter allows an hour on a water-bath. These all indicate that saponification is slow. I wish, however, to add that it is not complete. Some time ago I allowed a quantity of spirit to remain in contact with large excess of strong soda solution for two days, and then subjected the mixture to distillation and found that all fractions of the distillate up to 100° C. gave the nitrous radicle reactions, and showing, therefore, that the saponification was incomplete. This experiment was undertaken for the purpose of obtaining indication of "paraldehyde," and the odour of the distillate was so similar to that of a spirituous solution of that body as to convey an impression of identity, but the temperature and the nitrous radicle reactions removed the impression.

Edinburgh. Peter MacEwan.

Standardized Tincture of Nux Vomica.

Sir,—Mr. Smith has correctly indicated an inexact point in the process I advocated for the titration of the mixed alkaloids in extract of nux vomica, but the margin of error involved is not great. Dragendorff, my authority, states that each c.c. of the test solution of the strength I recommend precipitates 0·00167 of strychnia, and 0·00197 of brucia. I have satisfied myself of the correctness of this statement as regards strychnia, but as I have no absolutely pure brucia in my possession, I have been obliged to assume that it is equally correct as regards the latter also.

The factor 0·00182 was found in the mean of the two figures above quoted. I was aware it would not yield absolutely correct results when the proportion of one alkaloid greatly exceeded that of the other, but the amount of error as illustrated by the differences shown in the twelve samples quoted in the table (page 443) would be within 0·5 per cent., and I scarcely considered this defect sufficient to outweigh the advantages that attend the process; nevertheless, it is well that attention should be drawn to the fact.

I feel much tempted to reply to Mr. Dunstan's letter in detail, but think on the whole it is better to postpone discussion upon our special points of non-agreement until he has completed and made known the further work on the subject I am so glad to hear he is engaged upon. In the meantime I quote with cordial approval the last sentence of his letter:—

"The production of standard galenical preparations of potent drugs, *which, in the majority of cases, needs the expenditure of a vast amount of preliminary scientific work*, marks out a distinct line of progress and research in the pharmacy of the future. I mean, I think so."

I have taken the liberty of italicizing some very important words in this sentence, and thus read it commends itself to my full approval.

G. F. Schacht.

Extract. Cinchon. Liq.

Sir,—I am delighted that Professor Redwood has taken the ext. cinch. liq. in hand, and heartily concur in his new process. *Apropos* of this matter, I may mention that for several times I have aided the exhaustion of the bark with acid. hydrochlor. dil., by which means an extract was obtained much more satisfactory than the ordinary method, so much so that I now offer the process for what it is worth. The bark is first exhausted with H_2O, only half the quantity the B.P. directs. Then the humid residue is macerated all night in H_2O with ℥j to 16 bark acid. hydrochlor. dil.; again exhausted, the first percolate evaporated to three ounces. No. 2 percolate is evaporated to a soft extract and this is then macerated in the first 3 ounces, then the whole made up to 4 ounces with s. v. r. A product is obtained doubly bitter to the ordinary and more deserving of the name. Suppressing all further comments, I will make bold to say (1st), that Dr. Paul's investigation proved how miserable a preparation the ordinary one is; (2nd), that in dil. acid. hydrochlor. we have an efficient solvent of the alkaloid left behind; (3rd), prolonged heat does not degrade the alkaloid in presence of acid mur., as the whole of the gas is easily dissipated at first; (4th) in a new edition of B.P. the old method ought to be expelled.

31, *Minto Street, Edinburgh.* D. Gorrie.

Hawking Chemists.

Sir,—I notice in your last number an account of a chemist whose man was fined for hawking laudanum. It appeared that the chemist was the proprietor of a van from which drugs, etc., were retailed round the country.

It is a fact that many chemists send out carts, which call at every roadside house, and sell everything, from tea to paregoric and paraffin. Is it any use for the Pharmaceutical Society to endeavour to raise our trade to a science when the public see educated men sending out drug-carts, only differing from the common hawker in that they emanate from a select dispensing establishment instead of a small huckster's shop?

Such practices prevent the public from looking favourably on efforts that are made to place us somewhat above the mixed grocer: and who can be surprised?

Chemist and Druggist.

Apprentice.—We do not consider the preparation to be hurtful if properly made.

F. Barry.—If you refer to the numbers of the *Pharmaceutical Journal* for the past year you will find some information upon the subject.

T. H. G.—We have not received any report of such a case. You will find information respecting the formula you inquire about in *Pharm. Journal* (1883), pp. 884 and 936.

Communications, Letters, etc., have been received from Messrs. Hemans, Francis, Moir and Son, Franklin, Associate, Datura, Marmor, J.D., F.S.G.

NOTE ON KAMALA.*

BY WILLIAM KIRKBY, PH.C.

Kamala was not known in Europe as a drug until a very recent period. Before the year 1852 the only account of it is in the writings of Anslie, Roxburgh, Royle, and Buchanan. In that year, however, Port-Surgeon Vaughan met with it in the bazaar of Aden under the Arabic name of *wars*. Specimens obtained by him were forwarded to Mr. Daniel Hanbury, together with information concerning the same. The following information collected by him is found in his 'Notes on Drugs observed at Aden, Arabia':†—"*Wurrus* or *warus* is a red powder used chiefly as a dye. It is the produce of a plant resembling sesame. The plant rises to about 5 feet in height, bearing several separate bunches or clusters of small round seeds, which are covered with a description of flour; this, removed by gentle rubbing, constitutes the dye. Two kinds come into the market. The best comes from the interior, principally from the towns of O Badan and Gebla, and the districts of Yaffaee and Sjibul Rudfan. The second kind, brought by the Somalis of the opposite coast, comes from Hurrer. The second quality is not so much valued, and does not realize the price of the kind which comes from the interior. A considerable quantity of the dye is exported to Bombay, being used at Surat by ladies for dyeing silk a light brown-yellow. The Arabs use it as a dye and as a medicine, internally, for leprosy, and externally, in solution, for freckles and pustules. Much of it finds its way to the Persian Gulf, being known as *asberg*." Dr. Vaughan goes on to say that the best quality sells for 24 rupees the maund, while the African variety sells for only 17 or 18 rupees the maund.

Mr. Hanbury‡ states that he showed the specimens he had received to Mr. Alexander Gibson, of Bombay, who was at that time in London. Mr. Gibson suggested to him that it was obtained from *Rottlera tinctoria*. He then proceeded to compare the drug with specimens in the museum of the Linnæan Society, and found that Mr. Gibson was correct in his surmise.

Kamala, as found in commerce, is a fine, mobile powder, of a dull red colour. Under the microscope it is seen to consist chiefly of translucent, bright red granules mixed with colourless stellate hairs. These hairs give the drug its dull appearance. The glands, Fig. 1, *a*, are spherical, rather

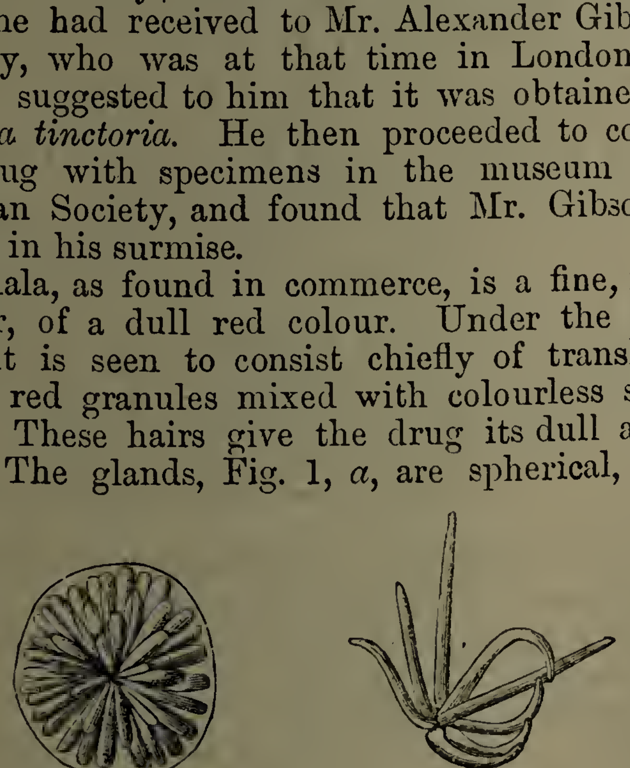


Fig. 1.
a. Gland of genuine kamala.
b. Stellate hair of the same.

irregularly so. Their diameter is from 70 to 120 mkm. (micromillimetres). They are flattened on one side, and are composed of a number of clavate cells enclosed in a pale yellow membrane. The cells are arranged in a radiate manner round a short stalk cell, which is not always visible, occupying the basal side of the gland. From ten to thirty of these cells may be seen on one side; the whole cell, however, contains from twenty to sixty of them. The cells are filled with a red resin, which is soluble in solution of caustic potash, alcohol, and ether. On treatment with solution of caustic potash the structure of the gland becomes plainly visible. On appropriate treatment, first with alcohol and afterwards with Schultz's solution or sulphuric acid and iodine, the cells are seen to be composed of cellulose, while the enclosing membrane is seen not to be cellulose.

Professor Flückiger* says that he examined authentic specimens from the Calcutta Gardens. These were taken from *Mallotus Phillipinensis* (*Rottlera tinctoria*), and he found them to agree entirely with the kamala of commerce.

From this it is plainly evident that the source of commercial kamala has been definitely settled.

Some years ago Messrs. Allen and Hanbury imported a remarkable kind of this drug from Aden. A full account will be found in 'Pharmacographia.' Mr. Hanbury forwarded a sample of this to Professor Flückiger, who submitted it to an exhaustive examination.† It differs from the ordinary variety in bulk, in having a *dark* red or violet colour. Microscopically examined it is at once seen to have quite a distinct structure. Solution of caustic potash dissolves the resin contained by the glands and the general structure is easily seen. The glands are cylindrical, somewhat conical, and are composed, like the other, of resin cells enclosed by a membrane. The arrangement of the cells will be best understood by reference to Fig. 2. The glands are

Fig. 2.
a. Glands of purple kamala.
b. Simple hair of same.

from 170 to 200 mkm. long and from 70 to 100 mkm. broad. The hairs mixed with them are simple and long, when compared with the short stellate hairs of the common kind. Professor Flückiger is quite sure the two kinds are not obtained from the same plant.

Dr. Dymock, in his 'Vegetable Materia Medica of Western India, says:—"'*Wurs*,' or '*wurrus*,' which differs from genuine kamala in being a dark purple colour, is the gland of the leaf of a leguminous plant, *Flemingia congesta*." He was not able to ascertain if it is collected in India or whether it is imported from Arabia. I have not had the pleasure of seeing Dr. Dymock's book; but it was the note, as above, which appeared in "The Month" of a recent number of the *Pharmaceutical Journal*, which first attracted my attention to kamala and its sources. Thinking it would be interesting to know if com-

* Read before the Manchester Pharmaceutical Association.
† *Pharm. Journ.*, [1], xii., 385.
‡ *Pharm. Journ.*, [1], xii., 589.

* *Pharm. Journ.*, [2], ix., 279.
† *Pharm. Journ.*, [2], vol. ix., 279.

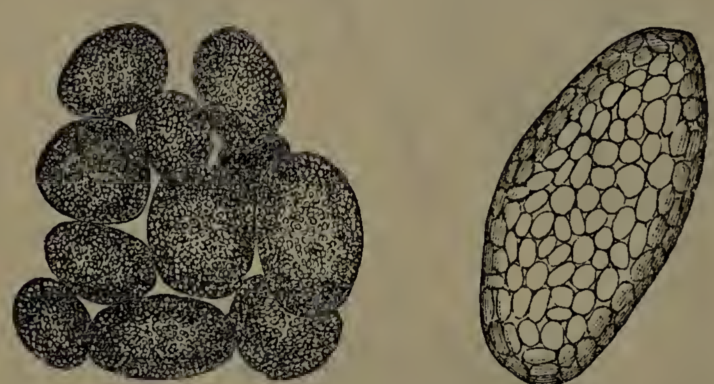
mercial kamala was entirely the produce of *M. Phillipinensis*, I obtained samples of the drug from various parts of the country. I find that everyone of the specimens obtained from dealers is genuine kamala.

Mr. E. M. Holmes, of the Pharmaceutical Society, has been kind enough to let me have samples of the specimens in the Society's Museum. The results of my examination are as follows:—

Sample marked "490 b," catalogued "Glands, covering fruit of *Rottlera tinctoria*," is genuine kamala.

Sample marked "490 c," catalogued "Wurrus, first quality," is identical with the purple variety examined by Professor Flückiger and is presumably the one referred by Dr. Dymock to *Flemingia congesta*.

Sample marked "490 d," catalogued "Wurrus, second quality."—This is totally different from either of the other two varieties spoken of. I have been unable to find any record of a third kind of this drug. I therefore venture to put before you a short description of this specimen. The glands are from 50 to 170 mkm. long, and from 50 to 100 mkm. broad. When seen with the microscope in a dry state they are translucent and but faintly coloured yellow. In form they vary very considerably; in fact, there appears to be no prevailing form. They impart but little colour to ether, alcohol, or solution of caustic potash. The cells are devoid of any such resin as is seen in the other two kinds. In solution of caustic potash they swell considerably, and their structure is rendered clearly visible. They consist of a mass of cells, composed of cellulose, enclosed by a non-cellulose membrane. The cells are not arranged in any particular manner. The general arrangement is shown, when seen in solution of potash, in Fig. 3, *b*. The hairs are similar to those found in the purple variety, being quite simple.



a *b*

Fig. 3.

a. New (?) variety of kamala seen dry.
b. The same seen in solution of caustic potash.

On drawing Mr. Holmes's attention to this unknown (?) variety, he informed me that he believed it was the *second* kind mentioned by Dr. Vaughan in his 'Notes,' and this sample was probably given by him to Mr. Hanbury, who presented it to the Museum.

I trust that some further information regarding the plants yielding the second and third varieties of "wurrus" will soon be forthcoming.

Looking at the last sort from an economic point of view, it would appear to be worthless as a dye, whatever it may be as a medicine.

In conclusion, I beg to tender my thanks to Mr. Holmes, and to Mr. Elborne who has assisted me in obtaining specimens of the drug.

THE MATERIA MEDICA OF THE NEW PHARMACOPÉE FRANÇAISE.

(*Continued from page* 839.)

N.

The articles omitted are Narcisse des prés, Nard celtique, Nicotiane rustique, Nigelle des champs. Those marked with an asterisk are Neroli ou Essence de Neroli and Nicotiane ou Tabac. The only alteration consists in the reference of the Bitter orange to the "Rutaceæ-Aurantiaceæ."

O.

The following are no longer official:—Orobe (*Orobus vernus*, L.), Orpin ou Reprise (*Sedum Telephinum*, L.), Ortie brulante (*Urtica urens*, L.), and Ortie dioique. Those marked with an asterisk are Orge (*Hordeum vulgare*, L.), Origan vulgaire and Ortie blanche ou Lamier (*Lamium album*, L.). The only addition is Orme fauve (*Ulmus fulva*, L.), the bark of which is better known in this country as slippery elm bark.

Opium.—This is said to be derived from *Papaver somniferum*, L., var. *album*, and to be the produce of Anatolia. This is scarcely correct, as the purple-flowered variety *β glabrum* is largely used in Asia Minor for the production of opium. Opium for pharmaceutical use should now yield when dried at 100° C. 10 to 12 per cent. of morphia and should afford about 50 per cent. of extract.

P.

Under this heading are omitted Pareira brava, Pavot noir, Pavot œillette, Pignon doux (seeds of *Pinus Pinea*, L.), Piment de la Jamaïque, Pin de la Caroline (*Pinus palustris*, Lamb.), Pin maritime, Poirée ou Bette, Poivre long, Polygala amer, Pomme de terre ou Parmentière, Pommier cultivé, Pouliot des montagnes (*Teucrium*, sp.), Pourpier cultivé (*Portulaca sativa*), Prêle d'eau (*Equisetum fluviatile*, L.) and Prêle d'hiver (*E. hiemale*, L.) Primevère (*Primula veris*, L.), and Pyrole ombellée.

The articles marked with an asterisk are Pariétaire (*Parietaria officinalis*, L.) Patience, Pensée sauvage (*Viola tricolor arvensis*, DC.), Pervenche grande et petite (*Vinca major* and *V. minor*, L.), Petit houx ou Fragon épineux, Pin sauvage, Poix de Bourgogne, Poix resine, Polygala de Virginie, Polypode commune. *Podophyllum peltatum* is the only addition under "P." It is placed in the *Berberidaceæ-Podophylleæ*.

Panama (Bois de).—This name now appears to be applied to *Quillaia*, as it is referred, with a note of interrogation, to *Quillaia Saponaria*, while *Quillaia savonneux* is omitted under "Q."

Patience (Racine de).—*R. obtusifolius*, L., and other species are now given as sources of this root, which in the last edition was described as Patience sauvage.

Pêcher.—The botanical name of the peach is now given as *Prunus Persica*, Mill., and the tree is referred to *Rosaceæ-Pruneæ*.

Persil.—The botanical name of parsley is now given as *Apium* (*Petroselinum*) *sativum*, Hoffm., and the leaves are no longer official.

Petit houx ou fragon épineux.—The natural order is now given as *Liliaceæ-Asparagineæ* and the official part is described as "souche" instead of rhizome.

Pin sauvage.—The young shoots commonly but wrongly, designated *Bourgeon de Sapin* are now official.

Poix de Bourgogne.—*Pinus Abies* is the botanical name now adopted.

Q.

Quintefeuille (*Potentilla reptans*, L.), is the only article omitted.

Quinquina Calisaya and Quinquina gris de Loxa only are marked with an asterisk.

Quinquina Calisaya.—Both the flat and quilled barks are official. Under the latter head the Java barks, known as *Ledgeriana* and *Javanica*, are apparently included. It is, however, almost useless to direct the flat bark to be employed, since the genuine flat *Calisaya* bark can scarcely be met with in retail trade. Barks which yield less than 25 per 1000 of crystallized sulphate of quinine are to be rejected. Barks which are rich in quinine, but which give bad officinal preparations, such as *Quinquina Pitayo* and *Q. lancifolia*, are to be reserved for the extraction of quinine.

Quinquina gris Huanuco.—This bark may now be obtained from *Cinchona micrantha*, R. P., *nitida*, R. P. and *peruviana*, How.

Quinquina gris de Loxa may be the produce either of *Cinchona officinalis*, L., or of *C. crispa*, Tafalla, and should contain at least 15 per 1000 of salifiable alkaloids, of which one-tenth should be quinine. The Indies, especially those belonging to England, are indicated as yielding these barks rich in alkaloids.

Quinquina rouge.—Both the flat and quilled barks are official, preference being given to the Dutch and English Indian quilled barks. Red bark should yield at least 30 per 1000 of the sulphates of the alkaloids of which at least 20 should be sulphate of quinine.

R.

Rhus radicans and *R. Toxicodendron*, Roquette cultivée (*Eruca sativa*, Lamk.), Roquette sauvage (*Brassica Erucastrum*, L,), Rose trémière (*Althœa rosea*, Cav.), and Rosier sauvage (*Rosa canina*) are omitted.

Raisin secs, Ratanhia, Réglisse, Rhubarbe de Chine, Riz, Romarin, Ronce sauvage (*Rubus fruticosus*), Rose à cent feuilles, Rose rouge (*Rosa gallica*, L.) and Rue are marked with an asterisk.

Ratanhia.—Under this name the root of two species is official, viz., Peruvian, and Savanilla or New Granada Rhatany. The latter is referred to Krameria (*Ixina Granatensis*, Pl. and Tr.), but the description given, "un brun pourpre sombre ou violacé," would seem intended to include the Pará rhatany (*Krameria argentea*, Mart.).

Réglisse.—The rhizome, as well as the root, is now official.

Rhapontic.—Rhubarb under this name, derived from *Rheum Rhaponticum*, L., and other species, is to be used exclusively in veterinary medicine.

Rhubarbe de Chine is described as the "tige et souche" of *Rheum officinale*, H. Bn. and of some other species, more particularly *Rheum palmatum*, Maxm., *Tanguticum*, L. The description given does not apply to the root of *R. officinale*, Bn., as cultivated and prepared in this country, but to the greater portion of the root imported from China.

Rose rouge ou Rose de Provins.—The buds are now directed to be deprived of the calyx.

S.

The articles omitted are Sagapénum, Sanicle, Saponaire d'Orient (*Gypsophila Rokejeka*, Del.), Sauge sclarée ou Orvale, Saxifrage grande ou Boucage (*Pimpinella magna*, L.), Schœnanthe de l'Inde, Schœnanthe officinal, Séséli de Marseille (*Seseli tortuosum*, L.), Soude commune (*Salsola Soda*, L.), Succin ou Karabé, Sumac des Corroyeurs (*Rhus coriaria*, L.), Surelle ou alleluia (*Oxalis Acetosella*, L.)

Those marked with an asterisk are Sabine, Safran, Sagou, L., Salsepareille du Mexique, Sang-dragon, Sangsue medicinale, Saponaire officinale, Sassafras, Sauge officinale, Scabieuse (*S. succisa*, L.), Scammonée d'Alep, Scille, Scolopendre, Scordium ou Germandé d'eau, Seigle ergoté, Semen contra, Séné, Squine (*Smilax China*, L.), Staphisaigre, Stramoine ou pomme épineux, Styrax liquide, Sucre de Canne and Sureau (*Sambucus nigra*).

Sucre de lait is the only new article.

Safran.—This is now attributed to *Crocus sativus*, L.

Salsepareille.—This is now said to be derived from a number of species of *Smilax*, the kind principally employed in France being La Salsepareille du Mexique, *S. Tuspan*, falsely called for a long time Honduras Sarsaparilla. It is said to be derived from *Smilax Medica*, Scht. et Cham.

Sandaraque.—This is now referred to *Callitris quadrivalvis*, Vent.

Santal rouge.—This is now referred to *Pterocarpus indicus*, W., with a note of interrogation, and to *Epicharis Loureiri* and *E. Bailloni*, Pierre. The remark in the last edition about a red resin, called dragon's blood, being obtained from *Pterocarpus indicus*, but which comes rarely into European commerce, is now omitted.

Saponaire officinale.—The stem as well as the root and leaf are now official.

Sassafras.—The wood instead of the root is now official.

Scrofulaire.—The root and flowering tops of *S. aquatica*, L., are now official, as well as those of *S. nodosa*, L.

Semen-contra, Semencine or Barbotine. — Under this name the young capitula of different species of *Artemisia*, *A. Cina*, Berg., *A. maritima*, *Stecheana*, Bess. (Stechmanniana ?), etc., are official.

Séné.—*Cassia lenitiva*, Bisch., is adopted as the botanical source of Alexandrian senna, and *C. angustifolia*, Vahl., for Tinnevelly senna.

Serpentarie de Virginie.—*Aristolochia Serpentaria*, Guib., is still adopted as the official species, although the rhizome usually met with in commerce is that of *A. reticulata*, Nutt.

Simarouba.—*S. amara*, Aublet, is now given as the source of Simaruba bark.

T.

The articles omitted are Térébinthe du pin d'Amerique (*Pinus palustris*, Lamb), and Térébinthe du Sapin balsamifere (*Abies balsamea*).

Tacamahaca.—This is now said to be the produce of *Icica heptaphylla*, Aubl. This resin should be completely soluble in alcohol.

Tanaisie.—The name now adopted for the tansy is *Pyrethrum Tanacetum*, DC.

Térébinthe d'Alsace.—The tree yielding Strasbourg turpentine is now given as *Pinus Picea*, L.

Térébinthe de Bordeaux ou Térébinthe commune is referred to *Pinus Pinaster*, Sol.

Térébinthe de Venise is now said to be obtained from *Pinus Larix*, L., instead of *Abies pectinata*, DC., as in the last edition.

Térébinthe de Chio is described as being greenish-grey, cloudy, with a feeble odour of turpentine and fennel; a sweet taste, aromatic, incompletely soluble in alcohol, but completely so in ether.

Tilleul.—The flowers are now referred to *T. sylvestris*, L., and *T. platyphylla*, Vent., which, however, are not here given as synonyms of *T. Europæa*, L.

U.

Uva Ursi, Raisin d'Ours is now placed here instead of under Busserole, and is referred to *Arctostaphylos Uva-Ursi*, L.

V.

The articles omitted are Valériane celtique, Valériane phu, Vermiculaire brulante (*Sedum acre*, L.), Verge d'or (*Solidago Virga-aurea*, L.), Véronique (*V. officinalis*, L.), Vétiver, Vipère, Vipérine commune.

Valériane officinale and Vanille are marked with an asterisk.

Valériane officinale is the name now adopted for valériane sauvage.

Vanille is referred to *Vanilla planifolia*, Andr. Vaniller (*V. Pompona*), which is an article of commerce in France, is therefore not admissible for use in pharmacy.

W.

The bark of *Drimys Winteri*, var. *granatensis*, is now official instead of that of the typical form. It is described as occurring in curved or quilled pieces 5–8 millimetres thick, whitish and marked with brown spots on its outer surface, the transverse fracture of a brown red colour, with large white striæ, which are transverse in the outer, and radial in the inner layers. Taste aromatic, very bitter and very pungent.

In comparison with the United States and British Pharmacopœia, one cannot but be struck with the large number of simples still retained in the materia medica, many of which are relegated in this country to the domain of the herbalist.

The botanical nomenclature and descriptions bear evidence of hasty work, which is further supported by the number of typographical errors which still exist in this part of the Codex.

TO PREPARE CORROSIVE SUBLIMATE GAUZE.*

In the New York Hospital, corrosive sublimate is used almost exclusively as an antiseptic upon gauze or jute. The sublimated gauze is prepared by immersing the bleached material in a solution as follows: corrosive sublimate, 20 parts; water, 4·480 parts; glycerine, 500 parts, for twelve hours; then wringing out, and allowing to dry, as far as the glycerine will permit. At the time of operation, a sublimate solution (1 in 1000) is allowed to trickle slowly but nearly continuously over the incision. Bleeding vessels are tied with sublimated catgut. No impervious protective is used over the dressings, as, by retaining the moisture of the dressings and the sweat, it is thought to act too much as a poultice. Metallic instruments must be immersed in a 5 per cent. carbolic solution, as the bichloride will form an amalgam with them. In New York Hospital, not only is the part to be operated upon washed with soap and water, but also with turpentine and alcohol, two ounces to the pint.

* From the *British Medical Journal*, April 5.

VALUATION OF GELATIN.*

BY F. PROLLIUS.

The author has determined the amount of ash, water and insoluble matter (residue insoluble in hot water) in various kinds of gelatin. To ascertain the gelatinizing property 1 part of the sample was dissolved in 90 parts of water, filtered, and the degree of viscosity determined.

	Ash.	Water.	Insoluble.	Time required for the solution to run out.
	p.c.	p.c.	p.c.	seconds.
Astracan from Schmidt and Dihlmann, Stuttgart	0·20	16·0	2·8	507
Ditto, from a collection.	0·37	18 0	0·7	485
Ditto. fine iridescent Russian quality, Tubingen collection	1·20	17·0	1·0	500
Ditto, Russian, from Gehe of Dresden	0·80	19·0	3·0	491
Ditto, in laminæ, from Gehe	0·50	19·0	0·4	480
Ditto, in threads, known as Hamburg threads	0·40	17·0	1 3	477
Hamburg isinglass	1·30	19·0	2·3	470
Another quality	0·13	19·0	5·2	—
Rolled northern fish bladder	3·20	1·5	10·8	467
Icelandish bladder	0·60	17·0	21·6	463
Indian isinglass	0·78	18·0	8·6	437
Yellow, quality unknown	2·30	17·0	15·6	360

To judge of the purity of isinglass, it is also recommended to subject the sample to microscopic examination.

MANGANESE VARNISH.†

The manganese varnishes are prepared by the use of manganous oxide, manganic oxide, manganese peroxide, and specially manganese borate. The last named compound gives a varnish of such excellent properties that it must be preferred to all other substances used for the same purpose.

Manganese borate varnish is prepared in the following manner: 2 kilos perfectly dry, white manganese borate, free from iron, in very fine powder, are gradually stirred into 10 kilos linseed oil, which is heated in a suitable vessel. By continual stirring a uniform distribution of the salt in the oil is effected. The heating is continued until the temperature of the oil reaches 200° C. It is to be observed, that a good quickly drying varnish can only be obtained when the manganese borate is entirely free from iron.

1000 kilos of linseed oil are then heated in the varnish kettle, until it begins to bubble. Then the mixture of linseed oil and manganese borate is run in, in a thin stream, the fire is increased, and the mixture is heated to a violent ebullition. After about twenty minutes boiling, the varnish is ladled out, filtered, while still hot, through cotton, and is then ready for use. Slabs of wood, which were immersed into the hot varnish, were coated with a perfectly dry, glassy layer, in from sixteen to eighteen hours.

It was shown by experiment, that manganese borate has the property of converting linseed oil, at comparatively low temperatures, into rapidly drying varnishes; a temperature of 40° is sufficient. If a small linen bag, containing 30 grams of manganese borate is suspended in a 10 litre flask, filled with linseed oil, the latter when placed in a warm place, will be converted into a good drying varnish in ten to fourteen days.

* From the *Dingl. polyt. J.*, ccxlix., 425. Reprinted from the *Journal of the Chemical Society*.

† From *Metallarbeiter*. Reprinted from the *Oil, Paint and Drug Reporter*, April 23.

The Pharmaceutical Journal.

SATURDAY, MAY 10, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

THE ANNUAL REPORT.

IN accordance with the precedents of previous years the Council of the Pharmaceutical Society, at its meeting on Wednesday last, agreed upon the Report that should be presented to the members at the Annual Meeting on the 21st inst., and probably copies of it will reach the hands of many of our readers almost simultaneously with the present number of the Journal. We think it will not be taking a merely optimist view of the Report to say that, although some statements which might have been hoped for a few months ago will be found wanting, yet in respect to the regular business and progress of the Society the record which the Council is able to present of the past year's transactions is very satisfactory. It is undoubtedly disappointing that no apparent progress has been made towards securing ameliorative legislation, and that the Government has even declined to undertake the responsibility of introducing any Bill tramelled by provisions not directly relating to the sale of poisons. But such is the congestion of parliamentary business in the present session that the Government, with all its influence and notwithstanding repeated promises evoked by inquisitorial goadings, has not yet been able to introduce the Poisons Bill it is supposed to have prepared, and until this has been done it would be idle for the Council to approach Parliament with an independent measure. In the meantime the Council has not been unsuccessful in enforcing the present defective law. As many as one hundred and twenty cases of infringement have been dealt with, and in the majority of these the primary object—the compelling of the discontinuance of the illegal practices—has been attained without instituting legal proceedings, whilst in every case in which these have become necessary during the year the suit has been successful, and a penalty has been imposed. It may be remarked that this number probably by no means represents the whole of the complaints that have been received and investigated; but, judging by numerous communications that reach us, a large proportion of them would be concerning practices which, however objectionable, are not at present illegal, whilst others would contain complaints unsupported by evidence of the nature which is indispensable to success in proceedings in a court of law. Of minor importance, but not without its value to chemists and druggists in common with traders generally, was the service rendered by the Council in securing the modification of a clause in the Patents and Trade Marks Bill concerning the use of the royal arms, which might have been a source of vexation and trouble had it passed unaltered. A Medical Bill, also, has occupied the attention of the Council, not like its predecessors for what it contained, so much as for what it was deficient in, namely, a provision for the legal representation of pharmacists on any future Pharmacopœia Committee. The Council having failed by its representations to obtain this concession from the Department in charge of the Bill, is prepared to do its best to bring the unanimous wish of pharmacists in the most effective manner before the House of Commons should the Bill reach the stage of Committee.

In every other respect the Report shows that during the past twelve months the Pharmaceutical Society has enjoyed a fair measure of prosperity. The Financial Statement shows that the receipts from subscriptions have slightly exceeded those in the previous year, and that the income from all sources leaves a respectable balance over the expenditure. With many of the details in the Report relating to the Examinations, the Library and Museum, and the Benevolent Fund, our readers will already be more or less familiar, and they need not be further referred to here; but the opportunity may be taken to emphasize the compliment paid to those Local Secretaries who by their personal effort and perseverance contributed so much towards maintaining the stream of benevolence at the high level of the previous year.

Our pages this week also contain the Report of the local executive of the North British Branch, presented at the Annual Meeting of the members of the Pharmaceutical Society resident in Scotland, held last week in Edinburgh. It is satisfactory to find that the operations of the Branch continue to be carried on with success in all departments. One topic that appears prominently in this Report is the recent decision of the Council to acquire premises in Edinburgh more suitable to the requirements of the Society and its pretensions in Scotland than those at present occupied. It is evident that this step is much approved by the members of the Society living beyond the Tweed, and it may be hoped that the anticipation that it may lead to an immediate augmentation of the membership of the Society in Scotland will be fulfilled. In the course of the discussion upon the Report comments were made upon what was assumed to be an increased difficulty which had been introduced into the Preliminary examination coincidently with the enlargement of the time allowed to the candidates, and it will be observed that the subject was brought under the consideration of the Council at its meeting on Wednesday last. We are inclined to think that an undue importance has been attributed to the portion of the examination to which objection has been raised. It only needs a glance at the questions on p. 871 to see that the English sentences which were set for translation into Latin at the last "Preliminary" were of so simple a nature that they should present not the slightest difficulty to a boy capable of giving a fair translation of the passages either from Virgil or Cæsar, since in the course of his studies he would necessarily have gone over the ground covered by these questions again and again. It is also worthy of note, as pointed out by Mr. GOSTLING, that Latin is not the subject in which the majority of failures in the Preliminary examination occur. At any rate no reproach can be cast upon the examiner who set the questions, since the Regulations distinctly specify the "translation of simple sentences from English into Latin." Still, it is well that such points should be discussed as they arise, with a view to the clearing up of doubts, and those who think that too great a stringency is exercised have the assurance of the President that if their objections are reduced to writing and forwarded to him he will take care that they receive due consideration.

A NEW READING OF THE PATENT MEDICINES ACT.

IT may be that others besides ourselves have been startled within the last day or two by reading a statement seriously put forward at some length in the editorial columns of our contemporary the *Medical Press and Circular*, to the effect that no single day passes in the experience of a chemist transacting an ordinary retail business without his being guilty of transactions for which he exposes himself to fines amounting in the aggregate to, possibly, thousands of pounds. If this were true it would indeed be a serious discovery; but it cannot be said that the adjective "serious" is quite the one most applicable or it. In fact the article is a fresh illustration of the truth that "a little learning is a dangerous thing." Moved by the "persecution" which our contemporary considers to have been involved in a recent enforcement of a law to the somewhat arbitrary application of which retail chemists and druggists have had to submit for many years past, the *Medical Press and Circular* took up the study of the Act under which stamp duties are levied upon "patent medicines," and arrived at the startling conclusion that stamp duty is chargeable upon all "preparations whatsoever to be used or "applied externally or internally as medicines or "medicaments, for the prevention, cure, or relief "of any disorder or complaint incident to or in "any wise affecting the human body, made, pre-"pared, uttered, vended, or exposed to sale by any "person or persons whatsoever." Being under this impression our contemporary sees an imaginary danger threatening chemists in that "any one of "the class may, to-morrow, be summoned for "selling to an informer a pennyworth of sper-"maceti ointment," and fears that even a medical practitioner dispensing his own prescriptions is liable to be brought under the penal clauses of the Act, unless he retains a supply of stamps "ready for affixing to each bottle or box that leaves his surgery." Indeed, our contemporary appears to have completely misread the remainder of the paragraph quoted, according to which the essence of the liability to stamp duty consists in the medicine or preparation being put forward as a secret, patent or proprietary article, or being advertised in any way as being beneficial in the prevention, cure or relief of any ailment affecting the human body. This may be easily illustrated by the case which has excited so much of our contemporary's sympathy. Unless we are greatly in error, a mixture of menthol and wax might have been sold as such, to any extent, without the seller being liable to pay one penny of stamp duty; but as soon as the mixture had once been advertised to the public, in newspaper, hand-bill, label, or any other medium, as capable of relieving headache, the conditions were changed, and the stamp duty became chargeable on every separate quantity sold. We have referred to this subject at somewhat greater length, perhaps, than it deserved, because the article in our contemporary is capable of disturbing effectually the equanimity of any nervous chemist and druggist who may read it, and not have a sufficient cognizance of the Act, 52 Geo. III. c. 150, to enable him to perceive the error. Otherwise the mistake would be almost too grotesque for serious discussion, for we are quite able to agree with one opinion expressed by our contemporary, that "the ludicrous side of the subject is as prominent as the grave aspect of it."

The Annual Dinner of the North British Branch took place in the Royal Hotel, Edinburgh, on Tuesday evening, April 29, Mr. Nesbit, President, being in the chair and Mr. Gilmour, Croupier. In responding for "The Pharmaceutical Society of Great Britain," Messrs. Borland and Young made very stirring speeches in reference to the position of the Society in Scotland and the acquirement of new premises. Mr. Borland, in strongly urging members to use their personal influence to get others to join the Society, gave a sketch of the present membership and showed in what directions it might be increased. The gathering was numerously attended and was an exceedingly harmonious and successful one.

* * *

It appears from a circular sent out by the secretary of a provincial association that a statement has been made by the local inspector of weights and measures to the effect that an Order of the Board of Trade has been received by him requiring that all chemists' measures shall have their denominations marked on them, and that symbols alone shall not be allowed. We are in a position to state that no such "Order" has been issued, the fact being that the

Board of Trade has no power under the Weights and Measures Act to take such a step. We understand, however, that it is the opinion of the Standards Department that apothecaries' measures should have their denominations marked on them "in legible figures and letters," as this appears to be required by the Act of 1878, and this opinion was indicated in the "Suggestions" as to the testing of apothecaries' graduated glass measures and apothecaries' weights which were issued to inspectors in May, 1881.

* * *

In reply to a question put by Mr. Warton in the House of Commons on Thursday, as to when the Government intended to introduce into the House of Lords the promised Bill on patent medicines, Mr. Mundella said that the Sale of Poisons Bill, which would deal with this subject, would be ready in a few days.

* * *

In accordance with an intention intimated at a recent Evening Meeting, Mr. Giles has given notice of a motion which he will propose at the Annual General Meeting of the Pharmaceutical Society, to the effect that the Council be requested to consider the best means of promoting systematic research, having for its primary object the initiation, examination and improvement of formulæ for the national pharmacopœia.

* * *

We think it may be useful to repeat here that tickets for the Annual Dinner should be obtained from the Honorary Secretary, Mr. Richard Bremridge, on or before Saturday, the 17th inst.

* * *

At a recent meeting of the Paris Pharmaceutical Society a commission was nominated, consisting of Messrs. Petit, Ferrand, Portes, Thibault and Champigny, and entrusted with the duty of bringing under the notice of the Minister "the numerous errors and omissions of the new Codex." The Commission has issued an appeal to all *pharmaciens* for assistance and requesting that suggestions may be made to the President, M. Petit.

* * *

The next meeting of the Chemical Society will be held on Thursday, the 15th inst., when the papers read will be:—"On the Indices of Refraction of Organic Substances," by Dr. J. H. Gladstone; "On Fluorene Derivatives," by Mr. W. R. E. Hodgkinson; and "Some Minor Researches on the Action of Ferrous Sulphate on Plant Life," by Mr. A. B. Griffiths.

* * *

A meeting of the School of Pharmacy Students' Association will be held on Thursday, May 15, at 8 p.m., when papers will be read on the "Botany and Materia Medica of Linseed," by Mr. E. H. Earle; on the "Chemistry of Linseed," by Mr. E. Cullinan; and on the "Separation of Cobalt and Nickel," by the Reporter on Analytical Chemistry, Mr. C. Thompson.

* * *

The Annual General Meeting of the Chemists' Assistants' Association will be held at 53, Conduit Street, on Wednesday, May 14, at 9 p.m. precisely, when the report for the past session will be read and the Council for the ensuing year will be elected.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, May 7, 1884.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Messrs. Andrews, Borland, Bottle, Butt, Churchill, Gostling, Greenish, Hampson, Hills, Radley, Robbins, Savage, Schacht, Symes, Williams, and Young.

The minutes of the previous meeting were read and confirmed.

THE LATE MR. SQUIRE.

The PRESIDENT said he could not commence the business of the day without referring to the loss sustained by the Society and by all British pharmacists, in the death of one its Founders and past Presidents, Mr. Peter Squire. It would be scarcely possible to find anyone who could speak of him as one who had laboured so long should be spoken of, from personal experience. He, himself, had known Mr. Squire for something like twenty years, first as an examinee, afterwards as a colleague on the Board of Examiners and as a member of the Council, and those who, like himself, had had the honour of working with him during the later years of his life must have been struck by the wonderful activity and keenness of perception he always showed. It was a marvel to his younger colleagues to find so much energy and fire in a man whose life had been one of such unceasing activity. The fact that he had departed with the honour and glory of a ripe old age made the reference to his death less saddening than it otherwise would be. Not many could expect to reach the age of eighty-six and few could expect to do the vast amount of work which Mr. Squire achieved during even the last twenty years of his life. He might further say, knowing something of the opinions held of Mr. Squire in the outside world, social and otherwise, that no man could be more correctly described as a typical pharmacist; and the respect in which he was held outside the Society's house was an indication of the honour which he had, by his labours, conferred on pharmacy. He would move the following resolution:—

> "That the Council wishes to express to Mrs. Squire and her family its most sincere sympathy at the loss which they have sustained in the death of Mr. Peter Squire, one of the Founders and past Presidents of the Society, and to convey an assurance of the high esteem in which he was held by the Council for the valuable services which he rendered to pharmacy and to the Pharmaceutical Society."

The VICE-PRESIDENT, in seconding the motion, said he had not had the advantage of knowing Mr. Squire as intimately as those resident in London, but he had been acquainted with him for the last thirty years, and he ventured to think that no name in the country was better known, since his 'Companion to the Pharmacopœia' was on the shelves of almost every pharmacy.

The motion was carried unanimously.

DIPLOMAS.

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

Ashton, Frederick William.
Cule, Taliesin.
Dobson, George Turner.
Granger, Harold.
Jones, Morgan Isaac.
Luxmoore, Charles Mann.
Marshall, Sam.
Milford, James Emery

Neve, Annie.
Spilsbury, James
Wood, John

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Ashton, Frederick William ...Chertsey.
Austin, Alfred ....Bournemouth.
Corder, Walter Shewell ....Kendal.
Cule, Taliesin ....Pontypridd.
Granger, Harold ....Hucknall Torkard.
Houfe, Robert William ....Bradford.
Jones, Morgan Isaac ....Trecynon.
Luxmoore, Charles Mann ......Bristol.
Marshall, Sam ....Hyde.
Milford, James Emery ....Manchester.
Neve, Annie ....Eastbourne.
Puckey, Courtenay ....Stanstead.
Selkirk, James ....Cork.
Spilsbury, James ....Leamington.
Wood, John ....Leighton Buzzard.

Chemist and Druggist.

Job Preston, of Sheffield, who was registered as having been in business on his own account before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society.

ASSOCIATES IN BUSINESS.

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

Aspinall, William ....Platt Bridge.
Atkinson, Charles Henry ......Heckmondwike.
Attwood, Henry Ernest ....London.
Bain, John...........................Liverpool.
Bates, Edward .. .. Brackley.
Bennison, Richard ....North Ormesby.
Bostock, Thomas Henry.........Eastwood.
Cardwell, Augustus...............Ossett.
Coates, Udolphus Aylmer ......Walsall.
Doubleday, Frederick William..Dorking.
Dow, William ....Kinross.
Gilkes, Frederick George ......Banbury.
Grant, Thomas......................Clevedon.
Green, William James............London.
Hands, Henry Joseph............Chipping Campden.
Harrison, Jeremiah...............Blackburn.
Hedley, Charles Alfred ....London.
Hendry, Robert Love ....Edinburgh.
Hodgkinson, Peter James ......Manchester.
Hudson, William...................Sunderland.
Illingworth, George Skeen ......Glasgow.
Jarvis, Clarence Frank ....Birmingham.
Jenner, Charles Samuel ....London.
Jones, George ....London.
Keith, John ....Newton Stewart.
Kemp, Herbert William.........Horncastle.
Kerr, William ....Dunfermline.
Lambert, John Thomas ....Wombwell.
Lees, James ....Watford.
MacNeilage, Alexander ....Greenock.
Masters, Henry James ....Bath.
Maxey, William Henry ....Sheffield.
Perkins, Thomas James ....Ealing.
Pitts, William Christopher......Norwich.
Price, Henry Thomas ....London.
Richards, Jonah Palmer ....Carmarthen.
Riddiough, Fred. ....Keighley.
Rigg, George Farrer ....Kendal.
Rogers, Oliver ....Tunbridge Wells.
Roughton, William ....Leicester.
Rowand, Robert ....Liverpool.
Savage, Frederick George ......Nottingham.
Shackleton, Thomas...............Accrington.
Tansley, Arthur James ....Kidsgrove.
Thomas, James Philip............Cheltenham.
Thomas, Joseph Arden ....Cheltenham.
Townsend, Joseph Edward......Long Sutton.
Wall, Edward John ....London.
Warburton, Edward ....Farnworth.
Watkinson, James ....Little Hulton.
Watson, Robert John ....Caistor.
Webster, George Samuel G. ...Ilkeston.
Wellington, Frederick............Taunton.
Wingrave, Arthur ....London.
Wooldridge, Elijah ....Cradley Heath.
Wright, Edwin......................Hadleigh.
Young, Robert John ....Banwell.

Modified.

Gall, Frederick.....................Landport.
Haywood, Charles ....Liverpool.
Higham, Thomas.. ....Lewes.
Jones, William James............Mitcham.
Slack, Josiah William............London.
Turpin, Alfred Barritt ....Chippenham.

ASSOCIATES.

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

Minor.

Atherton, Henry Charles ......Tunbridge Wells.
Atkinson, William George ......Ulverston.
Barlow, George Robert ....Congleton.
Barratt, William .. ..King's Lynn.
Blackburn, Albert Edwd. Hy...Eccles.
Blyton, Thomas Bage ....Manchester.
Burgess, Thomas ....Liverpool.
Callaway, George Frederic ......Ipswich.
Cappell, Robert ....Crieff.
Carter, Benjamin ....Falmouth.
Chifney, George Pearmain......Mildenhall.
Cooper, Albert ....Huntingdon.
Coull, George ....Edinburgh.
Davies, William ....Newcastle Emlyn.
Deck, Arthur Albert ....London.
Dunn, George Marchant.........London.
Dunn, Isaac George...............Chard.
Eastes, Ernest John ....Deal.
Edgar, Frederick George ......Southsea.
Evans, Daniel Thomas ....Llandyssul.
Fowle, Sydney ....London.
French, Herman ....Milton next Gravesend.
Freshney, John Wm. Septimus.Lincoln.
Golding, Frank Oliver ....London.
Groves, Thomas ....Bridport.
Guest, George Robert ....Brentwood.
Hacon, Elizabeth Constance ...London.
Hodgson, George ....Doncaster.
Hallawell, Joseph Lefebvre ...Ayr.
Harrison, Thomas ....Birmingham.
Hickley, Arthur Mackenzie ...London.
Jackson, John Thomas .. .. Scotforth.
Jefferson, John Mitchell.........Southport.
Jenkins, Thomas ....Aberdare.
Kirby, Herbert Edward ....London.
McDiarmid, Fraser ....Deal.
Madge, Thomas William.........Shaldon.
Marlar, John Frederick ....Halstead.
Mathias, James Russell Henry.Tenby.
Miller, William Henry ....Howden.
Mitchell, William Kirkpatrick..Wigton.
Nickolls, John Bate.. ....Bromsgrove.
Owen, John ....Sheffield.

Pierce, Robert Wynne Chas. ...Bangor.
Rennie, William ....Dumbarton.
Ridley, Henry ....Ipswich.
Roberts, Robert ....Llangynider.
Robertson, George ....Burntisland.
Robinson, Richd. Fredk. Wm...Manchester.
Scholes, William Isaac ....Pendleton.
Skoulding, William George ...Oakham.
Smith, Albert ....Stalybridge.
Smith, Joseph de Carle ....Norwich.
Spurway, Edgar ....Kidderminster.
Stewart, Robert McAll ....Penryn.
Taylor, John Williams ....Norwich.
Tennant, Alfred ....Lancaster.
Timbury, Alfred Jefferies ......Leominster.
Tugwell, Ernest Harry ....Greenwich.
Walker, James.......................Lanark.
Wookey, Edgar.......................Bristol.

Modified.

Bassett, John ....Leominster.

APPRENTICES OR STUDENTS.

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

Arrandale, James William.......Denton.
Aslin, William ....Sunderland.
Aspinall, Hortensius ....Liverpool.
Austin, James ....Birmingham.
Baker, Alfred John E. ....St. Austell.
Bax, Robert William ....Rawtenstall.
Beck, John Frederick ....Honiton.
Bullock, James.......................Uttoxeter.
Carron, Herbert Burgess.........Leyton.
Clark, James ....Thornhill.
Cook, Alfred Edward ....Landport.
Crabtree, Edmund ....Rawtenstall.
Crosdale, Robert Morgan ....Oldham.
Davy, John Thomas...............Plymouth.
Duncan, John G. B................Gainsborough.
Emery, Alfred ....London.
Evans, Alfred Philip ....London.
Freke, Cecil Henry ....Shaftesbury.
French, Montague Robert ......Gosport.
Fuge, Harry Dixon ....Matlock Bath.
Funnell, Richard....................Whittlesea.
Gaddes, Andrew ....Penrith.
Gartside, Charles....................Oldham.
Gibson, Horton John ....Grantham.
Govan, John Wallace ....St. Andrews.
Greenwood, William Russell ...Howden.
Harding, Charles Thomas ....London
Haynes, Alexander ....Fleetwood.
Holt, James Hartley ....Ormskirk.
Honman, Alfred Taylor ....London.
Limbrick, James Alfred ....London.
London, Walter Augustus ....Redditch.
Massey, Samuel Jeffrey ....Preston.
Middleton, Richard Watson ...Ilkley.
Moyse, Arthur ....Fareham.
Oldfield, William ....Denton.
Orme, Alfred ....Knutsford.
Roberts, Thomas ....Llanfyllin.
Scowby, Joseph Newsome ......Sheffield.
Stansfield, John Mills ....Birkdale.
Stewart, Hawthorn ....Ayr.
Streatfield, Edward Henry......Maidstone.
Street, Herbert.......................Lincoln.
Sweetapple, Thomas Pyke ......Taunton.
Thomas, Henry Owen ....Rhyl.
Tupholme, John James ....Spilsby.
Turpin, Ernest ....London.
Tweedie, Thomas Shortridge ...Annan.
Walker, William Henry..........Willenhall.
Webster, Thomas Findlater ...London.
Werner, Emil Alphonse ....Dublin.

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

THE PRELIMINARY EXAMINATION.

Mr. BORLAND asked if a failure in the translation of English into Latin militated against the success of candidates at this examination.

The PRESIDENT replied that he did not think it did, or only partially. It was used by the examiner mainly to see that the candidates did not translate Latin into English by learning by heart an English edition of the author.

Mr. BORLAND said the question was broached at a meeting recently held in Edinburgh, and reference was made to what seemed to be an innovation, to a certain extent, viz., that the English sentences for translation contained words which were not to be found in the Latin sentences which were given for translation. At the time when he was connected with the Board of Examiners in Scotland, a discussion took place on this practice, and it was only agreed to on the understanding that the English words which had to be translated were to be found in the Latin sentences,—not the individual words, of course, but the root, so that the student would only have to put it into the right case, mood or tense, as the sentence required. It was considered that it would be a hardship on the candidates to have to spend a considerable amount of time searching for the Latin word best suited to express the meaning.

The PRESIDENT thought Mr. Borland was rather confusing parsing with translating.

Mr. BORLAND said he thought not.

The PRESIDENT said the examination paper contained first a piece of Latin to be translated into English, from Cæsar or Virgil; and then there were a few little sentences in English to be put back into Latin, besides the parsing.

Mr. BORLAND said he referred entirely to translating English into Latin; and it was considered at the time of the discussion he referred to, that in giving sentences of that kind, the words in the English sentence should be found in the Latin passage which was given for translation into English, in some form or other. In looking at the sentences given at the time he found such was the case, but this was not so on the last occasion.

The PRESIDENT thought the words given were to be found in the author, and in that part of the book which the candidate had to study.

Mr. BORLAND was not quite sure of that.

Mr. WILLIAMS suggested that this matter was one rather for the Board of Examiners than for the Council.

Mr. BORLAND said his main point was whether a failure in this matter would tell against the candidate, and he thought this ought to be known, because otherwise a candidate might spend a great deal of time on one subject and so hardly do himself justice in others.

Mr. HAMPSON thought Mr. Borland was quite right in calling attention to the subject, which was considered a grievance.

Mr. YOUNG said the same view had been put forward by Mr. Borland when the question was discussed by the Board of Examiners in Scotland. He did not himself see that it made much difference that the exact words were not found in the sentences given, if they were in the book.

Mr. SYMES remarked that as the subjects were divided into three parts, and the matter in question came at the end of the Latin portion, the candidate would not spend extra time over that until he had finished the other portion. But he could not see how a failure in this subject would not tell against him; if it were so, what was the use of introducing it? The candidate was supposed to have at his fingers' ends the power of translating any portion of the particular book selected. It would be well for Mr. Borland to ascertain the exact sentences which were given, and if they were not found in the book selected he should support him.

The PRESIDENT said the examination had for some years been in the hands of the College of Preceptors, which body had had large experience, and he thought the Council would not like to interfere with it in any way. He remembered being told by an examiner of the College that the translation of these sentences into Latin was a distinct gain to the candidates. The object of the examination was to ascertain that the candidate had such a knowledge of elementary Latin as should enable him to become a fair translator of prescriptions by-and-by. Some young men might make a very slovenly translation of a paragraph from Cæsar or Virgil, and yet might do very well with these little sentences. He hoped Mr. Borland would give the College of Preceptors credit for providing the candidate the best opportunity of showing his general knowledge of elementary Latin.

Mr. BORLAND said that was his own idea entirely. He thought it was one of the best tests a young man could be subjected to, to translate English into Latin, but it was in his opinion a hardship on the candidate to have to search for the words required.

The PRESIDENT thought it was in a great degree a matter of individual judgment.

The VICE-PRESIDENT differed from Mr. Borland entirely, and thought it highly desirable that the candidates should show a knowledge of Latin words.

Mr. ANDREWS thought the sentences set were exactly of the same character as those in Smith's 'Latin Course.'

Mr. CHURCHILL thought it was a great mistake to lead candidates to suppose that this translation into Latin would not count against the candidate. If a man pretended to know anything of any language he ought to be able to translate into and from it with equal facility.

Mr. SCHACHT said the Council ought to take the sole responsibility of these examinations on itself and not throw it on to the examiners. The regulations laid down plainly included the translating of English sentences into Latin, and did not prescribe that they should be taken from the same book as the other Latin examples. They might occasionally differ as to the selection of any particular sentence, but that must be left to the examiner's judgment.

Mr. GOSTLING remarked that as a rule Latin was not the subject in which candidates failed.

The PRESIDENT said there was a very large margin allowed, within which a candidate was permitted to pass, and the examiners, who were experienced men, were ready to make all fair allowances.

Mr. SAVAGE suggested that if the Board of Examiners in Scotland had any suggestions to make it should communicate with the Board of Examiners in England, so that, if possible, they might agree.

The PRESIDENT said it had been shown by Mr. Schacht that the examination was quite within the regulations laid down by the Council, but if Mr. Borland or any other member had any ideas or suggestions with regard to the examination and would let him have them in writing, he would take care they should be submitted to the College of Preceptors. He had, from time to time, received letters from members containing observations on the examinations, derived from the experience of their sons, which he had submitted in this way, and such communications the College of Preceptors was always glad to receive.

REPORTS OF COMMITTEES.

FINANCE.

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

BENEVOLENT FUND.

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

£15 to the widow (aged 53) of an annuitant and member from 1842 to 1870, and subscriber to the Fund. The husband died in January last; applicant is suffering from inward tumour, and is dependent on her children for support. Middlesex.

£15 to a former pharmaceutical member, 1841 to 1851, and subscriber to the Fund, aged 73. Applicant was in business for forty-six years, but in consequence of his ill-health, the business gradually dwindled away. Devonshire.

£5 to the widow of a registered chemist and druggist, aged 63. Applicant had a grant of £5 in July, 1879. Is now in ill-health and with no friends who can assist her. Yorkshire.

Two other cases had not been entertained by the Committee.

The Secretary had reported that members and subscribers in various parts of the country had written and sent him letters they had received asking for pecuniary assistance.

The Committee expressed a hope that all such cases should be referred to the Secretary, so that proper investigations might be made.

The VICE-PRESIDENT, in moving the adoption of the report, desired to draw special attention to the last paragraph.

The report and recommendations were unanimously adopted.

LIBRARY, MUSEUM, LABORATORY, AND HOUSE.

Library.

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

	Attendance.	Total.	Highest.	Lowest.	Average.
March	Day	436	26	9	17
	Evening	181	20	3	8

	No. of Entries.		
Circulation of books.	Town.	Country.	Total.
March	176	134	310

Carriage paid, £1 14*s*. 6*d*.

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

Gay (F.), Essai d'une Monographie locale des Conjuguées, 1884.

The Committee recommended the purchase of the undermentioned works for the Library:—

Flückiger (F. A.), Cinchona Barks, pharmacognostically considered, translated by F. B. Power.

Moens (J. C. B.), Cinchona Cultivation in Asia from 1854 to 1882.

Mueller (F. von), Eucalyptographia, decades 1 to 5, and 7 to end.

The Committee approved of the purchase of the following:—

Berichte der deutschen chemischen Gesellschaft. Sundry numbers to complete vols.

Curator's Report.

The Curator had reported the attendances in the Museum during March to have been:—

	Total.	Highest.	Lowest.	Average.
Morning	582	40	5	19
Evening	148	16	1	4

The following donations to the Museum had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors and a special letter to Dr. Domingo Parodi:—

A collection of the indigenous drugs of Brazil and neighbouring countries, containing two hundred and fifty-seven specimens.

From Dr. Don DOMINGO PARODI, forwarded by Mr. W. B. Cranwell.

Specimen of Oil of Limes from Trinidad.

From Messrs. WRIGHT, LAYMAN AND UMNEY.

Specimen of Citroptene obtained from the "Oil of Limes." From Mr. J. O. BRAITHWAITE.

STATEMENT OF ATTENDANCE OF MEMBERS OF COUNCIL ON COMMITTEES FOR THE YEAR 1883-84.

	Committees held Once a Month or Oftener.		Committees held Occasionally.		Special Committees.	Total Number of Attendances.
	Finance.	Library, Museum, Laboratory, and House.	Benevolent Fund.	General Purposes.		
Number of Committee Meetings held.	11	10	11	10		
Andrews (*London*)	1	2	*	7	*	10
Atkins (*Salisbury*)	6	6	10	10	21	53
Borland (*Kilmarnock*)	*	*	7	7	*	14
Bottle (*Dover*)	*	9	6	5	8	28
Butt (*London*)	*	10	10	10	15	45
Carteighe (*London*)	8	10	5	10	26	59
Churchill (*Birmingham*)	*	*	3	6	*	9
Gostling (*Diss*)	8	8	*	8	*	24
Greenish (*London*)	*	10	10	4	2	26
Hampson (*London*)	*	5	*	8	3	16
Hills (*London*)	11	10	*	9	10	40
Radley (*Southport*)	*	*	10	10	*	20
Richardson (*Leicester*)	*	4	4	4	0	12
Robbins (*London*)	*	7	8	9	11	35
Savage (*Brighton*)	8	*	*	8	*	16
Schacht (*Clifton*)	9	2	*	10	5	26
Squire (*London*)	3	6	*	4	0	13
Symes (*Liverpool*)	4	*	*	5	5	14
Williams (*London*)	*	3	10	10	3	26
Woolley (*Manchester*)	*	*	4	5	4	13
Young (*Edinburgh*)	*	*	8	9	6	23

* Not appointed on this Committee.

NUMBER OF ATTENDANCES OF MEMBERS OF COUNCIL AT COUNCIL MEETINGS FOR THE YEAR 1883-84.

Andrews, Frederick	8
Atkins, Samuel Ralph	11
Borland, John	9
Bottle, Alexander	10
Butt, Edward Northway	11
Carteighe, Michael	11
Churchill, Walter John	9
Gostling, Thomas Preston	7
Greenish, Thomas	11
Hampson, Robert	11
Hills, Walter	11
Radley, William Valentine	11
Richardson, John George Fredk.	10
Robbins, John	11
Savage, William Dawson	11
Schacht, George Frederick	11
Squire, Peter Wyatt	6
Symes, Charles	10
Williams, John	10
Woolley, George Stephen	8
Young, James Robertson	10

Number of Meetings during the year, 11.

Specimens of the α and β Amylsulphates of Barium and of Cerotate of Lead obtained by the oxidation of paraffin. From Mr. W. H. INCE.

Fine specimens of Crystallized Bismuth, Iodide of Lead and Sesquichloride of Chromium. From Mr. E. B. VIZER.

Specimens of Sodium Hydrate in crystals. From Mr. R. A. CRIPPS.

Specimen of Phosphoric Acid in fine crystals, and Potassio-ferric Oxalate in crystals. From Mr. P. L. HUSKISSON.

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

A draft of the Annual Report had been submitted and agreed to.

The Council went into committee to consider the draft Annual Report.

On resuming, it was adopted and ordered to be printed, and the report of the Committee was also adopted unanimously.

FREEHOLD INVESTMENTS.

The report of this Committee stated that one of the purchases sanctioned last month had gone off, the property having been sold while the purchase was under the consideration of the Council, and recommended that the Committee be entrusted with powers sufficient to conclude a bargain when the property had been approved by the surveyor.

The PRESIDENT having explained the subject, the report and recommendations of the Committee were adopted.

NEW PREMISES IN EDINBURGH.

The PRESIDENT reported that the bargain for the premises at 36, York Place, Edinburgh, had been concluded at a price of £1900; the completion of the sale to take place on the 15th inst. He laid on the table plans of the floors and of the elevation of the house, and stated the alterations which the Committee considered it desirable to make in the premises to fit them for the use of the Society.

The Council went into committee to consider the details of this matter.

On resuming it was resolved that the alterations and improvements recommended by the Committee be carried out under the supervision of the local members of the Committee.

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor stating the progress of cases which had been placed in his hands.

Franklin Goforth, 33, Bridge Street, Runcorn, had paid the amount of penalty and costs into Court.

W. E. Taylor, 3, Victoria Buildings, Burgess Hill, had paid the amount of penalty and costs into Court.

Several cases of alleged infringement of the Act had been considered by the Committee, and recommendations were made in respect thereof.

The report was as usual considered in committee. On resuming, the report and recommendations of the Committee were adopted unanimously.

APPLICATION FOR REMISSION OF A PENALTY.

The following communication was read:—

"Treasury Chambers,
"5 *May*, 1884.

"The Registrar of the Pharmaceutical Society,

"Sir,— I am directed by the Lords Commissioners of Her Majesty's Treasury to forward to you two letters in original of the 23rd and 30th ulto. relative to a penalty mposed on Mr. E. A. Browne for an offence apparently against the Pharmacy Act; and I am to request you to submit them to the Council of the Pharmaceutical Society, and to inform my Lords, in order that they may answer Mr. Browne, whether, in the opinion of the Council there is any reason for remitting the penalty or any part of it.

"My Lords have before them the letter (17602) from the Treasury to the Registrar of your Society of 21st February, 1877,* and they have no intention by this present reference of withdrawing any part of it.

"I have the honour to be, Sir,
"Your obedient servant,
(Signed) "R. E. WELBY."

After having fully considered the circumstances of the case referred, it was resolved that a reply should be addressed to the Treasury, stating that in the opinion of the Council there is no reason for remitting the penalty or any part of it.

The PRESIDENT said that the person referred to in the Treasury letter had also sent an application to the same effect to the Council, to which he recommended that a similar answer be returned.

This was agreed to.

REPORT OF EXAMINATIONS.

April, 1884.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (17th)	8	5	3
,, (23rd)	7	6	1
	— 15	—11	— 4
Minor (16th)	21	6	15
,, (17th)	27	9	18
,, (18th)	26	11	15
,, (23rd)	22	7	15
,, (24th)	25	9	16
,, (25th)	25	10	15
	—146	—52	—94
Modified (16th) . . .	1	1	0
	162	64	98

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Minor (9th)	16	7	9
,, (10th)	14	5	9
	—30	—12	—18

PRELIMINARY EXAMINATION.

	Candidates.		
	Examined.	Passed.	Failed.
April 8th.	375	175	200

Nine certificates received in lieu of the Society's Preliminary examination.

1 College of Preceptors.
1 University of Aberdeen.
3 ,, ,, Cambridge.
1 ,, ,, London.
3 ,, ,, Oxford.

RESIGNATION OF AN EXAMINER.

The PRESIDENT read a letter from Mr. H. B. Brady, resigning his position on the Board of Examiners, and moved—

"That this Council desires to place on record its high appreciation of the services rendered to the Society by Mr. H. B. Brady, F.R.S., during the twelve years he has been a member of the Board of Examiners for England and Wales."

The motion was seconded by the VICE-PRESIDENT and carried unanimously.

THE BOTANIC GARDENS.

A letter was read from the Secretary to the Royal Botanic Society stating that the usual facilities would be afforded for students visiting the Gardens of the Society in Regent's Park, on the conditions hitherto observed.

* *Pharmaceutical Journal*, [3], vol. vii., p. 737.

NORTH BRITISH BRANCH.

Annual Meeting.

The Annual Meeting of the North British Branch was held in the Society's Rooms, Edinburgh, on Tuesday, April 29, at 4 o'clock afternoon.

Mr. John Nesbit, President of the Branch, took the chair and called upon the Secretary to the Branch to read the

Annual Report.

The Council of the North British Branch of the Pharmaceutical Society of Great Britain have pleasure in submitting their Report for the past year.

The operations of the Branch continue to be carried on with success in all departments. Owing to the early expiry of the lease of the present premises, the question of increased accommodation has again recurred. The limited accommodation of the present rooms has long interfered with the work of the Society, the attendant inconvenience being particularly felt on examination days. It has therefore been determined by the Council of the Society to purchase a house better adapted to the existing requirements and capable of extension should the Branch extend in usefulness and influence. Your Council feel that the accommodation afforded by the house, No. 36, York Place, the purchase of which has been effected, will not only serve the required purposes, but that it will give the Society a position superior to that which it has hitherto held in Scotland. With the change which will occur before the next Annual Meeting, your Council look forward to increased zeal on the part of Scotch adherents of the Society, and augmentation from those who have not yet availed themselves of the advantages offered by it.

During the past year the Library and Museum have been greatly enriched by valuable donations. To the Library several valuable works of reference and scientific periodicals have been added by purchase, and the donations to the Museum have been more than sufficient to fill up the available space.

Many students from all parts of the country continue to take advantage of these departments. To visitors fully three hundred volumes have been lent out from the Library, and for reference it has even more largely than usual been used by those connected with the Society. The number of visitors to the Museum during the past year has been 1514, namely, 980 during the day and 534 in the evening. It is hoped that in the new premises the Library and Museum will always be available for study, as these departments at present are in London.

The Secretary to the Branch reports that a larger number than hitherto of tickets for courses of lectures in botany and chemistry have been issued to pharmaceutical students, and it is pleasing to note that one of them is the Silver Medallist in one of the courses of chemistry lectures, while the names of several others occur in the honours list. Provincial as well as local students now come forward to these classes, and it is noteworthy that there is a growing desire on the part of young pharmacists to undergo a course of instruction in practical chemistry. Many from all parts of the country now spend a short time here in such preparation under recognized teachers. Your Council feel that these circumstances are a strong indication that our young men appreciate the advantage of a systematic course of study, and if they voluntarily undergo a modified curriculum, it is hoped that a well arranged and compulsory one will act more as a stimulus than as a retardation to their progress.

During the winter five evening meetings have been held and a sixth was arranged for April, but owing to examinations and other causes it was not proceeded with. The papers which have been read have in all but two cases come from members of our own profession, and have been marked by their practical importance and general interest. Your Council desire to record their indebtedness to those who have communicated the results of their labours at these meetings. Interesting discourses on subjects allied to pharmacy have also been delivered by Dr. Macadam and Mr. Geddes, and to these gentlemen your Council desire to express their thanks.

In the course of the year the Board of Examiners for Scotland have had four meetings for examination, extending over twelve days. The total number of candidates examined was 146, a large increase over the preceding year. This increase was in Minor candidates, of whom 134 were examined, 59 being successful and 75 being rejected, showing failures to the extent of 56 per cent. nearly,—a rate which, your Council cannot but admit, is distressingly high. Eleven Major candidates were examined, of whom 5 were successful, and also one Modified candidate. For the Preliminary examination 245 candidates have presented themselves at the various centres in Scotland, and the results of the examinations show that 138 have passed. The failures thus number 43·6 per cent., a slight increase over the previous year, but yet under the percentage (49·96) for Great Britain.

Your Council look forward with interest to the effect of the recent change in this examination. Candidates are now allowed one and a half hour for each subject, the object of this extension of time being to allow justice to be done to each portion of the paper.

Your Council regret that the Pharmacy Acts Amendment Bill, which the Council of the Society submitted to the Lords of the Privy Council at his invitation, was not brought into Parliament last session, owing to the slow progress of business in the House of Commons. The prospects of the introduction of the Bill during this session have not brightened; indeed the Lords of the Privy Council has intimated to the President of the Society that it is the intention of the Government to introduce a Bill dealing with the whole question of the regulation of the sale of poisons, but that the Bill will not affect the constitution of the Pharmaceutical Society. Your Council feel that the position of pharmacists cannot fail to be affected by any legislation dealing with the regulation of their calling, and they look forward to the introduction of the Bill with a jealous regard for the interests of pharmacy

In connection with the revision of the British Pharmacopœia, your Council received a communication from the British Medical Council similar in terms to that addressed to the Council of the Society. The communication was referred to a small committee which has not felt it expedient to proceed in the matter pending the action of the Council of the Society to obtain statutory pharmaceutical representation on the Committee for the compilation or revision of the national Pharmacopœia.

In the Report of the Committee of Scrutineers on the voting for the fourteen vacancies occurring in the Council at this time, it will be observed that there is a satisfactory increase in the number of voting papers sent out to the members and associates in business in Scotland, namely, 272, as compared with 247 last year. This gives a fair indication of the steady progress which the Society has been making in Scotland during the past few years: thus, at the end of 1880, the number of adherents was somewhat over 300, while at the end of 1883, they had increased to 409, and it is gratifying to note that a goodly number have been elected this year. With the increased inducements now offered, your Council feel that greater prosperity is yet attainable, and they trust to the support of all Scotch adherents in advancing the interests and furthering the objects of the Society.

Mr. Maben (Hawick), in moving the adoption of the report, said that he considered it as satisfactory a one as had been submitted by the Council of the Branch. The leading feature was undoubtedly that which referred to the acquirement of new premises in Edinburgh. The step which the Council of the Society had taken in this matter was one of the utmost importance to the Branch, and would be advantageous to the Society at large. He had always felt that in Edinburgh, a city of academies and the most important centre of medical education, the Society should occupy a prominent position. Independent of mere position, it would not be forgotten that increased accommodation implied increased facilities for business and for study, and attraction as a house of call for country members. He hoped that the opening of the new premises would be marked by some distinctive feature, in the way of demonstration and increase of Scotch membership. He was glad to learn from the report that the Society was making progress in Scotland; the additions might be few, no doubt, but that was because the number engaged in pharmacy in Scotland formed a comparatively small proportion of those on the Register, and they had nothing to be ashamed of in the progress which was going on. The results of the examinations were a part of the report which would interest everyone, particularly that which referred to the Preliminary. A change was recently made in this examination which was understood to be in the interest of the candidates, namely, increasing the time given for answering the questions, and so dividing the work as to allow a specific subject for a given time. That, he felt, to be an admirable change. But when one looked at the papers which had been given since the innovation it would be seen that not only was the time increased, but that the amount of work also was increased in at least a corresponding proportion, and, further, that the nature of the work was increased in difficulty. This, he considered, most unsatisfactory, and the result was seen in an increase of failures over last year. He was expressing the feelings of many country pharmacists in saying that this was a matter which required looking into. In commenting on the Pharmacy Acts Amendment Bill, he expressed the hope that it would be enacted ere long, and that the responsibility of prosecutions in cases of infringement would be transferred from the Society to the public prosecutors.

Mr. Tocher (Helensburgh) seconded the motion.

Mr. Borland said that there was one point which Mr. Maben had adverted to in his remarks on the Preliminary examination, in which he was at one with him, and which he properly referred to as a greater degree of severity. Probably the increase was apparent in the examination as a whole, but he thought that it was chiefly evident in the passages for translation from English into Latin. These passages were, he thought, a complete departure from what was intended when they were introduced. It was intended that they should bring out the candidate's knowledge of grammatical construction, but as now given they demanded a verbological knowledge which should not be expected of them. He felt very strongly in this matter, and was glad that the subject had been referred to.

The discussion on this subject was continued by Messrs. Frazer, Gilmour, Kinninmont, McAdam, McLaren, Stephenson and Young, a general opinion in favour of Messrs. Borland and Maben's remarks being expressed.

Mr. Murdoch (Falkirk) wished to draw attention to a subject which was of some importance to those connected with the Society, namely, the increase of open drug shops owned by unqualified persons. It was a well-known fact, he remarked, that the number of pharmacies was increasing out of the usual proportion to the population, and, naturally, registered chemists and druggists were anxious to keep the trade to themselves. But unqualified persons continued to open "apothecaries'" and "medical halls," "laboratories" and the like, with a friendly medical man to come between them and the law when necessary. This was unfair to young men who took the trouble to pass examinations, it was unfair to every registered chemist and druggist, and was very injurious to the public. He would like to see the Society doing something to put down this sort of thing, for as long as it continued it was a slur upon them.

The President of the Branch said that this was a matter which they all regretted, but was one of enormous difficulty to deal with. It should not be forgotten that a medical man was quite within his legal rights in keeping an open shop, and the Society could not, under the present Acts, prevent a medical man or any other qualified person giving the use of his name to an unqualified one. It was the former who was responsible in law, and if he chose to assume the responsibility they might have their own opinions about his conscientiousness, but the existing legal powers could not touch him.

Mr. Borland stated that this was a matter which had engaged the attention of the Council of the Society for a considerable time and he could assure Mr. Murdoch that they were extremely desirous of effecting a change. It might be remembered that the Pharmacy Acts Amendment Bill contained a clause which actually touched these cases. By this clause the Registrar had power to demand the name of the owner of each open drug shop in Great Britain, and it was hoped that this would go a great way to put down illegitimate trading. Unfortunately the progress of the Bill was uncertain, but members could help it on by influencing their parliamentary representatives. If members could suggest any other remedy than the one proposed he could assure them that it would be most carefully considered. Meanwhile they could rest assured that their interests were being constantly attended to by their Council.

Mr. Mackenzie said that there was only one way of putting down this matter, namely, to get a clause inserted in the Medical Acts Amendment Bill to the effect that medical men who kept open drug shops should be qualified according to the Pharmacy Acts. He had every reason to believe that such a clause would be supported by several prominent members of Parliament, and it was well known that leading medical men were in favour of it.

After some further remarks on this subject the report was unanimously adopted.

The Secretary to the Branch then submitted the report of the Committee of Scrutineers on the voting for vacancies in the Council of the Branch, caused by the retirement of fourteen members according to the rule instituted last year. Nineteen gentlemen had accepted nomination for the vacancies. The Committee reported as follows:—

Voting papers issued	272
Voting papers returned	135

Of which *one* was informal.
Leaving 134 papers to be recorded.

After tabulating the votes (a statement of which was laid on the table), it was found that the following gentlemen had a majority of votes:—

Ainslie, William, 58, George Street, Edinburgh.
Borland, John, 7, King Street, Kilmarnock.
Clark, W. Inglis, 26, South Canongate, Edinburgh.
Frazer, Daniel, 113. Buchanan Street, Glasgow.
Laird, George Hardie, 40, Queensferry Street, Edinburgh.
McAdam, Robert, 34, Virginia Street, Glasgow.
Mackenzie, James, 45, Forrest Road, Edinburgh.
Napier, Alexander, 69, South Clerk Street, Edinburgh.
Nesbit, John, 162, High Street, Portobello.
Pinkerton, William. 17, Greenside Place, Edinburgh.
Storie, Robert, 94, High Street, Dalkeith.
Strachan, Alexander, 148, Richmond Street, Aberdeen.
Watt, James, Haddington.
Young, James Robertson, 17, North Bridge, Edinburgh.

The President of the Branch declared that these gentlemen and Messrs. Baildon, Gilmour, Kinninmont, Mackay, MacRitchie, Stephenson, and Storrar (who retain office for another year) would constitute the Council for 1884–85.

Votes of thanks were then awarded to the President, Vice-President, Honorary Treasurer, and Auditors, for their services, after which the meeting adjourned.

As in former years, the new Council met after the Annual Meeting for the election of office-bearers. Mr. Gilmour in proposing the re-election of Mr. John Nesbit, as President of the Branch, took occasion to compliment him on the satisfactory manner in which he had conducted affairs. It was important, he remarked, that a man of experience should occupy the chair during the ensuing year, which would be an auspicious one in the history of the Branch, and he was sure that in Mr. Nesbit they had such an one. He had great pleasure in moving his re-appointment.

Mr. Frazer seconded the motion, and it was unanimously adopted.

Mr. Nesbit accepted office and returned thanks.

Mr. H. Bellyse Baildon, on the motion of Mr. Borland, seconded by Mr. Young, was re-appointed Vice-President, and Messrs. Gilmour and Young agreed to audit the accounts.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, May 1. Dr. W. H. Perkin, F.R.S., President, in the chair.

The following certificates were read for the first time:—H. B. Baker, E. G. B. Barlow, W. F. Fremersderff, J. Hargreaves, F. Nettlefold, J. Parr, A. E. Page, T. Stormouth, J. S. C. Wells.

The following papers were read:—*On Benzoylacetic Acid and Some of its Derivatives* (*Part I.*), by W. H. Perkin, Junior.—For various reasons the author determined to carefully examine benzoylacetic ether with special reference to reactions in which the ketone group takes part. He describes first the preparation of phenylpropiolic acid. Five hundred grams of cinnamic acid are suspended in 1–1·5 litres of absolute alcohol and hydrochloric acid is passed until the whole is dissolved. After standing for two to three hours the product is poured into ice and water. The cinnamic ether separates out as an oil, which is dissolved in ether, washed with a dilute solution of sodium carbonate, thoroughly dried, and treated with 440 grams of bromine. After standing for a short time the whole is poured into a large dish, and the ether allowed to evaporate, when phenyldibromopropionic ether separates out as a solid cake of large crystals. These are pressed between filter paper, and decomposed by alcoholic potash. The potassic phenylpropiolate is finally treated with dilute sulphuric acid when the free acid separates out as an oil. After purification it was obtained in crystals the measurements of which are given. The acid was then converted into phenylpropiolic ether, which, when treated with ordinary sulphuric acid slightly diluted with water, forms benzoylacetic ether. Full details of all the reactions are given. The ether is a colourless oil, boiling at 265° to 270° without much decomposition; it gives the same violet coloration with chloride of iron as aceto-acetic ether; boiled with dilute sulphuric acid it splits up into acetophenone, alcohol, and carbonic anhydride. The hydrogen atoms in the CH_2 group are replaceable by sodium. The barium, silver, copper, and lead salts were prepared. When pure benzoylacetic ether is treated with dilute aqueous potash, and the resulting product decomposed with dilute sulphuric acid, benzoylacetic acid was obtained which, after purification, crystallized in thin transparent needles, which polarize light, and melt at 103° to 104°. The copper, lead, calcium, barium, and ferric salts were prepared, and two analyses are given of the pure acid. In the next part of the paper the author has prepared compounds in which the hydrogen atoms in the methylene group are substituted by ethyl, etc. Thus ethylbenzoylacetic acid melting at 111° to 115° and ethylbenzoylacetic ether were investigated, the latter substance when treated with moderately dilute potash yields much phenylpropylketone, but with strong potash mostly organic acids are formed. The latter part of the paper gives an account of the preparation of diethylbenzoylacetic acid, allylbenzoylacetic acid, the corresponding ethers, their decomposition products, and an investigation of the action of bromine on allylacetophenone.

Dr. Percy Frankland then read a paper—

On the Composition of Coal and Cannel Gas in Relation to their Illuminating Power.—In this paper the author gives the results of his examination, somewhat in detail, of the gas supplied to some of the more important towns of the United Kingdom. The constituents which have been individually determined are the hydrocarbons absorbed by fuming sulphuric acid, carbonic anhydride, oxygen, nitrogen, hydrogen, carbonic oxide and marsh gas. In all cases the carbon density of the hydrocarbons has been determined, and in many cases also the hydrogen density; the carbon and hydrogen densities together representing the average molecular formula of the hydrocarbons present. Details of the determination of these densities are given. The reputed illuminating power and the ratio of the illuminating power to the proportion of ethylene to which the heavy hydrocarbons are equivalent are also recorded. The predominant hydrocarbon seems to be ethylene, but the quantity of this gas present is quite insufficient to account for the illuminating power of the gas. So that the denser hydrocarbons, though present in comparatively insignificant proportions, have much to do with the actual illuminating power. In comparing these analyses with similar results obtained in 1851 and 1876 it is seen that the carbon density has diminished whilst the quantity of nitrogen has increased.

Dr. Armstrong said that in oil gas much of the illuminating power was due to acetylene, crotonylene, etc., and, probably, in coal-gas the illuminating power was due to hydrocarbons of the acetylene series rather than to benzene. He suggested that the sulphur in coal gas, other than hydrogen sulphide, might be due to the presence of thiophene.

The Secretary then read a paper—

On a New Form of Pyrometer. By T. Carnelley and T. Burton.—The pyrometer, which the authors have used since 1881, consists essentially of a copper coil, which is placed in the muffle, kiln, etc., of which the temperature is to be determined. Through this coil flows a constant current of water. The temperature of the water is taken as it enters the coil and as it flows out; from the difference of these two temperatures and a table the temperature to which the coil has been exposed can be ascertained. A similar instrument has been devised by Boulier (*Bull. Soc. Chim.*, xl., 108). By means of the above instrument temperatures up to 650° C. have been determined to within 25°.

The Secretary then read three papers by E. Divers and Masachika Shimosé, of Tokio—

I. On Selenium Sulphoxide.—The authors summarize their results as follows:—A yellow modification of selenium sulphoxide appears to exist, but has not been obtained pure; when heated it is decomposeed into selenium and sulphur trioxide; sulphur trioxide oxidizes selenium sulphoxide, forming selenium dioxide and sulphur dioxide. Tellurium sulphoxide when decomposed by water gives tellurium and sulphuric acid, and by a secondary reaction sulphurous and tellurous acids are formed. *II. On the Reaction between Hydrogen Chloride and Selenium Sulphoxide.*—This reaction may be represented by the two equations—

$$(1)\ 2SeSO_3 + 2HCl = SeSO_3SeCl_2 + H_2SO_3.$$

$$(2)\ \underbrace{SeSO_3SeCl_2}_{\text{Selenium sulphoxychloride.}} + HCl = \underbrace{Se_2Cl_2}_{\text{Selenium selenochloride.}} + SO_2HOCl.$$

Selenium is dissolved in fuming sulphuric acid and hydrochloric acid gas passed into the solution, which slowly deposits drops of a deep red liquid, which is the selenium selenochloride. The mother liquor contains the sulphurylhydroxychloride, which has not yet been isolated. *III. On Selenium Selenochloride.*—The properties, physical and chemical, and an analysis of this substance are given.

Dr. W. R. HODGKINSON then read a paper—

On Fluorene, Part II.—During the fractional distillation of fluorene the author noticed the formation of an orange-red substance. It appeared probable that this body might be an oxidation product. Several kilograms of fluorene, m.p. 100°, were slowly distilled, and the fraction between 280° to 295° crystallized from acetic acid and redistilled; the fraction between 285° and 290° was then passed over a mixture of lead oxide and manganese oxide (5 to 1) in a wide iron tube, heated to the temperature of melting tin. A red solid thus distilled over, but the coloured substance could not be separated from the unchanged hydrocarbons by distillation. A partial separation was effected by boiling the substance twenty or thirty times with 50 per cent. acetic acid, which dissolved out the fluorene. The substance thus obtained crystallized from glacial acetic acid in rhombs m.p. 165 to 170, subliming with partial decomposition and forming a dense red vapcur. The body was oxidized by a solution of chromic anhydride in glacial acetic acid. Two oxidation products were obtained, one crystallizing in pale yellow needles almost insoluble in cold chloroform, melting at 278°, and the other separating in short red needles, melting at 188°, both having the composition $C_{13}H_8O_2$. The author has not succeeded in isolating the red colouring substance; it appears to decompose on distillation even in a vacuum, and is equally soluble with the hydrocarbons it accompanies in the different solvents.

The Society then adjourned to May 15.

SOCIETY OF ARTS.

SOME NEW OPTICAL INSTRUMENTS.

In the continuation of the Cantor lectures upon "Some New Optical Instruments and Arrangements," on Monday, the 5th inst., Mr. Norman Lockyer referred to the refraction and reflection of telescopes. Mr. Thomas Hooke, of York, had increased the aperture from 16 to 25 inches, but the anxiety resulting from introducing this plan led to his death; each lens which he made was tested at his observatory by means of the stars, but afterwards he found that a horizontal well 500 feet long answered the same purpose. The great drawback then to the use of such large apertures was the fact that crown glass of thirty inches diameter could not be obtained. The lecturer drew attention to a telescope of 3 feet aperture combining a minimum of atmospheric current with great freedom and easiness of motion; the polar axis is floated in mercury, and the tube, the rigidity of which is obtained by cross pieces, consists of four T pieces. A telescope of 8 feet aperture with all necessary fittings can be produced in ten months for the sum of £10,000, quite equal to the French 30 feet telescopes, the movable domes belonging to which cost alone £25,000 each. Though the glassworks of the present time are not able to run more than one ton of glass at one time, nearly two tons of porcelain can be reduced to the same state; experiments therefore are being made in Paris for the purpose of solving the question as to the use of porcelain with a glass surface instead of solid glass. The principal improved optical methods relate to the means by which permanent records of the solar spectrum of the stars can be obtained, and also the photographing of the sun, nebulæ and clusters of stars. The greatest difficulties met with are the excess of light in photographing the sun and the feebleness of the rays of light from the stars. Dr. Gadsen has overcome the excess of sunlight by inventing a trap by which a ray is only momentarily allowed to pass through a small slit upon the plate. Photographs taken by this method give a definite view of the sun spots and cyclonic lines on the sun's surface. Dr. Huggins, by focusing the light from a single star upon the plate through the slit for a period of an hour, has obtained photographs of single stars; for this purpose there is no necessity to keep the ray in the exact position the whole time, but should the photograph of a group of stars or nebulæ be required it is obligatory that each star be kept in a fixed position. Mr. Common has devised a method in which a fine platinum wire is kept in the position of bisecting one of the stars by the observer by means of rectangular screws, thus ensuring the fixedness of the other stars. The lecturer showed some photographs of the nebulæ of Orion exposed for periods successively of one, two and a half, four, ten, twenty and sixty minutes, thus as Mr. Lockyer stated, making it possible to learn more concerning the nebulæ of Orion in sixty minutes with nature than in two and a half centuries of human art. So delicate is this method that not only stars invisible to the naked eye are photographed, but with an aperture of thirty inches, stars ·152 of a second distant apart can be separately distinguished. In concluding the lecture, Mr. Norman Lockyer expressed an opinion that the Society of Arts should endeavour to take steps to enable glass lenses and mirrors to be obtained of sufficient diameter and thickness to meet the present requirements of the optician.

A vote of thanks was passed to Mr. Norman Lockyer for the lectures, and also to Mr. Common for allowing his photographs to be exhibited.

Parliamentary and Law Proceedings.

POISONING BY A LINIMENT.

An inquest was held in the Park Hotel, Birkdale, on Tuesday, April 29, before Mr. Samuel Brighouse, district coroner, on the body of Mrs. Large, who died on the previous Saturday, consequent upon taking a quantity of poisonous medicine.

Winnifred Mabel Large, aged between twelve and thirteen years, daughter of the deceased, said that on Friday Dr. Newsham saw her mother, on which day two bottles of medicine in question were brought to the house by her father. Witness did not think she gave her mother on Friday any of the medicine intended for internal use, but on Saturday morning she gave her a dose of it. About noon the same day she went to give the deceased another dose. The two bottles—one containing the medicine for inward and the other for outward application—were on the dressing-room table in her mother's bedroom, and her mother was in bed. The deceased asked witness to give her a dose of the medicine. The bottles were with their flat side towards the witness at the time, and the word "Poison" was plainly visible on the one containing the liniment. Witness took up the right bottle, but then stooped down to pick up something, and when she rose she lifted the bottle containing the liniment by mistake, and gave her mother a dose from it. As soon as her mother had taken the dose she found that a mistake had been made, and said so. Witness then ran downstairs for a neighbour, and Drs. Vernon and Newsham were sent for. Witness had no idea what deceived her, or caused her to make the mistake, when she rose from stooping for something as described. The room was partially dark at the time, the blind in front of the bed being down.

To the Foreman: I knew the difference between the two bottles. I had been told that the one marked "Poison" contained medicine which was poisonous.

To the Coroner: I can read. It was a tablespoonful of the wrong medicine I gave my mother, the prescribed dose of the other being that quantity.

Dr. Newsham deposed: I practise as a physician and surgeon in Birkdale. On Friday I was called in to attend the deceased and found her suffering from neuralgia. I prescribed medicines for her, one of which was to be taken internally, and the other to be applied externally. The bottles produced are those I sent. The poison in the liniment is belladonna, and the bottle containing that medicine is marked "Poison" on both sides.

In reply to a question by the Coroner, the witness said that he informed both Mr. and Mrs. Large of the highly poisonous nature of the liniment.

The Coroner remarked that he noticed the bottle containing the liniment and that in which the medicine for internal use was were similar in shape and size. Would it not have been better to put the liniment in a bottle of another and distinctive kind, so that the shape and appearance, in addition to the label "Poison," would indicate its contents?

The witness said he thought not. His experience was that there was less risk of mistake when the two bottles were alike in appearance, because in that case the label bearing the word "Poison" would always have to be referred to. When the bottles containing the two kinds of medicine were dissimilar in shape and appearance he thought there was more liability to error, as the mind became familiarized with them, and sometimes confounded them, there not being the same apparent necessity to look for the label bearing the word "Poison." In such cases as that in question he always supplied the liniment and other medicine in bottles of the same kind. He knew that as a rule medical practitioners when giving two such kinds of medicine put them respectively in bottles dissimilar in shape, but others did not do so. The liniment bottle in question was a four-ounce one, and for each ounce in it there was a drachm of the extract of belladonna root. There was also half an ounce of chloroform in the preparation. A teaspoonful of belladonna of the same strength had been known to prove a fatal dose even when medical aid was at hand. He was of opinion that the tablespoonful administered to the deceased comprised five teaspoonfuls. When he arrived at the deceased's house after the occurrence in question he knew the case was a hopeless one. He had been in practice for ten years as a qualified medical man. In reference to a remark by the Coroner about putting medicines in such cases as that under consideration in bottles of different shapes, witness was of opinion that in giving the bottle containing a poisonous preparation a characteristic shape the mind was taken away from the poison itself. Besides, it was his custom, particularly with regard to the humbler classes, always to warn them to put the poisonous preparation in such a place as would require a distinct act to get at it—on the top of the wardrobe, on the floor, or some such place.

The Coroner: Is there any medicine you prescribe to take inwardly which would poison the patient if a larger dose than that directed were taken?

Dr. Newsham: There is.

The Coroner: Are such medicines labelled "Poison?"

Dr. Newsham: No; but there are directions on the bottle specifying the dose, and how the medicine is to be taken.

After some further evidence the Jury found that the deceased "came to her death by misadventure;" and recommended "that in future the medical profession distinguish poison from medicine for internal use by putting up the poison in a bottle of a different shape from the medicine bottle."—*Southport Visitor.*

Poisoning by Carbolic Acid.

An inquest has been held at the Manchester City Coroner's Court, before Mr. Sydney Smelt, deputy-coroner, into the circumstances causing the death of Samuel A. Janney, an American planter, aged fifty.

From the evidence of Anthony Nava, the keeper of the Crown Hotel, Great Ducie Street, Strangeways, it appeared that the deceased gentleman was a native of Baltimore, United States, and had been staying at the hotel for about two months. He had been ill for about three weeks, and was attended by Dr. Crean and Dr. Dreschfeld, together with a nurse from the infirmary, named Rossington, in the daytime, and a nurse named Mrs. Holliday at night. On Tuesday afternoon the night nurse relieved Rossington, and about midnight Mrs. Holliday came and told him that deceased was much worse, and he went for Dr. Crean. Witness returned, and found both nurses there saying something about a draught, and they showed him a little bottle which smelt strongly of carbolic acid, and Mrs. Holliday said she had given deceased the draught. There were four bottles of carbolic acid in the bar holding about a pint each. The bottle produced held about two tablespoonfuls. All the medicine used by deceased was kept in his room. The nurse was quite sober. Medicine coming into the house was generally placed at the bar window and sent to the room afterwards.

Susan Rossington, one of the nurses to the deceased, said that she used carbolic as a disinfectant. She left deceased with Mrs. Holliday about half-past three and returned about 11 o'clock, when deceased was sleeping. About half-past 11 Holliday asked if she might give deceased a draught which had just come. Witness replied. "Yes, certainly." About 12 o'clock she was aroused again by Holliday, and on going to deceased's room she found he was dying. The small bottle produced, labelled "to be taken immediately," was on the table, and it smelt of carbolic acid. Deceased died about two o'clock. Witness believed that a draught was given to deceased about a week ago from a bottle very much like the one produced.

Mr. Richard Crean said deceased had suffered from liver disease and jaundice. He prescribed a draught for deceased about ten days ago, but had prescribed nothing since then. Deceased was unconscious when he arrived, and died a minute or two afterwards. His lips and tongue were blotched by some corrosive like carbolic acid, and his breath smelt of carbolic acid.

Mrs. Nava, the landlady, and Elizabeth Ann Beveridge deposed to finding the small bottle in the bar the previous night about 10 o'clock. It was standing amongst other bottles, and was not wrapped up and sealed. Such a bottle had never been used for keeping carbolic acid, and they had kept none recently except to disinfect the deceased's room.

Mrs. Holliday also gave evidence, and Thos. Bateson, the assistant to Mr. Thomas Jackson, chemist, of Great Ducie Street, said that the bottle produced was dispensed by him before the 17th of April, and sent to the Crown Hotel, wrapped in paper and sealed. It contained nothing but bromide of potash and camphor water, and it would be sent away full. That dose had been repeated once, but not this week. No draught was sent on Monday or Tuesday.

The inquiry was then adjourned for the purpose of finding, if possible, who put the carbolic acid in the medicine bottle, but without success, and medical evidence having been given that death had been caused by poisoning by carbolic acid, the Jury returned a verdict to that effect, adding that whether the cause was accidental or otherwise, the evidence was insufficient to show.—*Manchester Courier.*

Obituary.

Notice has been received of the death of the following:—

On the 18th of April, Mr. John Pumphrey, Chemist and Druggist, Bengeworth. Aged 64 years.

On the 26th of April, Mr. Richard Burgess, Chemist and Druggist, Winsford. Aged 58 years.

On the 26th of April, Mr. Richard Brierley, Pharmaceutical Chemist, Market Place, Stalybridge. Mr. Brierley had been a Member of the Pharmaceutical Society since 1853, and for several years filled the office of Local Secretary.

On the 30th of April, Mr. Thomas Bell, Chemist and Druggist, Ambleside. Aged 68 years.

Review.

THE GOLD-HEADED CANE. Edited by WILLIAM MUNK, M.D., F.S.A., Fellow and late Senior Censor of the Royal College of Physicians.*

A conventional dress and manner characterized the physician of a former century; the wig as part of a professional costume came in with Charles II., and continued to be worn long after George III. was king. The cane proper, which was indispensable to a medical practice, had a rounded knob or head, often of gold, sometimes of silver, but in later times generally of ivory. In earlier times the knob was perforated and contained Marseilles vinegar.

The celebrated Dr. Radcliffe, who gave his name to the Infirmary at Oxford, had a cane made of a particular pattern for himself, the shape being what is now called a crutch. This gold-headed cane was inseparable from the doctor, who for many years was President of the Royal College of Physicians; and on his death the symbol of authority passed successively into the hands of Mead, Askew, Pitcairn and Baillie, all foremost physicians of their day.

Dr. Macmichael, the intimate friend of Sir Henry Halford, took an extreme and personal interest in the College of Physicians, of which he was for five years registrar; and he hit upon the idea of making the gold-headed cane relate the history of the medical events which it may have been supposed to witness. Hence the book and the anecdotal sketches of the five celebrities just mentioned.

Dr. Munk brings the record down to more modern date, and contributes notices of Halford, Paris and Mayo; together with a running commentary on things medical; men, however, rather than medicine being described.

It is pleasant to read about Dr. Radcliffe, with his strong common sense and knowledge of the world which stood him in such stead; how he dared against opposition to treat small-pox with fresh air and cooling emulsions; how before the end of his first year in London he gained twenty guineas a day by regular practice, exclusive of fees that would appear fabulous were they not historical; and how Dandridge, the apothecary whom he patronized, died worth more than £50,000. But we have always admired most the story of the conversation said to have taken place between himself and his classical successor, Mead. "What," said Radcliffe, "you read Hippocrates in the original? Take my word for it, when I am dead you will occupy the throne of physic in this great town." Mead:—"No, sir; when you are gone, your empire, like Alexander's, will be divided amongst many successors."

Mead was an accomplished and varied scholar: he studied the nature of the plague which had made such serious havoc; strongly recommended inoculation in case of small-pox at the instigation of Lady Mary Wortley Montagu; altered the treatment of dropsy by bandaging after tapping; and attended the last illness of Sir Isaac Newton. Two most interesting digressions occur in the biography of Mead, the history of the College of Physicians, and that of the Royal Society.

Passing over the three next worthies we come to Dr. Munk's own share in the recital.

Few have more adorned their profession, or have been more continuously successful than Sir Henry Halford, Bart. His family name was Vaughan, but on the receipt of an ample fortune this was changed to Halford according to the terms of the bequest.

His father, Dr. James Vaughan, himself an eminent physician at Leicester, had five sons; he devoted the whole of his annual professional income to their education, and all five in turn became distinguished, and, indeed, remarkable in their several callings. All five rose to independence as soon as their education was completed.

When Halford (he is known now only by this name) came to London to practise medicine he borrowed a thousand pounds and started with that capital; he married a nobleman's daughter, having two years before been appointed Physician Extraordinary to the King (George III.). In seven years he had to resign his position at the Middlesex Hospital owing to the claims of private work; and then his reputation caused him to be consulted by Georgiana, the beautiful Duchess of Devonshire. Her disease was beyond all medical aid, but Halford was proved to have been correct in his diagnosis, contrary to the opinion of the regular physicians of her grace. His professional income rose instantly and largely. During his first year he had realized 200 guineas; in his sixth year the amount was 1000 guineas. Five years exactly after this event he and Dr. Baillie, the other fashionable physician of the day, were posting down to Windsor to visit Royalty. They compared their annual incomes; Halford had made 9500 guineas; Baillie, 100 guineas more. Sir Henry Halford was Physician in Ordinary to four successive sovereigns; almost every member of the Royal family, from the time of George III. to the death of George IV., had been under his professional care. His patients were the Court Guide. He was noted also for his admirable Latinity, his compositions in that language being a study worthy of imitation. By his chief instrumentality, and while he was president, the College of Physicians was removed to its present situation in Pall Mall; and Halford established there a series of evening meetings, which were frequented by the leading representatives of learning, literature, and science.

The author of the 'Pharmacologia,' John Ayrton Paris, has reaped more than passing fame from his fine contributions to medical literature. Strangely enough, his name is subject to a typographical error in the 'Gold-Headed Cane.' Exception may also be taken to the disquisition on solar, telluric and animal heat introduced into this section; it appears to be inserted in the wrong place, and the illustrations are not new.

Dr. Paris succeeded Sir Henry Halford in the Presidential chair of the College of Physicians. His career is specially interesting to the pharmacist from his attachment to chemistry and materia medica; in fact, a predilection for natural science characterized his whole life. Through his influence the Royal Geological Society of Cornwall was established. The safety bar and an instrument called the shifting carriage were said to have promoted the security of the miner as much as the Davy lamp. It was Paris who took an interest in young Faraday and secured for him the credit of having first liquefied chlorine gas. He soon became the most popular lecturer on materia medica in London, and his class was attended by many distinguished physicians of the next generation. In his own department he has had no superior in clearness and power of exposition. His best known work, mentioned already, ran through many editions and realized for its author above £5000. For the 'Treatise on Diet and Regimen,' he received £1000 before a line of it was written; and a similar sum for his 'Life of Sir Humphrey Davy,' when it was finished. Two works came to grief, 'The Medical Jurisprudence,' and 'The Elements of Medical Chemistry.' Here he shared the fate of Sir Benjamin Brodie, whose 'Psychological Studies' were not favourably received. But he made amends by his profits on a little book called 'Philosophy in Sport made Science in Earnest.' Those who would learn how to write the English language can have no better model than the 'Historical Introduction to Materia Medica,' which forms a sort of long preface to the work by which Dr. Paris will be remembered.

Here we must close these notes on Macmichael's 'Gold-Headed Cane' and its continuation by Dr. Munk.

* London: Longmans, Green and Co. 1884. Crown 8vo. Pp. i.-xvi., 1-246. 7*s.* 6*d.*

It is brimful of anecdote, and contains authentic information on the rise and constitution of certain great institutions.

All books of this class deepen our esteem for the acquirements and character of the medical profession; and we may reflect with pleasure, that however distinguished or successful were the physicians of a former date, they have left a race as eminent, to sustain the traditions of the past.

Correspondence.

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

Liquid Extract of Cinchona.

Sir,—In the experiments I made for the purpose of obtaining data on which to found the process I have suggested for liquid extract of cinchona, a sample of succirubra bark was first operated upon which, tested by De Vrij's method with lime and alcohol, yielded 4·8 per cent. of total alkaloids; and this in No. 60 powder, when treated as I have described with hydrochloric acid and water, and reduced to a dry extract, gave by precipitation with soda an amount of alkaloid corresponding to 4·3 per cent. of the bark used. In this operation not only was the percolated liquid acid, but the marc at the end of the process was slightly so also, and viewing this in connection with the fineness of division of the bark and the known action of hydrochloric acid as a solvent of cinchona alkaloids, the result did not exceed what appeared to me reasonable to expect. I took the near approximation of the amount of alkaloids in the extract to that in the bark yielding the extract as indicating a practical exhaustion of the bark, although, no doubt, further evidence would be looked for to establish complete exhaustion, especially as the method I adopted for estimating the alkaloids in the extract is not a rigidly exact one. My object was to devise a method as little complicated as possible and suitable for adoption by pharmacists generally, but the desire to submit such for criticism at a pharmaceutical meeting before the meetings had terminated for the season rendered it necessary to leave several parts of the investigation to be subsequently completed.

Since the publication of my paper I have repeated the process upon further samples of East Indian succirubra bark with results similar to those I have already recorded. The barks I have used have contained from 4·8 to 5·5 per cent. of total alkaloids, and with these I have found that when the percolated liquid has reached a quantity corresponding to ten or, at most, eleven pints of percolate from a pound of the bark, it has ceased to give a precipitate with soda. The marc, on being then treated with fresh hydrochloric acid, although yielding a solution which gives a dark brown extract with soda, some of which may be precipitated, has afforded me no distinct evidence of the presence of alkaloid. By a more searching process, however, with lime and alcohol (De Vrij's method) a small quantity of mixed alkaloids may be extracted, amounting, I have found, to about a tenth part of the alkaloids originally present in the bark, as determined by the same method. Thus a bark containing 5 per cent. of alkaloids, after being exhausted by the hydrochloric acid process, yielded 0·53 per cent. of additional alkaloids, the same method of estimation being adopted in both cases.

The results obtained by Mr. Cownley, and published in last week's Journal, appear to me to be explicable only by assuming that the sample of bark he has operated upon differed very much from any of those I have employed. It was richer in alkaloids than any of mine, but I do not think that alone would account for the results obtained by him. I have not yet worked on barks so rich in alkaloids as the one he describes, but am prepared to find that some modification of the process, especially in regard to the proportion of hydrochloric acid, may be necessary to meet the requirement of very rich barks. I attach importance to the degree of comminution of the bark in treating it by this process, and the fact that Mr. Cownley found it necessary to continue the percolation much further than I have done has raised a doubt as to whether he used the bark in sufficiently fine powder.

T. Redwood.

Spirit of Nitrous Ether.

Sir,—I am sorry to occupy more of your space with a subject which may not be of general interest to your readers, but Messrs. Dott and MacEwan are evidently so extremely irritated at my remarks and appear to have taken such pains to show that they are the only people who know anything about the above subject, and have done this in such a manner, that I feel called upon to reply. Mr. Dott's allusion to what he calls my sneer is calculated to produce an utterly wrong impression. I expressed my disappointment at the papers of these gentlemen because I had expected something very much better from them and from the North British Branch, from which source some of the best and most useful papers which have appeared in the Journal recently have been derived, notably those by Dr. Clarke and Messrs. Gilmour, Aitken and many others. If my expression was taken as depreciatory of the papers which have been contributed—some by Mr. Dott himself—to that Branch, I very much regret it, and I do not think that it was capable of that construction. Mr. Dott seems determined to foist upon me, notwithstanding my denial, an opinion which I neither held nor expressed.

I am content to leave anyone who is interested in the subject to judge whether my words as quoted by Mr. Dott are fairly capable of the construction which he puts upon them.

I am not surprised that Mr. Dott, who no doubt can perfectly account for the respective functions of the various constituents of the sundry acetous preparations so long used, should sneer at the acetic acid having anything to do with their actions; I indeed quite expected as much, and will not further enter into the subject, although Mr. Dott is pleased to call my remarks, "sheer nonsense." Mr. Dott in his paper says, "the only mention I have seen of the use of potassium iodide as a means of estimating," etc., etc., and refers to Mr. Hehner's suggestion of using this reagent with acetic acid; but in his recent letters he speaks of the idea as being in no way new, and says that he only refrained from mentioning my process as he could only have done so to condemn it. Which of these statements are we to believe? I had undoubtedly seen Mr. Hehner's remarks, but had forgotten them entirely, or I should probably have tried the acetic acid which he suggested. The idea is of course such a very likely one to occur to anyone that I did not claim any originality for it, which Mr. Dott certainly does, although he only copies Mr. Hehner's idea, simply substituting sulphuric for acetic acid, adding a little spirit, and adjusting his quantities to give whatever may be decomposed in terms of nitrite of ethyl. Mr. Dott ridiculously accuses me of believing and imagining a great deal too much; but I do not, as he does, imagine that an ingredient forming perhaps one fifth of the peculiar principles of the preparation is the only one worth estimating.

In reply to Mr. MacEwan's letter, I must admit that I did write two months for three weeks, but the matter is of no moment.

Mr. MacEwan then proceeds, with a politeness even surpassing that of Mr. Dott, and an assumption of wisdom quite pleasing, to state that I have neglected to take account of a certain elementary chemical fact; but he seems to forget that he admits in his paper the fact to which I alluded, and the only difference between us is one of degree.

He says that "the method is certainly not free from objection, the sources of error being (1) decomposition—

that is, further acidity." If for the words "the method is not free from objection" he had written is "worthless" I should have agreed with him. It is unfortunate for Messrs. Dott and MacEwan, who unite in heaping contempt upon me, that their results, as pointed out by Dr. Clarke, by no means agree.

Mr. Dott's figures are equally at variance with those of Dr. Dupré, who found by his process, which, like Mr. Dott's, includes free nitrous acid (and which, he admits, over estimates), only about half what Mr. Dott has found.

In conclusion, I may say that any reaction peculiar to a substance and which is capable of being measured forms, so far, a means of estimating it, and in this way neutral iodide of potassium does, without any acid, enable the B.P. preparation to be estimated. That this reaction is not only dependent upon the acidity is proved by the fact that spirit of nitrous ether when fresh liberates more iodine than it does after keeping.

When, as Professor Attfield says, we do not know what sp. æther. nit. is, it is surely better to rely upon a reaction which the preparation shows than to theorize and found a test upon your theory. A. C. Abraham.

[*** We would suggest the desirability of avoiding the tone of personality which the correspondents on this subject seem inclined to assume.—Ed. Pharm. Journ.]

The Antipodes.

Sir,—My attention has just been directed to a request by "Inquirens" for information as to the prospects of pharmacists at the Antipodes.

Eight years ago I was in Melbourne, and present at the first annual dinner of the Pharmaceutical Society of Victoria, and had then an opportunity for speaking on some of the subjects referred to in "Inquirens'" letter. I stated, that from what I had observed respecting the arrangements and conduct of colonial pharmacies, I had no hesitation in expressing my opinion that they were generally excellently appointed establishments, and some of them equalled, if not surpassed, many of our leading pharmacies at home. In fact, in the larger cities and townships, notably Melbourne, Ballarat, Sandhurst and Geelong, in Victoria; Adelaide, in South Australia; and Sydney, Bathurst, Newcastle and Maitland, in New South Wales, pharmacies were to be met with that would not be out of place here, in Oxford Street and Regent Street; I told them they followed us so closely that when walking up Bourke Street, or through Collins and Swanston Streets, Melbourne, "doing the block" as they call it, it was difficult to believe, and hard to realize the fact of being over sixteen thousand miles away from London. As the only representative present of the parent Society, and as a Founder of that Society, I was invited to give my impressions of pharmacy in Victoria, and I remarked that whilst I was astonished at the evidences of advanced pharmacy everywhere observable, I feared they were following us almost too closely, as they had evidently got into some of our bad habits, for I observed they kept open their establishments until 10 o'clock p.m. and even later on Saturday nights, which I thought could not be a necessity, but on the contrary was a very great mistake.

From a notice in this same Journal of April 12, under the heading of "Pharmacy in Victoria" I regret to learn the long hours system still continues; but an effort is now being made by the Chemists' Assistants' Association to bring about a slightly improved state of things, and I wish them all success, trusting it may lead to something better still.

In reply to the question "Would it be better to take situations as assistants, or start at once on our own account?"—I have no hesitation in advising the adoption of the first course. Get into some good pharmacy for a year or two; it will not be lost time, you will be getting acclimatized and experienced, and be able to look about you before settling down.

The leading pharmacists there, as here, object to engage assistants who merely seek their own interests, and expect at least a two years' engagement.

Qualified assistants, with good testimonials, run no risk of failing at once to meet with first-class engagements and liberal remuneration for their services; but let there be no mistake, there must be the *quid pro quo*.

The man who would not make his way at home is not the man to emigrate; he will utterly fail in the colonies.

Before settling down to a business on his own account I would recommend "Inquirens" to take a trip to New Zealand, as Dunedin, Christchurch, Wellington and Auckland all present most favourable opportunities as centres for observation and experience, and the climate generally is more adapted to the English constitution.

My impression also is, that there are better chances for commencing business there, than in the larger Australian cities.

5, *Coleman Street, E.C.* G. B. Francis.

Hawking Chemists and Cutting Prices.

Sir,—I am glad to see a letter in your last issue on the above subject. To my mind it is sad to find that after all the efforts put forth to elevate the position of chemists in this country we find it a fact in the year 1884 that some members of our trade or profession (?) should stoop to such mean practices as to hawk their goods about, and also to solicit orders from door to door, and that sometimes in a most offensive manner. I am not quite sure in a case lately reported if the parties are not breaking the law by not taking out a pedlar's licence, too. Cutting shops and their doings have been freely discussed in your Journal, and in this free country I do not see any good remedy has been proposed to stop it. The only chance the future chemist will have is by bringing to bear his higher education and professional ability that he may gain public recognition. I am not qualified by examination, being one of the older members of the trade, but, nevertheless, qualified I hope by long experience. I positively admire and respect the man who modestly holds the Major certificate of the Society; but the man who just struggles through the Minor and then announces to an astonished world that he is a chemist and druggist by examination should be treated as a humbug by all who would see this trade raised to its proper status.

Cutting prices have frequently been brought about by the grasping characters just alluded to; not content with their own business they press hard upon the heels of some 'cute grocer, who, in revenge attacks the legitimate goods of the chemist.

I see no help for it but the powerful influence of the trade through the Society being brought to bear upon such individuals until they are perfectly ashamed of their caravan drug carts and druggists' shops on wheels, etc. When a member of the medical or legal professions bemeans himself he soon loses caste. Why should it not be so with chemists?

A Northamptonshire Chemist.

Herbalist.—(1) *Euonymus europœus.* (2) *Petasites vulgaris.* (3) *Lycopus europœus.* (4) *Tamus communis.* (5) *Solidago Virgaurea.* (6) *Carpinus Betulus.*

F. A. Foot.—(1) *Lychnis.* (2) *Geranium Robertianum.* (3) *Stellaria Holostea.* (4) *Myosotis arvensis.* (5) *Nepeta Glechoma.*

"*Nemo.*"—Apply to the Army Medical Department, Whitehall Yard.

J. H. Dunn.—Digest powdered cochineal in a weak solution of ammonia or sal ammonic and afterwards dilute with water.

J. A. B.—The poison in the preparation has been repeatedly stated to be strychnine, indigo being used as a colouring material.

C. R. Hooper.—Shaving Cream.—Soft soap, ¼ lb.; boiling water, 1 pint; dissolve, cool, and add oils of cinnamon, verbena and neroli, 6 drops, dissolved in rectified spirit, 1 pint; mix well and if not perfectly transparent add a little more strong spirit, or filter through paper.

Inquirer.—Bicarbonate, certainly. (2) It has been before pointed out that the ℥ is the characteristic symbol of the "apothecaries'" and not of the "avoidupois" ounce. See the discussion on the subject in *Pharm. Journ.*, [3], viii., 477.

C. D. C.—We are not acquainted with the book to which you refer.

J. Epps, jun.—The specimen is *Myosotis sylvatica.*

Communications, Letters, etc., have been received from Messrs. Rogers, Mason, Parisot, Wilkinson, Elborne, T. S., Anonymous.

WARAS.

BY W. T. THISELTON DYER, C.M.G., F.R.S.

Perhaps I may be allowed to add a few remarks to what is stated about "waras" in Mr. Kirkby's interesting paper in the last number of the *Pharmaceutical Journal.* The note contained in the inclosed copy of the 'Kew Report' for 1880, p. 50, is, I believe, the origin of the identification of the plant producing the Aden drug with *Flemingia congesta.**

Professor Flückiger, with whom I had corresponded upon the subject, informed me (July 12, 1881) that though he at first objected to *Flemingia* as the source of "wars" he then thought the statement correct.

As the Kew Museum contained no satisfactory specimens of either African or Arabian "waras," we applied to the Resident at Aden to kindly assist us in procuring samples. These reached England in July of last year. In both cases the "waras" itself agreed microscopically with an authentic sample derived from Professor Flückiger, and had the structure figured by Mr. Kirkby. All three also exhibited the characteristic property of turning first bright red, then black, when carefully heated in small quantity on a glass slip over the flame of a spirit lamp.

The sample of Somali "waras" was mixed with seeds of a dull brown colour mottled with black. These were found to agree precisely with the seeds of *Flemingia rhodocarpa*, Bak., from the Mozambique, which, as mentioned in the 'Kew Report' (*l.c.*), "has its pods covered with a bright red resinous pubescence." A further scrutiny of the original specimen obtained by Captain Hunter from the neighbourhood of Aden, which is in a rather immature state, led Professor Oliver to the conclusion that this also belonged to *Flemingia rhodocarpa.* I believe that the drug is derived from the young pods and am disposed, therefore, to think that Dr. Dymock is in error in describing it as "the gland of the leaf."

I communicated these further facts to Professor Flückiger, and he wrote to me, October 4, 1883, "I am very much pleased with your statements and can only say, that I most fully agree with your conclusion as to the identity of the Somali 'waras' with my original specimen and also that of the seeds of *Flemingia rhodocarpa* with those met with in the said drug."

In the new 'Official Guide to the Museums of Economic Botany at Kew' (No. 1, p. 45) we accordingly state that "waras . . . . consists of the epidermic glands of the young pods of *Flemingia rhodocarpa*, Baker, native of Arabia and East Tropical Africa."

The third variety described by Mr. Kirkby is quite new to me and I join with him in hoping that some further information about the plant yielding it will soon be forthcoming.

* The following is the note referred to:—

"*Waras.*—A drug known under this name appears to be exported in considerable quantity from Aden. It is used as a substitute for kamala, a well-known Indian product of *Mallotus philippinensis* (*Rottlera tinctoria*, Roxb.). Its origin is quite unknown (*see* Flückiger and Hanbury, 'Pharmacographia," pp. 575, 576). At the suggestion of the former, Captain Hunter, Assistant Resident at Aden, obtained specimens of the plant stated to yield waras in Arabia. He has also sent one to Kew with a note stating that it was gathered 'at an elevation of 6000 feet on Jebel Dthubarah, 60 miles due north of Aden.' The plant sent was immediately identified with a leguminous species, *Flemingia congesta*, Roxb., having of course no affinity with *Mallotus philippinensis.*

"True kamala consists of the epidermal glands detached by brushing from the fruits of the *Mallotus.* Alcohol extracts from it a splendid red colour. The name 'waras' means saffron, and it may be mentioned in support of the notion that a similar substance is yielded in Arabia by perhaps one or more species of *Flemingia*, that dried specimens belonging to this genus stain paper in the herbarium a bright yellow colour when washed over with the alcoholic solution of corrosive sublimate used to protect them from the attacks of insects. *Flemingia rhodocarpa*, Bak., from the Mozambique district has its pods covered with a bright red resinous pubescence.

"In the 'Pharmacographia' (2nd ed., p. 372), Flückiger and Hanbury state that *Mallotus philippinensis* grows in Abyssinia and Southern Arabia. In a letter, Professor Flückiger doubts whether he and Mr. Hanbury were not mistaken in regard to this. The evidence of specimens in the Kew Herbarium only carries the distribution to the west as far as Scinde. There is nothing improbable in its extending to Arabia, the flora of which is still so imperfectly known."

CODEINE HYDROBROMIDE.

BY D. B. DOTT.

Codeine is the strongest of the opium bases, replacing all the others in solutions of their salts. Yet, probably for more than one reason, the salts of codeine are not much in demand, the alkaloid itself being more generally used. As the hydrobromide is sometimes required, I thought that a note of its principal properties might be of some interest, especially as the salt has not been previously described, at least so far as I have observed.

Codeine hydrobromide crystallizes from an aqueous solution in radiate tufts of four-sided prisms. The solubility in water was determined by digestion at a temperature below 60° F. for twenty-four hours, then at 60° for two hours, when portions of the solution were weighed and evaporated to dryness on a water-bath.

a. 165 grs. solution left 1·93 grs. = 1·97 grs. 2 - hydrate.

$$\frac{165-1\cdot97}{1\cdot97}=82\cdot75.$$

b. 144·25 grs. left 1·70 = 173 grs. 2 - hydrate.

$$\frac{144\cdot25-1\cdot73}{1\cdot73}=82\cdot38.$$

The solubility in water at 60° F. is, therefore, approximately 1 in 82·5.

With the heat of a water-bath 8·04 grs. of the air-dry salt lost 0·17 gr. = 2·11 per cent. $C_{18}H_{21}NO_3.HBr.2H_2O$ = 2·16 per cent. for $\frac{1}{2}$ H_2O. In the air-bath at 115° C. 5·74 grs. lost 0·485 gr. = 8·44 per cent. $C_{18}H_{21}NO_3.HBr.2H_2O$ = 8·65 per cent. for $2H_2O$. It is, therefore, evident that the hydrobromide like the hydrochloride loses a fourth part of its combined water at the temperature of the water-bath, and the remainder at some temperature above 100°. But we must not deal in fractions of molecules, so we ought to write the formula $(C_{18}H_{21}NO_3.HBr)_2$, $4H_2O$, or more accurately (having in view the researches of Dr. Wright), $C_{36}H_{42}N_2O_6.2HBr.4H_2O$. We may, of course, use the empirical formula when more convenient, just as we sometimes write the erroneous expression $FeCl_3$ instead of Fe_2Cl_6.

THE CHEMICAL PHARMACY OF THE NEW PHARMACOPÉE FRANÇAISE.

(Continued from page 900.)

This section forms the second part of the Codex Medicamentorius; distinguished by the blue edging of the leaves; the preparations being arranged like the preceding in alphabetical order, the acid radical in compounds being put first and in the vernacular.

The list includes mineral and organic substances, as they occur native, or in a purified condition; metallic bodies and their salts; certain miscellaneous substances, including amber (succin), coal-tar (goudron de houille), and petroleum (pétrole d'Amérique). When possible their formulæ, with indication of their Equivalent and Atomic weights, are given side by side.

In many cases the mode of preparation has been subjoined, omitting for the most part manufacturing commercial processes, though the rule has not been rigidly observed. The larger chemicals have their distinctive characters and properties described. Calomel (protochlorure de mercure) and benzoic acid: as well as similar preparations on the large scale hold their place amongst such chemicals as can or ought to be furnished by the pharmacien; if so, French pharmaceutical chemistry must be credited with higher laboratory work than prevails in England. Foreign criticism enlarges on this point, especially when discussing the elaborate directions given for the manufacture of essential oils, which would hardly be undertaken by the average retail pharmacien.

The fault is on the right side, and should these directions prove useful to those for whose benefit they are intended, they are to be congratulated on their advanced position.

Tests of purity are given when required, and possible adulterations noted; substances deemed poisons are specially marked as such.

The alkaloidal strength is stated in case of salts with organic bases for the guidance of the medical profession. Various chemical products, no longer used in medicine, have been eliminated; while about eighty new substances have been introduced.

As already a revision of the published text of the new Pharmacopée is under the consideration of a Committee, headed by M. Petit; it will be needless to specify the exact relation which the Codex of 1884 bears to its predecessor of 1866. The intention contemplated in this notice is to bring forward such official preparations as are in themselves distinctive, and a knowledge of which may be of service to the English reader.

The introduction of salicylic acid and some of its salts; of ésérine; chloral; chloroform newly described and its characteristics mentioned in detail; iodoform; the sulphates of cinchonidine and quinidine; pilocarpine; the tannates of pellétiérine (a tænifuge) and quinine; and notably of certain bromides and bromhydrates, may, however, be enumerated.

Three terms in constant use must be understood.

Aq=aquâ means always water of crystallization. Thus, carbonate de soude pur cristallisé:—

CO_2,NaO; 10 aq. in French equivalents = 143

or expressed by

$CO_3Na_2 + 10\,H_2O$. F. atom (formule atomique) = 286.

Readers who wish to work out the equations contained in the Codex must consult the table of Corps Simples (Elementary Bodies) printed on page 25 of the Notions Préliminaires.

It will be noticed throughout that two systems of Notation are used; the one based on the equivalent system, *i.e.*, 1 part of hydrogen by weight unites with 8 of oxygen to form water; the formula becomes HO and the combining weight of oxygen 8. The other system is based not on analysis pure and simple, but the combining weights regulated by the laws of specific heat, and vapour density; in fact, the atomic weights as usually recognized in England. In the first, hypothesis is ignored, whereas the second is entirely dependent on it.

A straight line drawn through a symbol marks dyad relation in the printed formulæ.

Altér. = Altérations. Foreign substances which a product may contain owing to incomplete purification. When these are indicated by italics, substances most frequently occurring are designed.

Fals.=Falsification. Foreign substances fraudulently introduced. The term corresponds to our word adulteration.

While in the list of materia medica an asterisk is added to such substances as should be found in every pharmacy, the pharmacien is left to his own discretion in the subsequent sections; a matter of little importance regarding chemicals, and of none in the galencial department, since the preface states authoritatively that it contains such official remedies as should always be in readiness for the prescriber.

Amongst important additions sundry applications of bromine and hydrobromic acid deserve attention. French critics are warm upon the subject of the circumflex accent being placed over the bromine compounds, as Brômure de Potassium in the text, though Brome itself appears without. This printer's arrangement is not invariably adhered to, as may be seen in the general index. Littré is dragged into the argument, and our neighbours must settle their own orthography. Judging from etymology we should pronounce the Codex in the right, and both Chrôme and Brôme have the circumflex in the table of Corps Simples, both having the same Greek authority.

Hydrobromic acid is ordered both gaseous and in solution. The acid is prepared by the action of bromine on melted paraffin; and it can be used directly as gas, or passed into water at 0° when the solution will contain about its own weight of gaseous acid. The solution can be made by acting on dilute sulphuric acid by crystals of bromide of barium; or by passing the gas into distilled water to a density of 1·077, a 10 per cent. solution is obtained.

The hydrobromates are eight in number; that of ammonia corresponds to our ammonium bromide.

The *Bromhydrate of Cicutine* is prepared by passing hydrobromic acid through an ethereal solution of cicutine. The salt being insoluble in ether is precipitated as pulverulent and colourless crystals, which are collected, further washed with ether and rapidly dried. The salt is purified by spontaneous evaporation from a cold saturated solution. One hundred parts contain 61·06 cicutine.

Bromhydrate of cinchonidine (basic) is made by acting on basic sulphate of cinchonidine with bromide of barium and boiling distilled water. Wash out the sulphate of barium; evaporate and crystallize.

Bromhydrate of cinchonidine (neutral) is so rendered by means of dilute sulphuric acid.

Eserine (the process of its extraction from Calabar bean being given in detail) forms one of the bromhydrates. It is simply dissolved in hydrobromic acid, sufficient being added to effect a perfectly neutral solution. Evaporate over a water-bath to a syrupy consistence, and allow it to crystallize for some days. The salt thus made is in fibrous masses, usually of a reddish-yellow colour, and not deliquescent though very soluble in water.

Sulphate of Eserine is also official; made by treating an ethereal solution of eserine with a 10 per cent. dilute sulphuric acid. The salt is directed to be collected and dried by spontaneous evaporation. This method of drying does not seem in keeping with the sentence which immediately follows. "The sulphate of eserine thus obtained is amorphous. It can be crystallized, but with difficulty, on account of its extreme deliquescence." Eserine, as is well known, contracts the pupil.

Of the remaining bromhydrates that of morphine is a simple solution in the acid in hot water. Evaporate over the water-bath and crystallize out the salt, using as drying agents concentrated sulphuric acid, or dry calcium chloride. Solubility in cold water 1 : 25.

The *bromhydrates of quinine*, basic and neutral, call for scarcely any remark. Bromide of barium, being converted into a sulphate, is washed out; and the soluble salt is evaporated and crystallized. In the neutral bromhydrate, dilute sulphuric acid is employed.

Monobrom camphor, and the bromides (bromures) of lithium, potassium and sodium are included in the bromine series. Lithium carbonate and citrate are also official.

It will be well to recollect that brômure ferreux (bromide of iron) is not a solid salt, but a solution containing one third of its weight of ferrous bromide. This must be borne in mind by the English dispenser when making pills of bromide of iron according to the Codex. The matter will claim attention when treating on the galenical section.

It should be stated here that the word "officinal" attached to a preparation generally indicates, and always in the case of acids, that which has been made or purified for medicinal use. Thus we get commercial sulphuric acid, and the officinal, which is the former in a pure state. Hydrocyanic acid is HCy; but a centesimal solution, under the name of acide cyanhydrique dissous, au 100^{e}, the process for its manufacture being given in detail, is the "officinal" or the one to be used in medicine.

Acide phosphorique officinal is the solution made by acting on red phosphorus by nitric acid. By officinal, therefore, is not only meant that the substance is ordered by authority, but that it is presented in the form in which it may be therapeutically exhibited.

The progress of pharmaceutical chemistry has necessitated the introduction of *salicylic acid*, and we find the *salicylates of lithium*, *quinine* (basic) and of *sodium*. To make the second, salicylate of sodium is dissolved in water, and to the solution, boiling, the sulphate of quinine is added. The insoluble salicylate is washed and dried, and carefully tested for absence of undecomposed sulphate.

Acide sulphydrique dissous, a solution of sulphuretted hydrogen, occupies a prominent position, though the English pharmacist would rather assign it a place in a purely chemical treatise. It is directed to be prepared, many necessary precautions being observed, by acting on powdered sulphuret of antimony (Sb_2S_3) mixed with sand, with commercial hydrochloric acid. Gentle heat is to be applied when the action flags or is less energetic. Otherwise a cold process is employed. The gas may be conveniently passed into a mixture of four parts water and one part glycerine, to retard decomposition on exposure to the air.

Permission is likewise given to prepare sulphuretted hydrogen either by acting on protosulphuret of iron by $HCl + 2H_2O$; or by $H_2SO_4 + 8H_2O$.

A useful note is appended to sulphuric acid. The commercial article obviously should be restricted to external use on account of the lead and arsenical compounds it may contain. When this impure acid is rectified on an extensive scale, avoid the choice of larger retorts; multiply their number.

Acetic acid (1·060) replaces distilled vinegar in the obsolete Esprit de Mindérer. Acétate d'ammoniaque liquide (liquor ammoniæ acetatis) is now made by mixing distilled water and acetic acid with the aid of a gentle heat; sesquicarbonate of ammonia is added until feebly alkaline. No water appears in the formula of 1866; the result is otherwise the same.

Acide azotique is not a synonym, but in all the glory of an official title reappears and indeed supplants that of nitric acid. Not that the latter was ever entirely banished, for though rejected by pharmacy, chemistry retained its services. We had thus in olden times acidum nitricum officinale with the formula $AzO_5,4HO$, and nitrate d'argent with the formula $AgOAzO_5$. According to new directions we must read azotic acid, with its salts the azotates.

Eau Régale (*Aqua Regia*).

is thus made:—

Acid. nitric pur.	4
Aq. destillat.	1
Acid. hydrochloric. pur.	15

Mix the nitric acid with the water; add the hydrochloric acid, and keep in an unstoppered bottle for some days.

Benzoic acid, both prepared by sublimation or by the wet process is minutely described with full details of manufacturing process. Neither need occupy attention, as the methods indicated are not likely to be followed by English pharmacists.

The benzoates are made by neutralizing solutions of alkalies with benzoic acid and subsequent crystallization.

In this manner the benzoates of ammonia, lime, lithium and sodium are formed.

(To be continued.)

SCANDINAVIAN PHARMACY.

ADAPTED BY JOSEPH INCE.

(*Concluded from page* 760.)

We must now see whether the laboratories, botanical gardens, and collections of natural history are in keeping with the programme which is sufficiently exacting.

By good fortune Monsieur Labonne was able to inspect them in the completest manner, and he pays incidentally a just tribute to the hospitality of these "Frenchmen of the North."

One day when with some friends he was visiting the ancient cathedral of Upsala, a young law student came up to them and said in the best French he could command, "Will you let me act as guide? Unfortunately I have never travelled in France, and have only learnt French in our academies; I shall be happy to speak with you for practice and see how many faults I make."

Monsieur Labonne having informed him that he himself was a pharmacien from Paris, and also a medical student, the friendly guide proposed to introduce him to two other students of pharmacy and medicine. No sooner said than done. In company of these two the party went to visit the pharmaceutical collections. Professor Frietz, M., took them everywhere. He is a professor of Botany who enjoys the same reputation in Sweden and even in Germany, as Professors Chatin and Baillon do in France. First they inspected the Botanical Garden, the plants being arranged according to the system of Linnæus; then the rooms which are so well arranged for vegetable micrography; and lastly the hot-houses of which the people of the North possess the secret. They delight in having tropical plants in a climate of ice. Amongst other things a mulberry tree was observed planted by Linnæus's own hands. The Swedes reverence their compatriot and are proud of him. A monument has been erected to him in the cathedral; it is a pyramid of porphyry bearing a bronze medallion portrait with this inscription—"Carolo Linné botanicorum principi amici et disciputi. 1798." The house also was shown which he inhabited when he was Professor at the University of Upsala.

The laboratories of physics and of chemistry are likewise irreproachable. One can judge of the general instruction of the country from the following episode:—The law student knew quite as well as the party he conducted, the names of all the plants met with on their walks. A Paris student of law would scarcely be expected to know as much, and perhaps not even a medical student. The plants are with few exceptions the same as in France; only for the same species the colours differ strikingly, for example, in the larkspur. Certain flowers, much neglected in France, are much used in Sweden and Norway.

First must be cited *Epilobium hirsutum*, whose lovely red petals form the background of the marvellous beauty seen in the immense meadowland of Sweden, those fertile and flowery meads. It attains the height of more than a yard, or yard and a half, and dominates the rest. Its bright colour, slender stalk and abundance, arrest the attention of the traveller. One is sure to find it on the way, and it is so faithful a companion that it is met with as far as the arctic circle. The peasants utilize it as food; they drag it out of the ground with the least possible injury to the roots. These roots are dried on hurdles during fine weather, and in the winter vary somewhat their poor vegetables.

Beyond the arctic zone there is a species of sorrel which serves the same purpose.

Oxyria reniformis. It is preserved by congelation; later on, when wanted, it is converted into a pulp by boiling.

The Lapps to keep themselves from scurvy use a very bitter plant, the *Mulgedium alpinum.* They mix it with their bread steeped in reindeer's milk. This kind of pottage must be particularly esteemed, for the day when Monsieur Labonne paid them a visit in one of their chief camps near Troms, he was offered some and was placed on the Boasso. This is a great stone near the hearth, and is the seat of honour in the smoky hut. The *Mulgedium* turned out as bitter as Gentian.

Another plant found in great abundance is the meadow-sweet (Ulmaire). The air in this cold climate is literally saturated with the odour of its numerous white flowers, to the inconvenience of the traveller. Norway and Sweden confirm the law, that flowers of the same species have more perfume in the north than in the south. The extreme solar radiation volatilizes the odorous principles. Everyone knows that in France flowers exhale the least odour in the middle of the day. The sweet scent of the lime trees struck the party. The walks of Christiania are thus perfumed. There is nothing similar to this in the south of France.

It is also very curious to note the rapidity with which certain species belonging to southern regions develop far in the north. Thus planes, *Acer platanoides*, transplanted from Christiania to Troms (70° N.), become extremely vigorous; their leaves are much broader, and their branches much more numerous. It would be very interesting to study with care the effect produced by *a day of several months without a night* on the colour of flowers and the taste of fruits. Such researches have never been undertaken; unfortunately a long residence in these countries would be required.

The *Vaccinium uliginosum* will exhaust the list of plants not utilized in France for food, but precious in that respect in these regions.

Monsieur Labonne first saw this small shrub on the railway. One afternoon on the way to Christiania, little boys, with bare feet, darted out from the depths of the fir woods, and threw handfuls of small green branches at the driver of the train. This was several times repeated and the driver caught the bunches with extreme dexterity. Asked for an explanation, he laughed and bit the small blue berries between his teeth with great gusto. They seemed quite appetizing, especially in a country where there were no grapes, and where one had to regret somewhat the leeks of Egypt, that is to say the fine rich fruits of France. The berries had a rather agreeable acidulous taste, reminding one a little of the grape. The leaves quite resembled those of uva-ursi, which is a broad hint for those who practise adulteration. It was not whortleberry but the *Vaccinium uliginosum.* The shrub was met with everywhere, even at the North Cape, and the berries served to assuage thirst. It was too abundant for it formed the seasoning of all kinds of sauce for fish and flesh.

On the shores of the Arctic Ocean this plant is the sole representative of a scanty vegetation. There, better than the busserole, it deserves the name *bear's grape*, for it literally forms the chief sustenance of that animal in these parts. After this slight digression into botanical details the fauna of Scandinavia must be noticed; and some products special to the country.

The reindeer (*Cervus tarandus*) is the first animal which presents itself to view. The name is from a Swedish word denoting either cleanliness or swiftness, for *rheen* signifies, clean and rānna, means to run. At the present moment the animals are seldom met with wild, but they are seen in droves under their owners' charge. Near Tromsö from five to six hundred were encountered together in one valley. To enjoy this sight previous notice must be given to the Lapps; else there will be very few to show, the main herd being sent to feed upon the mountains. The Lapps who have been demoralized by contact with civilization, demand thirty francs for thus assembling their herds, alleging a pretended loss. This tax must be paid to curiosity. Reindeer milk is very thick, and loaded with butyraceous principles. Its taste is somewhat sharp and biting and it can only be drunk in a diluted state. These animals make a strange noise with their knees. On coming near them, a series of cracking sounds are heard similar to those produced by an electric battery.

In summer their ordinary food is the Vaccinium already mentioned; in winter they live on a small white moss, extremely delicate, which they find beneath the snow by making a large hole with their fore-feet.

They often kill with a blow from the hoof a small rodent, the *Lemus Norvegicus*; not to feed upon its flesh, but to eat the grass which it has in its stomach. This shows a keen power of scent, and proves that necessity is the mother of invention. The Lemus resembles a water-rat.

To find the reindeer wild one must penetrate as far as Spitzbergen; that involves a six months' sail amongst the icebergs. Monsieur Ch. Rabot, well-known for his travels in Lapland, and a member of the Geographical Society, reported to the writer that he had himself killed twenty reindeer. While the seal is attracted by noise, the greatest silence is indispensable when hunting reindeer, and the windward side must be avoided. Frequently fishermen are seen arriving in little boats with some hundreds of these animals on board. These bold sailors brave innumerable dangers to catch the young white bears, which they sell to the different museums.

The grey bear is common. At Throndjem it is a constant dish at a restaurant; but tourists do not like it much on account of its highly flavoured taste.

The lynx and glutton are found. A Government reward of 35 francs is offered for the destroyal of either of these two.

Lastly, there is the *Cervus alces*, a stag larger than a horse.

We come now to the bird kingdom, creatures which exist in fantastic abundance in the arctic circle, and specially in the Lofoden isles.

After the splendour of the scenery, and the strange effects of the midnight sun, that which remains stamped upon the memory by a voyage along the Northern shores of Norway is the recollection of the myriads of winged creatures which form a cloud round the vessel.

You should see them on retiring for the night, battle for a place on a reef just peeping above the water.

You should hear them shrieking one to the other and making an indescribable uproar.

The Eider (*Anas mollissima*) is the most valuable. Its down, says Professor Guibourt, makes furs, muffs and coverlets as warm as they are light. This down constitutes a considerable source of revenue to the province of Finmark. The Dutch trade in the eggs. In Texel these are made into omelettes; and the southern part of that island is called Eyerland (or egg-land), on account of the number of birds which come there to lay their eggs. There is a sale for them at Amsterdam. Proper to Scandinavia are the *Tetrao urogallus*, and the *Laggopus mutus*.

If we pass the wonderful Lofoden islands, and continue the route towards the north, we arrive at Hammerfest, where we quit the birds for the fishes.

As for the city itself, imagine a town watered by cod liver oil and you will have some notion of the odour. The captain had warned the party beforehand, but their handkerchiefs steeped in eau de Cologne were but a slight defence. This horrible smell is due both to the important manufacture of the oil and to the thousands of fish on hurdles drying in the sun.

The two to three thousand inhabitants of Hammerfest, the most northern town in the world (71° N.) are all occupied in this trade. Suffice it to say that a single boat well equipped, well stocked with bait, and in a good place can take from 500 to 600 cod a day. The scientific estimate that the ovary of a female of ordinary size contains nine million eggs.

This is the mode of preparation.

First they remove the head and abdominal viscera; the ovary serves for bait; the liver yields the oil. Not long ago the heads were wasted; now they are dried and powdered and used as manure for poor land.

The body, dried, hard and rolled in sticks, is called stockfish which is imported chiefly into Greece, Italy, France and Spain.

The fresh livers are piled in barrels, slightly pressed, and the virgin oil runs out, unfortunately a kind rare in pharmacy, though its quality is beyond doubt superior. Then the livers are treated by a press similar to those used in Normandy for cider.

This is oil, second quality; colour, reddish-brown.

The waste livers are subjected to strong heat, and an oil is produced, third quality and black.

Whales afford an industrial occupation at Hammerfest.

The day before the arrival of Monsieur Labonne, the fishermen had caught a whale without trouble. The creature had stuck in a small creek which made a sort of natural trap, and it was unable to regain the open sea. The captain was asked what might be the value of the fish; and he replied 6000 crowns (£336). They begin with selling rather dearly the 600 or 700 fins or whalebones; then they make great profit out of the immense quantity of fatty matters contained in the huge creature. This fat, improperly called oil, is naturally liquid and is used for dressing skins. Beside the oleine, margarine, and phoceine, there is a volatile principle of the odour of leather which gives the latter its characteristic smell.

Turning to quite a different train of ideas, there is a monument at Hammerfest erected to the memory of Struve, who measured an arc of meridian from Ismäil on the Danube to the frozen Ocean precisely at this spot.

Further north all cultivation disappears and tree vegetation ceases—nothing but an underwood of stunted birch and willow.

The weather, which had been superb, changed; the wind rose and a tempest broke over the travellers. Fortunately, the dense mist by which they were surrounded cleared, and some hours after they arrived in face of the old rock which marks Cape North. To their surprise the crevices were filled with vegetation. Mosses, dwarf arbutus, saxifrage, houseleek, yellow sedum, and other plants with which they were unacquainted, conveyed an idea of fertility.

Fish, even the largest, is caught with extreme ease; the large red hooks are scarcely plunged into the water than up comes an inhabitant of the sea, not a miserable specimen, but weighing some pounds at least.

Monsieur Labonne then mentions the famous hydromel, which is a syrupy alcoholic liquid made with water, honey and bitter herbs. Formerly it was the national drink of Sweden and Norway, but it has been dethroned by German beer. They tasted it, however, in a very small village near Upsal at Gamla-Upsala. Every visitor makes a point of so doing, and the liquor is served in the hollow ox-horn like that which served for a drinking vessel in the days of Thor, Odin and Freyr. But now they are mounted in silver, and the one offered to the tourist was a gift from Bernadotte to the innkeeper. A metal band bears the names of various princes and princesses who have imbibed the hydromel. The three gods, or rather deified kings, named are interred here, the tumuli being the sole curiosity of Gamla-Upsala. The village church is interesting as containing the tomb of Anders Celsius, the inventor of the centigrade thermometer employed in France. He was a Swede, but the Swedes themselves use the thermometer of Réaumur. A prophet has no honour in his own place.

The celebrated Tar is made in these parts from the wood of different kinds of pine: chiefly from *Pinus sylvestris* and *P. Ledebourii*.

The houses being constructed of wood, the trunks are reserved for that purpose; the roots and inferior portions being used for the tar manufacture. The process is as follows:—

As far as possible they select a barren spot on the mountain side and hollow out, funnel-wise, a big conical hole destined to receive the liquid product. Then just above this huge recipient they carefully pile up the roots and waste pine wood in a mound of about 25,000 cubic metres.

They cover this gigantic mass with a thick layer of turf and moss heaped up with heavy logs, and a few holes are left to let in air.

The fire is lighted from the top: the wood burns slowly, without flame, like forest charcoal kilns, and thus furnishes a large quantity of tar without detriment to the charcoal. This tar, following the slope of the mountain, accumulates in the reservoir, from which it is made to pass, by tubes arranged for the purpose, into iron tanks, or even into hollow trunks of trees. The operation lasts from one to five weeks, according to the way the roots, etc., have been prepared.

It is clear that those who are entitled to practise pharmacy enjoy much more consideration in those countries, where they are amenable directly to a central authority, than where, as in France, they are free after gaining a diploma.

But that which in Sweden chiefly raises their status is their union in societies analogous to the French Chamber of Notaries. An unworthy member may be excluded for a time or in perpetuity by the President after a meeting of the College. The limitation of number saves them from the necessity of gaining customers by all manner of reduced prices. The public are protected by a Government tariff, with fairly remunerative prices which cannot be exceeded.

The Swedes are not subjected to governmental visitation as in France, a matter which excites the indignation of Monsieur Labonne. He considers that the granting of a diploma should be accepted as sufficient guarantee for honourable conduct. Swedish pharmacy has, however, in his opinion, one grave inconvenience—the small number of pharmacies. These are transmitted from father to son; and from uncle to nephew. A number of well-educated young men, therefore, are forced to leave their native land, and to seek in France the means of subsistence, though they they possess a title which they have laboriously acquired.

MORPHINE.*

BY O. HESSE.

The author has studied the action of acetic and propionic anhydrides on morphine and its derivatives. With regard to the nomenclature introduced by Grimaux, the author contends that the term codeïne is unjustifiable. When the hydroxylic hydrogen in morphine is replaced by the acetyl group, the resulting product is mono- (or di-) *acetylmorphine*; and when it is similarly replaced by methyl, etc., the resulting compounds should be called *methylmorphine*, etc., and not codeïne, codethyline, etc. For derivatives where one of the hydrogen-atoms of the nucleus is replaced by methyl, etc., the author proposes the name of *morphimethine*, etc.

Morphine dissolves easily in excess of acetic anhydride at 85°, to form *diacetylmorphine*. This substance crystallizes in anhydrous prisms, which are easily soluble in alcohol, sparingly so in ether, melt at 169°, and with hydrochloric acid yield a hydrochloride which gives no coloration with ferric chloride. No more highly acetylized body could be obtained. *Dipropionylmorphine* was prepared in a similar manner. It is amorphous, easily soluble in alcohol, ether, and chloroform, sparingly so in water. The *hydrochloride* is an amorphous powder easily soluble in water and yielding a pale yellow amorphous *platinochloride* $[C_{17}H_{17}(C_3H_5O)_2NO_3]_2,H_2PtCl_6$. Morphine methiodide treated with freshly precipitated silver chloride yields *morphine methochloride* crystallizing in long colourless needles, containing $2H_2O$, which it loses at 120°. It dissolves in concentrated sulphuric acid without discoloration, but the solution turns violet when heated. It gives a dark blue coloration with ferric chloride in aqueous solution. The *platinochloride* forms orange needles containing 1 mol. H_2O. Morphine methiodide dissolves with difficulty in acetic anhydride at 100°–120°, and forms the diacetyl-compound. The yield is, however, very bad, a much more satisfactory result being obtained with morphine methochloride. *Diacetylmorphine methochloride* crystallizes in concentrically grouped needles, which are easily soluble in water, and give no coloration with ferric chloride. From its solutions potassium iodide precipitates *diacetylmorphine methiodide*. The chloride yields a pale yellow *platinochloride* crystallizing in small needles containing one mol. H_2O, which they partly lose on exposure to the air, completely at 110°. The action of methyl iodide on morphine in the presence of bases has already been studied by Grimaux (*Pharm. Journ.*, [3], xii., 48.) With acetic anhydride codeïne (methylmorphine) gives *acetylcodeïne* crystallizing from ether in prisms which melt at 133°. When propionic is substituted for acetic anhydride, *propionylcodeïne* (*propionylmethylmorphine*) is formed; on evaporating its ethereal solution, this is left as a colourless film easily soluble in ether, benzene, and alcohol. It dissolves in sulphuric acid with a bluish tint, which turns dark blue on the addition of a trace of ferric chloride. When heated, both solutions turn dark green. It yields crystallizable salts with acids. The *hydrochloride* crystallizes in large colourless needles containing $2H_2O$, and soluble in water and alcohol: it gives a yellow crystalline *platinochloride*. The *acetate* crystallizes in colourless needles soluble in water. It loses a part of its acetic acid at 100°. The *hydriodide* crystallizing with one mol. H_2O, the *oxalate* with $3H_2O$; and the sulphate are all soluble in water. *Codeïne methochloride* (*methylmorphine methochloride*) is obtained from codeïne methiodide by

* From *Annalen*, ccxxii., 203–234. Reprinted from the *Journal of the Chemical Society*.

treatment with silver chloride; and crystallizes in large rhombic prisms with one mol. H_2O. It yields a yellow flocculent *platinochloride* with $3H_2O$. The *sulphate* gives colourless needles containing $4H_2O$. A solution of the last-named salt yields, with barium hydroxide, a colourless solution of *codeïne methylhydroxide*, which on evaporation over sulphuric acid, deposits crystals of *methocodeïne* (*methylmorphimethine*). The unchanged hydroxide solution precipitates hydrates from solutions of metallic salts, and rapidly absorbs carbonic anhydride from the air. Codeïne methiodide dissolves in acetic anhydride at 85°, and deposits oblong rectangular tables of *acetylcodeïne methiodide* on cooling. Thus obtained, the crystals are anhydrous; but on recrystallization from alcohol, colourless needles containing $4H_2O$ are obtained. The *platinochloride* forms a yellow crystalline precipitate. If a solution of sodium, potassium, ammonium, barium, or calcium hydroxide be added to an aqueous solution of codeïne methiodide, a colourless strongly alkaline solution is obtained which gradually becomes coloured, and deposits *methocodeïne*. The reaction is quickened by using an excess of the alkali and heating to boiling. The action of the alkalies is therefore to liberate the hydroxide from which the elements of water are subsequently eliminated,

$$C_{18}H_{21}NO_3,CH_3(OH) = C_{19}H_{23}NO_3 + H_2O.$$

For the preparation on a large scale, it is best to boil the methiodide with rather more than the molecular weight of potassium hydroxide, extract the hot solution with benzene, and shake out the latter with acetic acid. The acetic solution is then saturated with sodium chloride, and the precipitated chloride recrystallized from a small quantity of water. A concentrated aqueous solution of the chloride is then decomposed with sodium hydroxide, and the base at once extracted with ether. In a few minutes the ethereal solution deposits long colourless prisms of methocodeïne. Freshly precipitated, this substance dissolves freely in ether, but when crystallized only sparingly. It crystallizes from boiling alcohol in prisms, from boiling water in needles, in the latter case with one mol. H_2O. It melts at 118·5°, and dissolved in 97 per cent. alcohol gives $[\alpha]_o = -208{\cdot}6°$ when $p=4$ and $t=15°$. In moderately concentrated sulphuric acid, the base and its salts dissolve to a colourless solution, which gradually becomes of a purplish-violet tint, and turns olive-green when heated. The base gives a blue colour when heated with concentrated sulphuric acid. The *hydrochloride* crystallizes with $2H_2O$ in needles soluble in 10·8 parts of water at 18°. The platinochloride is of a dark green colour.

Methocodeïne dissolves in acetic anhydride at 85°, and yields *acetylmethocodeïne*. It melts at 66°, and gives a blue coloration with concentrated sulphuric acid. It is soluble in alcohol, sparingly so in water. The salts crystallize easily: the *hydrochloride* with $\frac{1}{2}H_2O$, the *platinochloride* with $4H_2O$, the nitrate with $3H_2O$, and the sulphate with $8H_2O$.

With methyl iodide, methocodeïne forms *α-methocodeïne methiodide*, crystallizing in prisms with $\frac{1}{2}H_2O$ and soluble in water. The *α-methochloride* is obtained from the methiodide by the action of silver chloride, but could not be obtained in a crystalline form. It gives a blue colour with concentrated sulphuric acid. The *α-platinochloride* is a yellow flocculent precipitate. α-codeïne methochloride dissolves in acetic anhydride forming *α-acetylcodeïne methochloride*, which crystallizes with $2\frac{1}{2}H_2O$ in long colourless silkly needles, easily soluble in alcohol and boiling water, sparingly so in cold water. It gives up 2 mols H_2O at 100°, but the remainder cannot be expelled without decomposition setting in. With concentrated sulphuric acid it gives a brownish-red coloration. The *platinochloride* forms a sparingly soluble yellow crystalline precipitate. An aqueous solution of the α-iodide becomes milky on addition of potassium or sodium hydroxide, and gradually deposits an oil which appears to be unchanged iodide. If, however, the solution be boiled with alkali, an oil is deposited on cooling, which solidifies after a time. This substance is not the original iodide, but is isomeric with it, and the author, therefore, names it *β-codeïne methiodide*. It differs from the α-iodide in crystalline form, in containing no water of crystallization, and in being less soluble in water. The *β-chloride* was not obtained in the crystalline form, and gave a purplish-violet colour with concentrated sulphuric acid. The *β-platinochloride* yields small orange needles: the sulphate is amorphous. Decomposed with barium hydroxide, the sulphate yields the alkaline *β-methocodeïne methylhydroxide*, which crystallizes in small colourless plates and flat prisms, soluble in water and alcohol. If the solution be evaporated at 30–40°, an amorphous deliquescent and highly caustic mass is left. This, however, is not a pure body. The *β-chloride* yields *β-acetyl-methocodeïne methochloride*, from which the β-iodide can be obtained by double decomposition. The *platinochloride* forms a yellow powder containing $3H_2O$.

These results confirm the presence of only two hydroxyl-groups in morphine; and the author points out that these two groups are different in character, the hydrogen of one being replaceable by either positive or negative radicals, that of the other only by the radicals of the fatty acids. Morphine methiodide is not decomposed by boiling with bases, whereas directly the hydroxylic hydrogen-atom is replaced by an alcohol radical, the stability of the methiodide is at once reduced, and in the presence of bases its decomposition and the introduction of the methyl radical into the nucleus takes place even at ordinary temperatures. The author believes the hydrogen-atom thus replaced to be one in close proximity to the hydroxyl-group which is only displaceable by acid radicals, and not, as Gerichten and Schrötter contend, one of those combined with the nitrogen-atom. He declines to accept as proved the formation of methylethylpropylamine by the decomposition of ethocodeïne methyl-hydroxide, on which Gerichten and Schrötter base their argument. On the latter supposition the author should have obtained dimethylpropylamine by the decomposition of methocodeïne methyl-hydroxide, whereas he only obtained trimethylamine. He believes the decomposition to take place according to the equation—

$$C_{18}H_{20}NO_3(CH_3),CH_3OH \ = \ N(CH_3)_3 + C_{15}H_{10}O_2 + CH_3{\cdot}OH + CH_2 + 2H_2O.$$

The ethyl compound would then give ethylene in the place of methylene, and this was observed by Gerichten and Schrötter, but ascribed by them to a secondary reaction.

The author is inclined to look upon *laudanine* as a morphine derivative containing propionyl, but in which the relative character and stability of the two hydroxyl-groups is different to what is the case in morphine. He is now continuing his researches in that direction.

OLIVE OIL AND ITS PRODUCTION.

The following particulars with regard to the production of olive oil in Tuscany have been furnished to Mr. Consul Inglis by one of the principal exporters in Leghorn:—

The olive oil produced in Tuscany from the first pressing of the fruit is intended for consumption as an article of food. Hence, great attention is paid both to the culture of the olive tree and the process of making oil.

The olive crop is subject to many vicissitudes, and is an uncertain one. It may be taken as a rule that a good crop does not occur more frequently than once in three years. A prolonged drought in summer may cause the greater part of the small fruit to fall off the trees. A warm and wet autumn will subject the fruit to the ravages of a maggot or worm, which eats its way into it. Fruit thus injured falls to the ground prematurely, and the oil made from it is of very bad quality, being nauseous in taste and somewhat thick and viscous. Frost following immediately on a fall of snow or sleet, when the trees are still wet, will irretrievably damage the fruit, causing it to shrivel up and greatly diminishing the yield of oil, while the oil itself has a dark colour, and loses its delicate flavour.

The olive tree in Tuscany generally blossoms in April. By November the fruit has attained its full size, though not full maturity, and the olive harvest generally commences then. The fruit, generally speaking, is gathered as it falls to the ground, either from ripeness or in windy weather. In some districts, however, and when the crop is short, the practice is to strip the fruit from the trees early in the season. When there is a full crop the harvest lasts many months, and may not be finished till the end of May, as the fruit does not all ripen simultaneously. Oil made early in the season has a deeper colour, and is distinguished by a fruity flavour, with a certain degree of pungency; while as the season advances it becomes lighter in colour, thinner in body, and milder and sweeter in taste. Oil made towards the close of the harvest in April or May from extremely ripe fruit is of a very pale straw colour, mild and sweet to the taste, though sometimes, if the fruit has remained too long on the trees, it may be slightly rancid. Oil very light in colour is much prized in certain countries, notably France; and hence, if it also possesses good quality, commands a higher price in the Tuscan markets.

The fruit of the olive tree varies just as much in quality as does the grape, according to the species of the tree itself, the nature of the soil, exposure, and climate of the locality where it grows. Some varieties of the olive tree largely grown, because thought to be better suited to the special conditions of some districts, yield a fruit which imparts a bitter taste to the oil made from it; such oil, even when otherwise perfect, ranks as a second rate quality. The highest quality of oil can only be obtained when the fruit is perfectly and uniformly sound, well ripened, gathered as soon as it has dropped from the trees, and crushed immediately with great attention. Should the fruit remain any time on the ground, particularly during wet weather, it deteriorates fast and gets an earthy taste; while if allowed to remain an undue length of time in the garners it heats, begins to decompose, and will yield only bad oil.

The process of making oil is as follows:—The fruit is crushed in a stone mill, generally moved by water power; the pulp is then put into bags made of fibre, and a certain number of these bags, piled one upon another, are placed in a press, most frequently worked by hand; when pressure is applied, the oil flows down into a channel by which it is conveyed to a receptacle or tank. When oil ceases to flow, tepid water is poured upon the bags to carry off oil retained by the bags. The pulp is then removed from the bags, ground again in the mill, then replaced in the bags and pressed a second time. The water used in the process of making oil must be quite pure; the mill, press, bags, and vessels sweet and clean, as the least taint would ruin the quality of the oil produced. The oil which has collected in the tank or receptacle just mentioned is removed day by day, and the water also drained off, as oil would suffer in quality if left in contact with water; the water also, which necessarily contains some oil mingled with it, is sent to a deposit outside, and at some distance from the crushing house, which is called the "Inferno," where it is allowed to accumulate, and the oil which comes to the surface is skimmed off from time to time. It is fit only for manufacturing purposes. After the second pressing the olive-pulp is not yet done with; it is beaten up with water by mechanical agitators moved by water-power, and then the whole discharged into open-air tanks adjoining the crushing-house. There the crushed olive kernels sink to the bottom, are gathered up and sold for fuel, fetching about 12 francs per 1000 kilos., while the *débris* of the pulp is skimmed off the surface of the tank and again pressed in bags, yielding a considerable quantity of inferior oil, called "Olio lavato," or washed oil, which, if freshly made, is even used for food by the poorer classes. The pulp then remaining has still a further use. It is sold for treatment in factories by the sulphide of carbon process, and by this method yields from 7 to 9 per cent. of oil; of course suitable only for manufacturing purposes. Only the first two pressings yield oil which ranks as first quality, subject of course to the condition of the fruit being unexceptionable. New oil is allowed to rest awhile in order to get rid of sediment: it is then clarified by passing through clean cotton wool, when it is fit for use.

The highest quality of olive oil for eating purposes should not only be free from the least taint in taste or smell, but possessed of a delicate appetizing flavour. When so many favourable conditions are needed as to growth, maturity and soundness of the fruit, coupled with great attention during the process of oil making, it is not to be wondered at that by no means all, or even the greater part of the oil produced in the most favoured districts of Tuscany, is of the highest quality. On the contrary, the bulk is inferior and defective. These defective oils are largely dealt in, both for home consumption and export, when price and not quality is the object.

In foreign countries there is always a market for inferior defective olive oil for cooking purposes, etc., provided the price be low. Price and not quality is the object, so much so that when olive oil is dear, cotton-seed, ground-nut and other oils are substituted, which bear the same relation to good olive oil that butterine and similar preparations do to real butter.

The very choicest qualities of pure olive oil are largely shipped from Leghorn to England along with the very lowest qualities, often also adulterated.

The oil put into Florence flasks is of the latter kind. Many years back this was not the case, but now it is a recognized fact that nothing but the lowest quality of oil is put into these flasks; oil utterly unfit for food, and so bad that it is a mystery to what use it is applied in England. Importers in England of oil in these flasks care nothing, however, about quality; cheapness is the only desideratum.

The best quality of Tuscan olive oil is imported in London in casks, bottled there, and bears the name of the importers alone on the label. There is no difficulty in procuring in England the best Tuscan oil, which nothing produced elsewhere can surpass; but consumers who wish to get, and are willingly to pay for the best article, must look to the name and reputation of the importers and the general excellence of all the articles they sell, which is the best guarantee they can have of quality.

THE RESIN INDUSTRY IN THE LANDES DEPARTMENT.*

BY A. RENARD.

The Landes department is the most important centre in France for the production of resin. This large triangular space of about fourteen thousand square metres, bounded upon one side by the ocean, and on the others by the Adour, the cultivated heights of the Lot et Garonne department, and the vineyards of Bordeaux, is an ancient bed of the sea, covered by sand of the Pliocene age. The sandy masses, which in many places are more than eighty metres thick, contain a few beds of clay; but at only a slight depth there occurs a compact layer, termed "alois," which is traversed with difficulty by the roots of trees, and which is one of the greatest obstacles to forest vegetation. In former times the rain-water, retained by this compact layer of sandstone, remained upon the soil, and transformed the surface of the Landes into a vast marsh; but since then numerous drainage ditches have been cut and convey the surplus water to the pools on the shore. In this way the surface has now

* From the *Moniteur Scientifique*, vol. xiii., p. 945.

become almost dry, the marshes have disappeared, and the inhabitants of these districts are no longer compelled to raise themselves on stilts to traverse the vast stretches of land, which formerly were impassable to ordinary pedestrians.

There is no doubt that before the middle ages the greater part of the Landes was covered with forest, at least upon the borders of the sea; but through the improvidence of the inhabitants these woods had been destroyed, and the sand had commenced its invading march from the sea coast, threatening to swallow all that it met upon its way. The first attempts which were made to reclaim the "dunes" date from the commencement of the eighteenth century; but it was Brémontier who, between 1787 and 1793, definitively solved the problem of the plantation of the Landes, he succeeding in consolidating more than 250 hectares of shifting "dunes." In the present day an immense forest of pines covers all this vast extent of territory, formerly uncultivated and marshy, and forms an impassable barrier to advance of the "dunes" from seaward.

The maritime pine is the tree chosen, to the exclusion of almost all others, by the Landais cultivators, and its reproduction is effected either from seeds or from cuttings; but the finest trees are those obtained from seeds, and this is the method generally followed. The sowing takes place naturally. Every four or five years a clearing is made by cutting down the least vigorous of the young trees so as to allow the others to develop under the most favourable conditions, and at the end of twenty-five or thirty years the trees are about one and a half or two metres apart. Those which at this stage still require to be removed are bled to death. This operation consists in making two large gashes on opposite sides of the tree, the turpentine that exudes being collected by one of the methods described subsequently. Under these conditions the tree is quickly exhausted, and at the end of four or five years is cut down. Eventually a final selection is made of the finest trees in the *pignada*, which are to be preserved for regular working, care being taken that they shall be equidistant at about eight metres; all the others are then bled to death and cut down at the end of from five to seven years. When the trees selected for preservation, which are called "*pins de place*," have attained a diameter of 30 to 35 centimetres they are ready for working.

By means of a sharp blade, slightly curved and fixed perpendicularly at the end of a wooden handle, an incision is made at the base of the tree on the side facing the east, and this is retouched every three or four months. The cutting is commenced in April and continued until the end of September, during which time it should reach a height of about half a metre. Care, however, is taken early in the season, about the beginning of March, to define the extent of the incision by removing the external surface of the bark from the part of the tree which is to be denuded. The following year the incision is continued upwards, and afterwards, for five consecutive years, until a height of two and a half or three metres is reached. A similar operation is then commenced on the side of the tree exposed towards the south, and by the time this has had its turn a return can be made to the first incision, which has become cicatrized. When the operation is well conducted a tree can be thus bled during more than two hundred consecutive years (*pendant plus de deux cents années consécutives*).

Two methods are in use to collect the exudation. The older one, which is the most simple, consists in making a small trench at the base of the tree, in which the runnings from the tree collect. While the incision is near the ground the collection is effected fairly well; but after two or three years, when the incision has attained a considerable length, the exudation reaches the ground with difficulty. Under the influence of wind and sun the greater part of the essential oil is volatilized or resinified; and the collection becomes insignificant. The second method called "Hughes's method," after its inventor, partially avoids these inconveniences, and, besides, has the advantage of yielding a "gemme" much more free from soil and vegetable *débris*. It consists in affixing to the tree, by means of a nail, a small pot, which is placed every year under the fresh cut. The turpentine thus caught, having to run a less distance to reach the recipient, is always richer in essential oil than that obtained according to the older method.

The collection of the "gemme" is made every two or three weeks. The pots are first emptied into a vessel of forty or fifty litres capacity, from which the contents are transferred to a large trench in the ground capable of holding four or five hundred litres, from which the casks are filled when required for sale. In October the resin that has solidified on the tree is gathered. This can be added to the other portion for the purpose of distillation, but usually it is kept separately, and sent into commerce under the name of "galipot" or "barasse."

The "gemme" is the primary material for the manufacture of oil of turpentine; it is a mixture, or rather a solution of colophony in the oil. Under the influence of heat the oil is volatilized and the colophony is left as a residue. The industrial distillation of the "gemme" is carried on in small factories usually situated in the midst of the forest. The season commences in the month of May and terminates in October.

On the arrival of the "gemme" at the factory it is decanted into two large wooden vats capable of containing one hundred barrels of 340 litres each. By means of a kind of saucepan fastened to the end of a long wooden staff the material is dipped from these vats and introduced into two large copper boilers, known as preparatory boilers, of six to eight barrels capacity. In these boilers the "gemme" is heated during a whole day over a low fire. The water collects at the bottom, whilst foreign substances, such as chips of wood, twigs, etc., rise to the surface, from whence they are skimmed off and put to drain in straw filters arranged above the second boiler. In the evening the fire is allowed to go down and the boiler is left to itself. In the morning the "gemme," freed in this way from the water that it held in suspension and which frequently amounts to 12 or 15 per cent., as well as earthy and ligneous matters, is introduced into a copper receiver of a fixed capacity of 300 litres. At the bottom of this pan there is a pipe, fitted with a tap, the other end of which opens at about eight inches from the bottom of the still in which the distillation has to be effected. The still is of copper and furnished with a worm that dips into a wooden receiver full of water. Three hundred litres of "gemme" are run in and heated strongly. The oil commences to distil over and at the end of fifteen or twenty minutes about eighty or a hundred litres of hot water are run into the still through a tap fixed in the upper part of it. This addition of water has for its object to facilitate the volatilization of the remainder of the essential oil. The distillate is received in a vessel made of sheet-iron and fitted at its upper part with a capacious pipe, by which the essential oil, being lighter than water, passes off into the casks set for its collction.

When the liquid issuing from the worm no longer contains much essential oil, the supply of water is stopped; the distillation is then continued for a few minutes more and the operation is finished. The yield of essential oil varies with the season and is about 15 to 18 per cent. of the weight of the "gemme." The exit pipe at the bottom of the still is then opened and the "brai," or resinous residue, is run into a sheet-iron tank, after having been made to pass over a copper plate pierced with holes, so as to eliminate various impurities that it may contain. The apparatus is then ready for a fresh operation, which is commenced without allowing it to get cold. In this way eight or ten distillations are effected daily.

After the "brai" has been allowed to cool for some time it is run into wooden casks, where it solidifies. That which is derived from "gemme" collected by Hughes's method is sent into commerce under the name of "yellow colophony" and that obtained from "gemme" collected by the old method is sold under the name of "brai clair." The resins of inferior quality, or "brais noirs," are obtained by the same method, but are the product of the distillation of the less pure portion of the "gemme" which collects towards the bottom of the preparatory boilers.

Sometimes the "brai," instead of being run directly into casks, is used for the manufacture of resin. In this case, upon issuing from the boiler of the still, it is run into a special vat, and whilst it is still liquid about 15 to 20 per cent. of hot water is added, in quantities of 20 to 30 litres at a time. The mixture is stirred energetically with staves until the whole mass has become opaque and thoroughly homogeneous; then it is run through a trough in sand into cylindrico-conical moulds also in sand, where it solidifies. The resin thus obtained is of a pale yellow shade, and under the name of "yellow resin" or "*résine de boutique*," is used in the making of resin candles.

The straw filters, upon which have been deposited all the impurities collected upon the surface of the preparatory boilers, are used for the preparation of a further quantity of "gemme" of inferior quality. They are introduced together with the detritus remaining upon them into a kiln, resembling a lime-kiln, known as a "*four à pègle*." The fire being lighted and a portion of the material burnt, determines the liquefaction of the "gemme," which runs off through an orifice situated in the lower part of the kiln into a receiver containing water. This "gemme," submitted to distillation, yields about 10 per cent. of its weight of essential oil.

Manufacture of Resin Oils.

This industry dates back half a century, and at the present time has attained a considerable development. In 1832, M. Dives, whilst distilling "gemme" for the extraction of oil of turpentine, made the observation accidentally that in continuing the operation beyond the point when only colophony was left in the still this was decomposed, giving rise to an oil. He therefore replaced the copper alembics by cast iron retorts, and the mode of distillation which he adopted is the same as is employed at the present time.

Eighteen hundred kilograms of "brai" are introduced into a large hemispherical cast iron boiler, heated over arches, together with 1½ or 2 per cent. of lime, added with the object of rendering the oils more fluid. The boiler is covered with a copper dome, which is luted with clay; this is in communication with a worm, also in copper, disposed in a vat full of cold water. Pine wood is employed as fuel in heating the boilers. The operation is commenced at three o'clock in the morning, the fire being urged strongly at the commencement, and in two or three hours the distillation begins; the fire is then moderated and maintained so until seven in the evening. The distilled products are received in a small sheet iron vessel, having in its upper part a tube by which they can be passed into the casks. At the commencement of the operation water passes over, which is run off through a tap placed in the lower part of the receiver. Afterwards about 25 kilograms of a light fraction are collected, and then nine or ten barrels of oil, each containing 160 kilograms. At the end of the operation the bottom of the boiler is brought to a dull red heat. There remains then only a solid carbonaceous residue, which has to be removed by means of a pick after each distillation.

The total yield in the lighter fraction and resin oils is about 80 to 85 per cent.; the principal loss is due to the combustible gases which are given off in abundance during the whole of the operation, and which have not hitherto been utilized.

The resin oils thus obtained are not identical throughout the entire distillation. They are distributed generally, according to their colour, into three classes: pale oils, blue oils and green oils.

The "pale oils" are the most abundant, the quantity reaching 1100 or 1200 kilograms in each operation. They are of a brownish yellow colour and rather fluid. In density they vary between 0·990 and 1·000. They are incongelable, even at very low temperatures. They possess considerable lubricating properties, but present the inconvenience of resinifying rather rapidly in contact with the air, which, together with their odour, has always limited their employment. Railway companies and miners use large quanties for lubricating machinery, after adding 25 to 50 per cent. of colza or mineral oil. They are also employed, either alone or mixed with linseed oil, in the manufacture of printing ink.

The "blue oils" consist of that portion of the products which passes over immediately after the pale oil. These oils are more coloured and have a very pronounced blue fluorescence. Their density is about ·990 to 1·000.

Lastly, when the operation approaches its termination, the "green oils" are collected, which are of a still darker shade, and possess a very strong green fluorescence. They are always mixed with a very large proportion of water, from which it is extremely difficult to free them. These oils, like the "blue oils," are more fluid than the "pale oils;" they contain, in fact, a larger proportion of a light spirit, the presence of which is due to the commencement of pyrogenation which the colophony undergoes in consequence of the high temperature to which the distillatory apparatus is submitted.

The blue and the green oils are employed especially as lubricants for waggons used in mines. As to the light spirit the proportion of which amounts to one or two per cent. of the colophony distilled, its employment is very limited. It possesses a very pronounced odour, is brownish in colour, and has a density of about 0·950. Exposed to the action of the air it resinifies rather rapidly, similarly to oil of turpentine. Occasionally it is used in the place of oil of turpentine, especially in making up paint for out-door use.

The resin oils, obtained by the method indicated, are usually sent into commerce in the same condition. They are then frequently turbid and slightly opalescent through the presence of a small quantity of water distributed through the mass. In order to render them limpid, M. Durou has proposed to allow them to stand some time in large reservoirs arranged under glass roofing, exposed to the sun. Under the influence of heat and light the oil clarifies pretty rapidly, especially in summer, and at the same time undergoes a slight decoloration. The same result is also attained by a rectification, and for this purpose the apparatus used in the distillation of the colophony is employed. The operation should be conducted slowly. A certain quantity of light spirit is first collected and set aside, after which, the oil distils perfectly clear. This distillation yields very good results; but always occasions a loss of 6 to 8 per cent. The rectified oil has a density of ·972. Several processes have been proposed for removing from resin oils their odour, which in many cases constitutes an obstacle to their employment. Washing with soda, followed by agitation with sulphuric acid, is the process which appears to yield the best results, but this method of purification has not yet received any industrial application.

When a lubricant for carriages is required the "brai" is submitted to a rapid distillation not lasting more than four hours. The oil obtained under these conditions then contains a large proportion of resin, which has been carried over mechanically; it is viscous and thick, and is known as "strong" oil. To prepare the lubricant, one part of slaked lime is suspended in two parts of thin oil from a slow distillation, and one part of the thick paste so obtained is incorporated with four or five parts of "strong" oil. The resin contained in the latter combines with the lime to form a resinate of lime. The paste is stirred well, and then while still liquid it is run into barrels or boxes, where it acquires quickly the desired consistency. These lubricants are sometimes coloured by the addition of powdered pigments.

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INDIAN PHARMACOGNOSY.

AT a time when utilitarian ideas exercise so dominating an influence as they do in the present day it may savour somewhat of the Quixotic to appear to advocate the extension of technical studies to antiquarian researches respecting drugs, since these do not, superficially at least, suggest yielding much of a *quid pro quo* in pocket or reputation. Many pharmacists are already disposed—and with good reason—to complain of the little value set by the public on qualifications obtained at the cost of hard labour and hard cash in order to enable them to serve it more efficiently. Certainly there is little in this direction to encourage the pharmaceutical student to stray beyond those bounds in the science of materia medica which enclose what is absolutely requisite in order that he may be able to pass his examinations and carry on his calling creditably. Yet there have always been a few who have interested themselves in points turning upon the history as well as the sources of drugs, and have been able to appreciate a work like 'Pharmacographia,' or a series of articles like the "Notes on Indian Drugs," from the pen of Dr. DYMOCK, which were published in this Journal a year or two since and were highly prized in many quarters, though they did not escape a somewhat irrational protest at home. It may interest some, therefore, to learn that the republication of the "Notes" by Dr. DYMOCK, systematically arranged and in a collected form, has been the occasion of the appearance of an appreciative article on Indian Pharmacognosy in the *Archiv der Pharmacie*, in which Professor FLÜCKIGER, who has himself made such important contributions to this class of literature, recalls some interesting facts in the antiquities of Indian drugs.

As late as the commencement of the sixteenth century very little comparatively was known in Europe respecting India. Although the importation of its products in the middle ages depended mainly upon the enterprise of the great commercial republics of Italy, even the most powerful of them had no direct and regular intercourse with India, and only occasional travellers from one or another of them reached the famous land. The notices of its drugs in those times were therefore few and widely separated. In the sixth century, KORMAS, a Greek merchant and traveller, saw the pepper plant growing in its South Indian home and met there also sandal wood and cloves brought from the more remote east. In the ninth century, KURDADBAH, postmaster and minister of police to the caliphs of Mesopotamia, obtained certain information respecting camphor, cubebs, galanga, and pepper. A century later mention was again made of pepper by the Persian geographer ISTACHRI, and in the twelfth century the first mention was made of cardamoms as an Indian drug by IDBISI, the Arabian geographer at the court of the Norman King ROGER, at Palermo. The earliest information respecting Ceylon cinnamon dates from the thirteenth century. The fourteenth century saw members of different religious orders making their way into the peninsula, and from them came notices of ginger, and more information upon cinnamon and the important subject of pepper. But in the first half of the fifteenth century a Venetian merchant, NICCOLO DE CONTI, spent twenty-five years in India, and in his exhaustive and striking accounts of the spices and dyeing materials of Southern India went far beyond his predecessors, and may be said to have opened up a new era.

In 1497, just as the Spaniards were invading a new world in the west, the doubling of the Cape of Good Hope by the Portuguese discoverer, VASCO DA GAMA, opened up a sea route to the East Indies, a feat which his countrymen were not slow to turn to advantage in establishing an important commerce. Amongst the officials sent over to look after the interests of Portugal was THOMAS PIRES, an apothecary, who was first appointed to the "factory" in Malacca, partially apparently in the interests of pharmacy, and afterwards was sent as an ambassador from Portugal to China. Writing from Cochin, in 1516, to King MANUEL, he enumerates the drugs indigenous in the country, as well as those imported. The information contributed by this Portuguese pharmacist, though still too scanty, was an advance on what was known before. According to him frankincense came to Cochin from Arabia, as well as from Orissa, on the east coast of India, though what this latter frankincense was exactly is not now quite certain. Opium was imported from Egypt through Aden; but it was also already produced in Cambaya, north of Bengal, and Bombay. The drug was then only "eaten" (probably smoked) by kings and lords, on account of the cost. Tamarinds, on the other hand, were so cheap, as to be looked upon as a "vergelt's Gott." PIRES also met there with aloes from Socotra, Aden, Cambaya, Valencia in Aragon and Sumatra. Among the "gomas fetidas" he enumerated sagapenum, galbanum and opopanax; but neither ammoniacum nor asafœtida. He also mentioned myrrh and liquid styrax. From the mineral kingdom, which was at that time well represented in pharmacy, PIRES met with "tincar" (tincal) from Thibet and "rubine," as well as pearls from the Red Sea, Ceylon and Southern China. About the same time, another Portuguese, ODOARDO

Barbosa, wrote an account of a journey through India, in which he quoted the prices of a series of drugs that he met with in Calicut, on the Malabar coast. But a much more valuable contribution to the history of Indian drugs was made by a third Portuguese, Garcia de Orta, who in 1534 went out as physician on board an admiral's vessel and settled down at Goa as royal physician to the hospital. There he produced his famous 'Coloquios dos Simples e Drogas,' in which Indian drugs were described with a care previously unknown, the descriptions being accompanied by a mass of other useful information. Next to that of Garcia the name most worthy of mention in connection with the history of drugs in the sixteenth century is Filippo Sassetti, who writing to a friend in his native state of Florence, probably from Cochin, discoursed right intelligently of the catechu tree (*Acacia Catechu*) and Ceylon cinnamon bark. In the next century the Dutch became powerful competitors with the Portuguese for the commerce of these regions, and wrested from them successively the famous Spice Islands, or Moluccas, and Cochin. Some knowledge of the natural products of the neighbouring countries must therefore have become a desideratum to the new masters, and it was in these circumstances that Hendrick Adriaan Rheede tot Drakenstein, the Dutch governor of the Malabar coast, ordered the compilation of the 'Hortus Indicus Malabaricus,' which was not published, however until 1703, four years after his death. In this work, which consisted of twelve folio volumes and was illustrated by seven hundred and fifty plates, many of the medicinal plants of Southern India were figured and described. Another contribution to this field of literature from Holland was Burman's 'Thesaurus Zeylanicus.' After the British rule had become definitely established in India, especially by the memorable battle of Plassey, in 1757, the ground was taken up by investigators from our own country, Dr. William Roxburgh being in the front rank. In his 'Plants of the Coast of Coromandel,' published in the years from 1795 to 1819, and his 'Flora Indica,' published between 1820 and 1832, not a few plants of pharmaceutical or technical interest were figured and satisfactorily described for the first time. In 1813 another English physician, Dr. W. Ainslie, in his 'Materia Medica of Hindostan' called attention exhaustively to the popular remedies of India, a subject which had been partially dealt with three years before by Fleming in a 'Catalogue of Indian Medicinal Plants and Drugs.' Then followed a number of valuable botanical works, in which, however, pharmacognosy had no special place; among these may be mentioned Wallich's 'Plantæ Asiaticæ Rariores,' Wight's inclusive but artistically unimportant 'Illustrations of Indian Botany' and 'Icones Plantarum Indiæ Orientalis,' and Royle's 'Illustrations of the Botany and other Branches of Natural History of the Himalayan Mountains and of the Flora of Cashmere.' In 1837 this last-mentioned author, who was a medical man in the service of the East India Company, broke fresh ground in the still imperfectly worked field of Indian medicine and published an essay on 'The Antiquity of Hindoo Medicine,' a line that has been followed in more recent years in Udo Chand Dutt's 'Materia Medica of the Hindoos.' In 1842 a new phase in the literature of Indian materia medica was initiated by the issue in Calcutta, by the order of the Government, of O'Shaughnessy's 'Bengal Dispensatory,' which was but the forerunner of the 'Pharmacopœia of India,' a work prepared under the authority of Her Majesty's Secretary of State by Dr. Waring, assisted by a Committee of native and English experts, amongst whom was the late Daniel Hanbury. We have thus followed Professor Flückiger through his *résumé*, dating from the earlier notices of separate Indian drugs to a period when they were first officially catalogued and described in a national pharmacopœia. Here we must leave him, notwithstanding that a flattering mention of the place which this Journal has taken in this field of literature might have excused our pursuing the subject a little further.

There seems to be every probability that the Annual Dinner on Tuesday next, at the Holborn Restaurant, will in every respect prove to be a success equal to any of its predecessors. At the risk, therefore, of appearing to be guilty of unnecessary repetition we would urge those members and friends who desire to be present, if they have not already obtained their tickets, to apply for them today (Saturday) to the Honorary Secretary, Mr. Richard Bremridge, as it will be absolutely necessary to close the list in time to allow proper arrangements to be made. On Wednesday evening, as probably most of our readers are aware, the Conversazione will be held in the South Kensington Museum.

* * *

We have received a copy of the Report of the Executive Committee of the Chemists and Druggists' Trade Association which will be presented at the Annual Meeting of the members, to be held at the Inns of Court Hotel, Lincoln's Inn Fields, on Tuesday next, at noon. It commences with an enumeration of three cases in which members have been successfully defended in prosecutions under the Sale of Food and Drugs Act, and four cases in which proceedings have been taken for infringements of the Pharmacy Act. It then refers to the communications of the Executive with the Council of the Pharmaceutical Society in reference to the amendment of the Pharmacy Acts, and describes the course taken in petitioning Parliament for the amendment of the Medical Bill so as to provide for the representation of pharmacists on the Pharmacopœia Committee. The other work mentioned as having been done during the year is the obtaining of the issue of an Order by the Inland Revenue authorities that officers when purchasing methylated spirit for analysis shall leave a portion of the spirit sold with the seller. It is to be regretted that the Executive has again to report a decline in the strength of the Association, whilst even of the 3340 members said to be at present on the Register only 2632 appear to have paid the annual subscription. Whether this state of affairs, which has involved a further diminution of the balance in hand, is correctly attributed in the Report to "the severe and now long continued depression in trade," is in our opinion at least doubtful. We think it is rather attributable to an apathy, similar in quality, but intensified in degree, to that which has before now laid the Pharmaceutical Society, with double the number of subscribers, under the reproach of not being representative of the whole body of chemists and druggists.

* * *

France, and, indeed, the whole scientific world, has sustained another most serious loss through the death, on Monday last, of Charles Adolphe Wurtz, the eminent chemist. Barely a month has passed since, as the representative of the Faculty of Sciences and the Faculty of Medicine of Paris, he took part in the obsequies of his illustrious master, Dumas, and now he has himself been called away. Some words which he used on that occasion seem peculiarly applicable to the circumstances of his own death. "Une belle mort : elle vous a surpris au mileu des vôtres, dans le plenitude de vos facultés." It is rather remarkable that of the four eminent men who have yet delivered the Faraday lecture, two should have died within a few weeks of each other. We hope to be able to give next week some account of the life and work of M. Wurtz, who was an Honorary Member of the Pharmaceutical Society of Great Britain.

* * *

England, too, about the same hour lost one of her ablest chemists in Dr. Robert Angus Smith, who died at Colwyn Bay, in his sixty-eighth year. Dr. Smith was born in Glasgow, where also he received his early education; but he studied chemistry under Liebig, at Giessen, and more than thirty years afterwards he bore testimony, in the dedication of his most characteristic work, 'Air and Rain,' to the admiration he still retained for his great German master. His name, as a scientific man, is most closely associated with researches upon the atmosphere and its pollution by noxious gases. Upon the passing of the first Alkali Act, in 1873, he was appointed Inspector-General under its provisions, and the annual reports issued under his superintendence have evidenced the skill and tact that he brought to bear in enforcing the new, and in many quarters much disliked law.

* * *

In a review of the drug trade of New York for the year 1883, Mr. D. C. Robbins states that among the most noteworthy facts were the large increase in the importation of quinine salts and the decrease in the importation of cinchona bark for manufacturing purposes. During the year the imports of quinine salts amounted to 1,055,764 ounces, against 794,495 ounces in the previous year; whilst the imports of bark fell from 5,010,547 pounds in 1882 to 3,639,315 pounds last year. The imports of medicinal opium appear to have remained nearly stationary; but the increase in the quantity of opium specially manufactured for smoking purposes was enormous. Hitherto this opium has been imported *viâ* San Francisco, and it has been assumed that it has been consumed principally by Chinese residents; but Mr. Robbins points out that the import of smoking opium, which, previous to 1882 had never exceeded 77,196 pounds, in that year reached 106,221 pounds, and in 1883 amounted to 298,153 pounds, whilst during the same time there has been but little increase in the Chinese population in the United States.

* * *

Some idea of the extent to which the competition of the coal-tar colours continues to affect natural pigments may be gathered from the fact that the cochineal harvest in Teneriffe, which so recently as the year 1880 was estimated to produce to the farmers £600,000, is estimated to have yielded last year only £200,000, the average price having fallen from 2*s.* to 9½*d.* per pound. There also appears to be some additional anxiety in the island in respect to the future of the cactus upon which the insects are reared, and rhea grass and the sunflower have been suggested as substitutes.

* * *

In accordance with a resolution passed at the last annual meeting of the German Pharmaceutical Association, the Council of that society has nominated a "Permanent Pharmacopœia Committee," consisting of the following twenty members:—F. A. Flückiger, B. Hirsch, G. Biltz, G. Vulpius, C. Schacht, A. Kohligk, C. Brunnengräber, C. Schneider, G. Berg, G. Wolfrum, T. Salzer, C. Finkh, —Bertkau, T. Pusch, T. Wimmel, A. Oberdörffer, C. Bernbeck, O. Maschke, B. Jassory, and T. Dugend.

* * *

The Lord Chancellor has intimated his intention of adding the name of Mr. Richard Fitzhugh, Pharmaceutical Chemist, to the Commission of the Peace for the Borough of Nottingham. Mr. Fitzhugh was for several years, and until recently, a Local Secretary of the Pharmaceutical Society and Superintendent of Written Examinations, and we doubt not that many of our readers will learn with pleasure that this honour has been conferred upon him.

* * *

The Summary in the 'Medical Students' Register' for 1883, which has just been issued, shows that the total number of medical students registered last year in the three kingdoms was 1783, being 79 less than in 1882, and a lower number than has been registered since 1878. The falling off was considerable in England and Ireland, whilst in Scotland there was an excess of registrations over those in any previous year.

* * *

We have been favoured with a copy of the "Order of Exercises," which was to have been followed at the Annual Commencement of the Massachusetts College of Pharmacy, held on the 2nd inst., and notice that one of the addresses was to be delivered by Mr. Henry Sugden Evans, a former President of the Pharmaceutical Society of Great Britain.

* * *

Among the candidates selected by the Council of the Royal Society to be recommended for election at the annual meeting are—Professor G. J. Allman, Professor J. Bayley Balfour, Mr. James Bell, Professor Walter Noel Hartley, Professor J. G. McKendrick, Dr. A. Ransome, Professor C. S. Roy, and Professor M. Watson.

Provincial Transactions.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The last meeting of the session was held at the Owens College, on April 29. Mr. F. R. Cooper, in the chair. The minutes of the previous meeting having been read and confirmed,

A lecture with experiments was given on the "Manufacture of Coal Gas," by Messrs. A. W. Duncan, F.C.S., and F. C. J. Bird, conjointly, the latter exhibiting with the lantern a series of thirty views and diagrams.

Mr. Duncan, after briefly describing the origin and formation of coal, said that the coal is carbonized in fire-clay retorts, at a temperature of 1800° or 2000° F.; the higher the temperature the greater is the volume of the gas, but with a smaller illuminating power for the same quantity consumed; the total illuminating effect of the whole of the gas produced, however, shows a gain. The coal is carbonized for from four to six hours, when the coke is withdrawn and the retorts recharged. The retorts are continually in operation, never being allowed to cool down for a period of twelve or eighteen months, when they are worn out and require renewal. The gas next bubbles through the liquid in the hydraulic main, which acts as a seal or liquid valve, preventing the backward rush of the gas when the retorts are opened. Here tar and ammoniacal liquor deposit from the cooling gas; the ammonia exists as hydrate, sulphocyanide, hyposulphite, carbonate and sulphide. In the condensers, through which the gas is next passed, the gas is thoroughly cooled, when more tar and ammoniacal liquor is deposited. Care has to be exercised, especially in the winter time, not to cool too much, or the gas would suffer deterioration by the condensation of some of its illuminating constituents. It is necessary to prevent pressure in the retorts and overcome the resistance of the several purifying arrangements and the weight of the gasometers. For this purpose there are several fan arrangements, called exhausters, for forcing the gas in the proper direction. In the early days of gas lighting, before exhausters were used, the gas was much deteriorated by the pressure, some of the hydrocarbons being decomposed and depositing dense gas-carbon around the interior of the retorts. The gas is next thoroughly freed from ammonia, which has only partially been left in the condensers and hydraulic-main; not only is the ammonia a valuable bye-product, but if left in the gas it would corrode the copper and brass fittings of the meters, etc. For the removal of the ammonia are a great variety of apparatus termed scrubbers, washers and washer-scrubbers. The best known is the coke-scrubber, being a tower filled with coke; a spray of water is distributed over the top, which slowly percolating through the coke exposes a large moist surface to the ascending gas, and thus the ammonia is absorbed. The Livesey scrubber is a very efficient one; in this the coke is replaced by a large number of grids or trays about four inches apart, each tray is formed of deal boards about half an inch thick, with the same distance between each board. In the washers there are various arrangements by which the gas is made to bubble through water. The gas still contains some sulphur compounds and carbonic acid, and to free it from these it has to pass through rectangular boxes called purifiers. There are two modes of purification, one with hydrate of lime and the other with hydrated oxide of iron. Hydrate of lime removes carbonic acid and sulphuretted hydrogen, and the sulphide of calcium produced combines with and removes the bisulphide of carbon. Oxide of iron purification gives no objectionable smell of sulphuretted hydrogen, as does the spent lime, which latter is difficult to dispose of, except from the smaller works in agricultural districts where it can be utilized as a fertilizer. The hydrated oxide of iron, however, only combines with the sulphuretted hydrogen, allowing the carbonic acid and carbon bisulphide to pass. When all the iron has been converted into sulphide, it only needs exposure to the air to be revivified; the iron is oxidized and the sulphur deposited. The oxide is repeatedly used until it contains a large amount of sulphur, when it is sold to be converted into sulphuric acid. The purified gas only requires to pass through the meter to be registered before passing into the gasometer. In the Cooper process, lime is placed in the retorts with the coal, and in this way much of the sulphur, instead of passing into the gas and needing so much purification, is left behind in the retorts in combination with the lime. The process, however, when tried in Salford, was found to deteriorate the coke so much as to prevent its adoption. One of the most promising of recent inventions in gas lighting is that of the regenerative furnace of Siemens; a bench of these are in use at the Salford Gas Works with very satisfactory results, there being a great saving of coke. By the ordinary arrangement the retorts are not heated by the direct flame but by the heated air and products of combustion. The fire has to be kept at a much higher temperature than that to which the retorts are heated, as by the time the heated air has reached the furthest retorts it has been very much cooled down. The retorts are not uniformly heated;—whilst those nearest the fire may be overheated, those furthest away are insufficiently. In the regenerative furnace, we have first the generator where air in insufficient quantity for complete combustion is passed over ignited coke; there is thus formed highly heated carbonic oxide, with some hydrocarbons; also hydrogen and oxygen from the decomposition of steam which is allowed to pass through the ignited coke. These gases pass directly under the retorts, where they are mixed with a sufficient quantity of air for their complete combustion; this air being first highly heated by the waste heat of the furnaces. This gaseous fuel can, unlike coke, be brought just where it is required and the retorts are exposed to the direct flame. By the ordinary method, under the most favourable conditions, at least double the volume of air theoretically necessary for complete combustion has to be admitted into the furnaces, thus causing a great loss of heat. In the Siemens furnace, however, the air can be much better regulated, and the quantity required is much nearer the theoretical quantity.

After the reading of the paper a discussion took place and hearty votes of thanks were accorded the authors for their paper.

The Chairman having congratulated the Association on the successful proceedings of the past session, the meeting then terminated.

MANCHESTER PHARMACY STUDENTS' ASSOCIATION.

On Saturday afternoon, May 3 (by the kind permission of the manager, Mr. Hunter), a visit was paid by members of this Association to the Salford Corporation Gas Works, at Regent Road. The party were conducted through the works, and the process of gas-making in its various stages lucidly explained by Mr. Spencer, special attention being called to an experimental retort bench now on trial at these works, in which the retorts are heated on the regenerative system, and which is said to promise most satisfactory results. At the close of the inspection a hearty vote of thanks was passed to Messrs. Hunter and Spencer.

The monthly meeting took place on Thursday evening, May 8, in the Materia Medica Museum, Owens College (by permission of the Council). The President, Mr. A. H. Jackson, B.Sc., in the chair.

Before opening the meeting the President, in a few well-chosen sentences, expressed his sincere pleasure at seeing so many members present, at the same time remarking that the Owens College was the home of many societies which, though much smaller in numbers than they were, yet did good and useful work; he also trusted that youth and energy might do much for the Association, and wished it a long and vigorous existence which might enable it to contribute to the mutual advantage of its members, to their pharmaceutical knowledge, and to the elevation and advancement of the cause of pharmacy.

The President then called upon Mr. William Kirkby to read a paper on "An Adulteration of Quince Seed."

After describing the botanical origin, microscopical structure, etc., of the quince seed, which were illustrated by diagrams and coloured plates, the author drew attention to a sample of quince seed which had undoubtedly been exhausted of the mucilage contained in its outer coats, dried, mixed with particles of some gum (probably acacia or senegal) to give its decoction the necessary viscosity, and then offered for sale. The seeds at first sight were not very dissimilar in appearance to ordinary quince seed, but from experiments made by the writer (details of which were given) they yielded, on treatment with water, a very weak and inferior mucilage.

After the reading of the paper a discussion followed, in which the President, Messrs. Thomas, Mitchell, Breeze, Elborne, and the Secretary took part.

The second paper of the evening, on "The Aconites," was then read by Mr. William Elborne.

Dividing the aconite roots of commerce into three groups, European, Indian, and Japanese, allusion was made to the distinguishing characters of the roots obtained from the various species, and their structure and chemical composition fully entered into. Reference was especially made to the microscopical distinctions between the roots of the European species, *A. Napellus*, *A. variegatum*, and *A. paniculatum*, their transverse sections showing a totally different arrangement of the vascular bundles. The paper was well illustrated by specimens and microscopical sections.

A discussion on the subject was then carried on by the President, Messrs. Duncan, Kirkby, and Breeze.

The next meeting will be held on Thursday evening, May 22, when a paper will be read on "The Poisons Act—Is Legislation Necessary?" by Mr. A. D. Breeze.

On Saturday afternoon, May 24, a visit will be made to the Botanical Gardens, Old Trafford, when Mr. William Elborne will read a paper on "The Medicinal Plants of the Month."

LEICESTER CHEMISTS' ASSOCIATION.

A lecture was delivered at the rooms of the above Association, on Wednesday evening, by Mr. H. Pickering, on "Induced Electricity."

Mr. J. J. Edwards presided, and there was a very good attendance.

The lecturer explained the various phenomena of inductive electricity in a very able manner, illustrating the different properties by means of a powerful battery, a large Ruhmkorff's coil, and numerous other electrical instruments.

The lecture was thoroughly enjoyed by those present, and at the close a hearty vote of thanks was accorded to Mr. Pickering.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, May 1, Mr. T. S. Dymond, Vice-President, in the chair.

The minutes of the previous meeting having been read and confirmed, a paper on "Animals or Plants?" by Mr. C. Shapley, was read by the Assistant Secretary.

The author first called attention to the fact that the distinctions between animals and vegetables are not in all cases so evident as might at first sight be supposed, but that, especially in the lower forms of life, a good deal of research is often necessary to establish which division certain organisms belong to, and that even then, what is considered an animal to-day may be classed as a plant to-morrow.

The principal distinctions between plants and animals were enumerated in order, and it was shown that each in turn did not hold good in all cases, and that although all of them applied in the majority of cases, yet none was perfectly absolute. Examples were given in each case of exceptions to these rules; the composition of the cell-wall (cellulose in plants, gelatine in animals) was stated to have an exception in the case of the cloak of the lower molluscs, which contained no nitrogen; the presence of starch in some animal tissues, and of chlorophyll in stentor, hydra, etc., as well as of cholesterin in certain plants, was mentioned; certain plants (protophytes) were stated to have organs of motion similar in character and constitution to those of certain animals (protozoa); and the power possessed by certain animals, *e.g.*, fresh water sponge, of decomposing CO_2 and developing chlorophyll in the presence of light was noticed. The most trustworthy distinction was shown to be that animals derive their nourishment from organic substances which they receive into their interior, while plants live on inorganic material, absorbing it from without. This was shown to hold good in nearly all cases, the few exceptions, such as euglena having been observed in the substance of a diatom, being considered doubtful. A supposed instance of metamorphosis in the case of *Volvox Globator* was referred to, and the life history of several of the lower organisms given. The author concluded by remarking that what we now believe to be simple may not be so in reality, as not only the extreme minuteness but also the great transparency of minute forms may conceal their structure from our limited powers of vision.

The paper was followed by a discussion in which the Chairman, Secretary and Mr. Ince took part.

A vote of thanks to Mr. Shapley was moved by the Secretary, seconded by Mr. Short, and carried unanimously.

The Secretary then read the following Report on Materia Medica, by Mr. W. Elborne:—

A Note on Commercial English-prepared Cod Liver Oil.

BY WILLIAM ELBORNE,

Assistant-Lecturer on Materia Medica and Pharmacy, Owens College.

The Gadidæ or Cod tribe are a family of fishes belonging to the Malacopterygious or soft-finned order. They include among others—

Gadus Morrhua	Cod,
„ æglefinus	Haddock,
„ molva	Ling,
Merlangus vulgaris	Whiting,

and are found for the most part in the seas of cold or temperate climates; from their size and tendency to congregate in particular localities, as well as from the wholesomeness of their flesh, they are consequently of great importance to man. The livers of these fish also yield valuable oil, notably that of the common cod, *G. Morrhua*.

As is well known, the chief seats of the cod-fishery are the banks of Newfoundland and the west coast of Norway, where great care appears to be bestowed upon the selection of the livers and subsequent extraction of the oil. The livers, being taken as fresh as possible, are carefully examined, those which are poor or injured being rejected; the selected livers are then well washed and dried, and afterwards put into open barrels where the oil slowly exudes and is ladled from the surface. When filtered this forms the "natural straw-yellow coloured" oil of the first quality. The livers are next transferred to a kind of water-bath, and heated to 180° F., yielding a second quality oil of a pale colour, and, by raising the temperature, inferior oils are subsequently obtained known as the light brown and dark brown oils, the latter being used chiefly by tanners and curriers.

Owing to the great increase in price of the Newfoundland and Norwegian oils during recent years the home production of oil has experienced an unwonted stimulus; large quantities being prepared at Grimsby, Whitby, Aberdeen, and other large fishing stations in the north.

The peculiarities respecting the source and preparation of the English oil, I am informed, are as follows:—A promiscuous mass of cod, haddock, ling, and whiting livers are thrown into a large tub directly they are brought ashore, stirred up with a stick, and allowed to remain until slight decomposition has taken place, the effect of which causes the rupture of the cells containing oil, which latter then escapes and rises to the surface. The oil being removed, the livers are afterwards submitted to a steaming process similar to the Norwegian method. In physical characters, taste, and odour English-prepared cod liver oil and haddock oil are undistinguishable from the famed Newfoundland and Norwegian oils (reputed to be extracted from the livers of the *cod* only).

Owing to the similarity in chemical composition of marine animal oils in general, the difficulty attending the examination and recognition of fish oils yielded by the same genus becomes more apparent.

The following, however, is a tabulated list of some results arrived at in examining seven samples of oil in reference to their specific gravity, viscosity, and rise of temperature on admixture with sulphuric acid:—

Samples of oil.	Fresh Norwegian Cod Liver.					Fresh Cod Liver English (Grimsby) Oil.	Fresh Haddock Liver (Aberdeen).
	No. 1.	No. 2.	No. 3.	No 4.	No. 5.	No. 6.	No. 7.
Specific gravity	·927	·929	·930	·926	·926	·930	·931
Lowest temperature at which it remained perfectly clear	Fah. 20°	28°	30°	26°	24°	40°	32°
Opaque	14°	22°	26°	20°	22°	36°	26°
Solid	8°	14°	16°	18°	10°	20°	16°
Viscosity	14·1	13·8	14	15·8	15·9	13·5	12·45
Rise in temperature . . .	64°–224°	64°–232°	64°–238°	66°–218°	67°–232°	64°–238°	64°–242°

The specific gravities of the above were taken at 60° Fah., in a specific gravity bottle, and the solidifying point by use of a freezing mixture of ice and salt.

The viscosity or fluidity of the oil was determined by ascertaining the rate at which it flowed through the fine aperture of a Mohr's burette as compared with water through the same aperture, and at the same temperature (20 seconds = 1).

The rise of temperature which occurs on mixing a fixed oil with concentrated sulphuric acid (specific gravity 1·845) is a reaction which has been employed by Maumené, Fehling, and others. In this case Fehling's method was followed, 6 c.c. of oil being placed in a very small white gallipot and its temperature noted, 2 c.c. of acid was then gradually added from a burette, the mixture stirred with a delicate thermometer and its highest temperature noted. In conducting these reactions the Grimsby oil (No. 6) frothed over on addition of the acid; in Nos. 1, 2, 3, 4, 5 a brown film was left on the inside of each gallipot, and in No. 7, a black film.

In reference to this report, I regret to state that time has not permitted the extension of the above table to a similar examination of other samples of cod, haddock, ling and whiting oils, which latter I had intended preparing myself; nevertheless, in due course I hope to be able to furnish such data.

Looking at the table, however, as it stands, it is noticeable that while the specific gravity of Norwegian oil is fairly constant, there are considerable differences in the temperatures at which they become opaque and solid and that their rise in temperature increases with their specific gravity; also that the English prepared cod liver oil and haddock oil are more susceptible to turbidity on being submitted to low temperatures, probably owing to the fact that the margarine or solid fat has not been previously removed by exposure to a low temperature (a process to which I believe the Norwegian and Newfoundland oils are subjected). From a commercial point of view, haddock liver oil is considered a "cod liver oil" superior to the English prepared cod liver oil referred to in this paper.

In conclusion, I beg to thank Mr. James Hart, for much valuable service and information, also Mr. Hermann Woolley.

The report was discussed by the Chairman, Secretary, Messrs. Cullinan, McDermott, Rees and Short.

The meeting then adjourned.

SOCIETY OF ARTS.

Fermentation and Distillation.

A course of Cantor lectures on "Fermentation and Distillation" was commenced on Monday, the 12th inst., by Professor W. Noel Hartley. The lecturer at first explained the principal methods used in the conversion of the starch both of grain and potatoes into sugar. In the treatment of the former malted grain is always used, the saccharification being carried on at the temperature of 73° F., almost invariably obtained by means of steam passing into a false jacket, through which, after the conversion of the starch into sugar, cold water is passed to reduce the temperature. The formation of lactic acid during this operation, the lecturer said, was rather advantageous than otherwise, because the conversion then took place more completely; phosphoric acid also tended to produce the same result. Before operating on potatoes it is usual to ascertain the proportion of starch they contain, so as to enable an estimate to be formed of the quantity of water needed for the preparation of the mash. They are then submitted to the processes of washing, cooking and mashing. The saccharification is now frequently effected by treatment with sulphuric acid. The starch grains, after being previously separated from albuminous matter by water, are heated with sulphuric acid for five hours; lime is then added, and the whole mixture is placed in a large vat. Professor Hartley then proceeded to classify the carbohydrates in three groups: (1) the amylose or starch group, $n(C_{12}H_{20}O_{10})$, including starch, dextrin, arabin, cellulose, lichenin, glycogen, inulin, and tunicin; (2) the saccharose, or cane sugar group ($C_{12}H_{22}O_{11}$), including saccharose, lactose, maltose, synanthrose, melitose, and melizitose; and (3) the glucose, or grape sugar group ($C_6H_{12}O_6$), containing dextrose, levulose, galactose, arabinose, eucalypte, inosite, sorbite, and dambonite or bornesite. The lecturer explained the connection between these groups and their constituents by means of separate quantities of water and carbon, and showed that if the elements of a molecule of water were added to starch maltose ($C_{12}H_{22}O_{11}$) was represented, whilst the abstraction of the elements of a molecule of water resulted in erythro-dextrin, which also could again be reduced to achroo-dextrin. Professor Hartley then referred to some of the differences in starch grains: those of barley burst at 99° F., and swell until a temperature of 144° F. is reached; those of maize burst at 122° F. and swell until the same temperature is arrived at; and those of acorns do not burst until 135° F., swelling until 190° F. is reached. The lecturer then mentioned some of the soluble ferments, and remarked upon the derivation and properties of diastase, maltine, invertin, emulsin, papayin, myrosin, ptyalin, pepsin, and pancreatin. Passing from these to the glucosides, he mentioned that amygdalin ($C_{20}H_{27}NO_{11}$) could be split up into bitter almond oil, prussic acid and glucose, tannin ($C_{27}H_{22}O_{17}$) into gallic acid and glucose, salicin ($C_{13}H_{18}O_7$) into saligenin and glucose, and arbutin ($C_{12}H_{16}O_7$) into hydroquinone and glucose. Professor Hartley then remarked upon the necessity of maintaining an exact temperature during saccharifying operations, not only because too great a degree of heat destroys the diastase when malt is used, but also because whilst 80 per cent. of maltose and 19 per cent. of dextrin are obtained at a temperature of 140° F. a rise of 9° in temperature leads to a loss of 40 per cent. of maltose and a corresponding increase of dextrin. In concluding the lecture Professor Hartley said many of these results obtained were due to the work of Brown and Hiron and O'Sullivan, though he mentioned the names of many others who had contributed to them.

Cupro-Ammonium Solutions.

A paper upon "Cupro-Ammonium Solutions and their Use in Waterproofing Vegetable and Paper Tissues" was read by Dr. C. R. Alder Wright before the Chemical and Physics Section of the Society of Arts on Thursday, the 8th inst. It commenced by defining a cupro-ammonium compound as a product of the combination of ammonia with copper compounds, and stated that salts of copper usually combine with four proportions of ammonia. Cupro-tetrammonium sulphate ($Cu_2NH_3)SO_4,H_2O$ is obtainable in crystals by the admixture of a concentrated solution of copper sulphate and a solution of ammonia; the salt being separable by the addition of a very strong ammonia solution or by shaking with alcohol. Similarly other cupro-tetrammonium salts can be obtained. A closely-related compound is cupro-ammonium hydroxide, prepared by dissolving cupric hydrate or agitating metallic copper in ammonia solution in presence of air; the copper oxidizes and dissolves in the ammoniacal liquor, which assumes a blue coloration more or less deep according to the time of agitation. The instability of these compounds under the influence of heat and water, alone or conjointly, is very marked, though considerably lessened in the presence of a large excess of ammonia. The cupro-tetrammonium sulphate is decomposed by the addition of a large bulk of cold water, a basic insoluble copper sulphate being formed together with free ammonia and ammonium sulphate. The cupro-ammonium hydroxide solution is decomposed by addition of alcohol, a blue precipitate of hydrated copper oxide being thrown down, or by boiling, when anhydrous black copper oxide is formed and ammonia liberated. It is to the more stable forms obtained by dissolving copper salts or copper hydroxide in an excess of ammonia solution, that the name of "cupro-ammonium solutions" is given. These solutions have long been known to possess the property of apparently dissolving cellulose and various allied substances; paper, cotton-wool and similar materials disappear and are apparently dissolved upon digestion in these fluids. Some chemists assert that the substances are simply gelatinized and remain in the solution in a transparent form; but the reappearance of the cellulose as a flocculent precipitate upon neutralization by an acid or the addition of potassium cyanide solution points to a case of true solution. On evaporation to dryness of a cupro-ammonium solution in which cellulose has been dissolved, a more or less gummy residue is obtained, containing the cellulose intermixed with copper oxide and other salts; if, however, the cellulose be in excess, black oxide of copper is often not formed at all, but a green varnish-like mass of cellulose combined with copper, so that if the solution be evaporated on the surface of paper, calico, etc., just dipped in the solution, each filament of the fabric used employed becomes coated with the mass, and the whole welded together. This cement-like mass of cupro-cellulose, as it may be termed, being insoluble in water, communicates its water-resisting properties to the material so treated; the presence of copper also proves advantageous in protecting the substance and making it less prone to the attacks of insects or mould, even when kept under conditions favourable to the growth of animal and vegetable life of a parasitic nature. The use of a solution of cupro-ammonium hydroxide is found preferable to that of solutions containing cupro-ammonium salts, for not only is the action in cellulose more energetic for a given amount of copper and ammonium in solution, but various other advantages are gained. As fabrics treated with cupro-ammonium sulphate solutions will contain the soluble sulphate of ammonium and sometimes that of copper when dried, there is a tendency for the material to become porous if exposed to the dissolving action of water and also to cause an unsightly efflorescence under other conditions. On the contrary if cupro ammonium hydroxide solutions be used, all the ammonia present is volatilized, and may be recovered during the drying process; whereas with cupro-ammonium sulphate solution a considerable fraction of the ammonia is fixed as sulphate, and so lost. It is further observed that whereas iron precipitates the copper in solutions of ordinary copper salts, no such action takes place with cupro-ammonium hydrate solutions, so that cast or wrought iron tanks for the reception of the liquor, as well as steel rollers and machinery employed in contact with the liquor or with fabrics moistened therewith, can be used with impunity. This peculiarity is the more remarkable as this non-action is not observed with metal zinc, which precipitates the copper with about equal facility, whether the copper be in the form of an ordinary copper salt or in that of a cupro-ammonium solution. The use of copper or brass in the construction of the machinery employed must also be studiously avoided, otherwise corrosion and injury is speedily brought about. A bath containing a mixture of cupro-ammonium, and the analogous zinc-ammonium hydrate solutions, may be used with advantage for certain purposes. The zinc compound alone does not sufficiently pectise cellulose to give good results; but when used in conjunction with cupro-ammonium hydroxide, pectising is brought about by the copper solution, whilst certain advantages are obtained by the presence of the zinco-cellulose in the finished goods. As the subject of the manufacture of both cupro- and zinco-ammonium solutions has recently been dealt with in a paper read before the Society of Chemical Industry, the lecturer did not refer to it further than to state that the fluids are obtained by the simultaneous action of air and ammonia water on metallic copper (or brass, if a mixture of cupro- and zinco-ammonium hydroxides is required), due attention being paid to the recovery of the large amount of ammonia necessarily carried away by the "spent air" during the operation. The good results obtained in laboratory experiments have led to a company being formed, having their works at Willesden for the manufacture of fabrics, principally paper and canvas, treated with cupro-ammonium solutions so as to waterproof them and render them rot-proof, and practically free from the attacks of insects and moulds. Specimens have been exhibited at South Kensington in 1872 and in the Paris Exhibition of 1878, but since the latter date many improvements have been made in the nature of the plant requisite for the manufacture and the process for obtaining the essential fluid facilitated, thus enabling marketable products to be produced. These products consist of several classes and are generally known under the name of "Willesden" goods; the rope, cordage, etc., is prepared by simply dipping the made-up materials into a bath of cupro-ammonium solution, using certain precautions as to the mode of immersion and its duration, and the strength of the solution; upon drying not only is a varnish-like dressing obtained, but the fibres are strengthened by the cementing together, and many advantages are claimed as compared with similar goods protected by tarring or treated with other preservative compositions. The canvas is prepared in a somewhat similar manner, saving that the fabric to be treated is usually unwound from one roller and rewound upon another, after passing successively through the bath and a succession of drying rolls similar to those of a paper-mill. Paper is either treated in the same way as the canvas, or else a number of layers are pressed into one solid sheet of continuous lengths, whilst still pectised by the action of the cupro-ammonium solution. The uses to which these materials may be applied appear indefinite, ranging from the applications to stationery and bookbinding to the purposes of building both boats and houses. Among many illustrations shown by the lecturer to prove the superiority of fabrics treated with cupro-ammonium solutions over ordinary materials, was a specimen of paper immersed for eight consecutive weeks in a steam boiler at a pressure of 60 lbs., the only apparent change being a slight cockling at the edges. These fabrics possess many advantages over galvanized iron, both as articles of transport and for use under a tropical sun, weighing less than one-tenth a relative quantity of galvanized iron, and also allowing of being put up in compact rolls so that no space is wasted in packing; the cost of transit will therefore be less heavy. Further, being comparatively non-conducting, the heat of a tropical sun is less felt under a roof of this kind than under a metallic one, whilst no inconvenience is felt from condensation of moisture on a cold night. No change is manifest, and no unpleasant odour emitted under the hottest tropical sun, whilst no painting is required to prevent corrosion or leakage, though the surface takes paint readily if required for decorative purposes. In case of fire, although not absolutely indestructible, the "Willesdenized" materials will not readily feed the flames owing to the copperizing and compacting processes employed.

During the discussion which followed the reading of the paper many suggestions were made as to the uses to which fabrics treated with the cupro-ammonium solutions might be applied. Questions were raised as to whether the copper was an essential constituent of the fabric so treated, and also whether a plan could not be devised for submitting the materials to treatment with cupro-ammonium solutions before being made up, thus ensuring not only a superficial layer of "cupro-cellulose" but a fabric thoroughly impregnated with the solution. As to the application to electricity the fabrics were described as not ready conductors, but could not be used as safe insulators. Dr. Atcherley remarked that one of the first discoverers of the process of treating fabrics with cupro-ammonium solutions was the late Dr. John Scoffern, and also stated, as an example of the capability of these fabrics to withstand the attacks of insects, that a specimen had been placed in a white ant's nest for a period of six weeks without sustaining the slightest injury.

Parliamentary and Law Proceedings.

Poisoning by Rat Poison.

An inquest has been held at Barrow, before Mr. John Poole, on the body of Mr. T. H. Baynes, who had died from the effects of poison.

The following is the evidence relating to the sale of the poison:—

Mr. John Bryden, chemist, Old Barrow Island, said the deceased came into his shop on Monday afternoon, April 21, and asked if he had anything that would kill rats, as they were eating the ledgers in the office. Witness told him he had, and showed him several different kinds. He took one in a box, for which he paid a shilling. Witness could not say what it contained. He did not make it himself, but got it from London, and it was called "Rough on Rats." Could not say if it contained arsenic or strychnine.

The Coroner: Did you enter it in your book?

Witness: No.

The Coroner: Why?

Witness: Because I knew him so well. There is a list of poisons that we should enter, but this is not one of them.

The Coroner: You say you do not know what it contained?

Witness: Because it was not one of those mentioned in the Act.

The Coroner: But that does not exempt you under the statute from entering it, does it?

Witness said there were some rat poisons they entered in the book, even when sold to persons they knew.

The Coroner: Why did you not do it in this case?

Witness: I did not think of it at the time. The deceased was talking in his usual way, as he knew him very well. He (witness) had never opened any of these packets to see their contents. The deceased purchased the only one he had, but he had since got another packet in consequence of this case; but had not yet examined it. Witness knew the deceased well and did not notice anything wrong in his manner.

By Mr. Nalder: Had known the deceased for about nine or ten years. When he came to the shop witness was of opinion that he was on his way from dinner. He seemed to be perfectly calm, and in a happy frame of mind. Witness did not notice the slightest difference in his demeanour. They had no conversation except that relating to the sale of the rat poison. Deceased had been a customer of witness's for a long time, but never remembered having sold him rat poison before. Was sure he could not have bought any without witness knowing it. Deceased had dealt with him for about eight years, but more so since he had commenced business on Old Barrow.

By the Coroner: The deceased was not in the shop before on the same day.

Dr. Murray said on Monday evening, the 21st, he received an urgent message to proceed to the house of Mr. Baynes, West View, as his son Tom was either very ill or dying. Witness proceeded there at once, and found the deceased lying on the floor quite dead. He was partially dressed. Witness also observed some vomited matter in a basin in the bedroom, which consisted of a stringy mucus with a little blood. On Wednesday afternoon witness made a *post-mortem* examination of the body, and found it was well nourished. On examining internally he found the liver quite healthy. The lungs were also healthy but congested. The stomach contained about eight ounces of bloody fluid. The lining membrane of the stomach was intensely congested and red all over. There were no ulcerations. On the surface were particles of what appeared to be a powder. On examining the heart he found it healthy and muscular; the right side being full of blood and the left comparatively empty. Witness afterwards placed some of the powder under the microscope and found crystals of some metallic compound. From the appearance of the body immediately after death, and the vomited matters, and from the facts disclosed by the *post-mortem*, and the total absence of disease, and from what little he had heard of the case, he was forced to the conclusion that he did not die from natural causes, but from the action of some irritant poison, the mode of death being by syncope, or failure of the heart's action.

The box of rat poison mentioned by the witness Bryden was produced at this point. The witness on examining it said it was the same colour as the powder found in the stomach of the deceased.

After some further evidence the Coroner summed up, saying that there was no doubt deceased had purchased this poison with a view of taking away his life. The Act for the Sale of Poisons, 31 and 32 Vict., was passed to prevent persons getting poisons in the way this had been got. The Act was intended to meet cases of this kind, and in cases where precaution was necessary. If that precaution had been used in the present case it might perhaps never have happened. The deceased might have gone home and the strain on his mind might have passed away.

The Jury returned a verdict "That the deceased died from the effects of poison taken during a fit of temporary insanity." They also recommended that the Act with regard to the sale of poisons should be strictly enforced.—*Ulverston News.*

Obituary.

Notice has been received of the death of the following:—

On the 19th of February, Mr. Joseph Raper, Chemist and Druggist, Bradford. Aged 75 years.

On the 4th of March, Mr. Henry Jones, Chemist and Druggist, Wimborne. Aged 46 years.

On the 18th of April, Mr. Henry Cheese, Pharmaceutical Chemist, Coleford. Aged 51 years.

On the 20th of April, Mr. Walter Herbert Priestley, Chemist and Druggist, Newton Abbott. Aged 29 years. Mr. Priestley was an Associate of the Pharmaceutical Society.

On the 1st of May, Mr. John Bryne, Chemist and Druggist, Cheddar. Aged 51 years.

On the 2nd of May, Mr. Frederick Baker, Chemist and Druggist, Ottery-St.-Mary. Aged 48 years.

On the 3rd of May, Mr. James Leare, Chemist and Druggist, Sunbury. Aged 81 years.

On the 7th of May, Mr. Robert Thomas Ainsworth, Chemist and Druggist, Rusholme. Aged 38 years.

On the 8th of May, Mrs. Alice Lawton, Chemist and Druggist, Dukinfield. Aged 55 years.

On the 10th of May, Mr. William Andrew, Chemist and Druggist, Bradford, near Manchester. Aged 51 years.

Reviews.

THE COLONY OF BRITISH HONDURAS: ITS RESOURCES AND PROSPECTS. By D. MORRIS, M.A. London: E. Stanford. 1883.

The author was invited by the Government to pay a short visit to the colony of Honduras in order to investigate its flora and economic resources. The result is the account, or rather the report, contained in this work; plants of purely botanical interest being for the most part omitted, but special attention being devoted to the industrial productions of British Honduras.

The name of the colony has been chiefly connected hitherto with the trade of mahogany and logwood; and the writer endeavours to show that the place offers natural facilities for more extensive commercial enterprise.

It is somewhat discouraging to find that a fair amount of capital is indispensable to the successful colonist; and as £1000 seems the lowest estimate, a new field of energy is offered rather to the experienced cultivator than to a young man seeking to advance his fortunes in an unexplored and rising country.

It appears, however, that British Honduras has a special opening not only for sugar plantations, cacao and coffee, but for the smaller industries connected with fruit and vegetables.

The most interesting plant found wild in the forests is the india rubber tree, the *Castilloa elastica*.

The original supplies of india rubber are likely at no distant date to fall short of the demand; and as this tree is most abundant throughout the colony, great hopes may be expected from its cultivation.

The mode of extraction and preparation are detailed at length; and Mr. Morris, adopting the favourable opinion of Mr. Clements Markham, considers that this Central American rubber is well worthy of attention. The authorities of Kew have procured various rubber seeds and plants, and distributed them far and wide for the purpose of establishing them under cultivation; many cannot be easily cultivated under ordinary circumstances. The castilloa tree offers all round the most advantages, as it strikes its roots far into the ground without exhausting the surface soil; it grows with wonderful rapidity, soon forming a handsome shade tree; and lastly it gives a return in rubber within eight or ten years, while most other trees do not mature for some twenty or thirty years.

Amongst the economic plants mentioned are the vanilla, indigo, arnatto and the guaco; the last known to us as a febrifuge and anthelmintic, and possessing a local reputation as a supreme antidote against serpent's bites.

The larger industries, such as the fibre-producing plants, the sugar cane and others, hardly concern the pharmacist, but the description of nutmegs, pimento, cinnamon, cardamoms and spices generally, from an economic point of view will repay perusal.

The system of cash payment, as specially visible in the fruit trade, has given an entirely new impetus to commerce. The planter was formerly in the hands of an agent; now he can choose his own market, and secure immediate returns.

Intending settlers are advised to gain practical experience from an established colonist, before venturing on their own account, and to trust to commercial undertakings, as there are no salaried appointments in British Honduras.

The book is a careful record of the commercial capabilities of the colony, founded upon personal investigation.

MEDICAL GUIDE TO THE MINERAL WATERS OF FRANCE, AND ITS WINTERING STATIONS. By A. VINTRAS M.D., Physician to the French Embassy. London: J. and A. Churchill.

The serious study of the therapeutics of mineral waters has become a distinct branch of medicine, and one quite worthy of cultivation. As an adjunct to ordinary practice these waters are invaluable. Of late years also many springs which owed their reputation either to local tradition or to some happy accident of patronage which made them fashionable have been carefully investigated. Eminent physicians have devoted themselves to this special subject; and the result has been to the undoubted advantage of patients to whom ordinary treatment offered only partial relief. As a secondary and inevitable consequence, a wonderful impetus has been given to commercial industry. Small villages, picturesque and neglected, have risen into importance; while many thousand visitors annually crowd to the more celebrated health-resorts.

This book, by Dr. Vintras, is limited to the mineral springs of France, to which it forms a general not a particular guide. There is no attempt in its pages to exalt one locality to the detriment of another; but the intention is to describe scientifically and impartially the various French springs, to explain their medicinal value, and to give full information respecting them both to the medical world and to the public.

Acknowledgment is paid at the outset to the researches of Dr. Durand-Fardel, who has done so much to elevate hydrotherapeutics to the position of a special science.

By the term mineral water is meant natural waters which are employed in therapeutics in consequence of their chemical composition or temperature. The proportion of the mineral principles which they contain cannot be taken as distinctive, since some of the most interesting are the least strongly mineralized. The extended action which they exercise upon the constitution, on the whole of the secreting system, on the capillary circulation and on the ultimate phenomenon of nutrition, separates them from other pharmaceutical remedies. A mineral water is not a medicine which can be kept at hand and used at will; and with regard to its employment, clinical study in the hospital teaches nothing, individual experience obtained by special investigation must be the only guide.

The chemical analysis of a water is to a certain extent hypothetic, for the combinations in which its constituent elements are presented are not extracted in the form of salts; and the principles by which their acids and bases are brought into connection with each other and expressed in definite proportions are not absolute. Still the slight dissidence of chemists cannot bring any serious modification to the therapeutical character of a spring. Iron is a most usual ingredient; arsenic frequently accompanies it, especially in the mountainous region of Auvergne. Lithium has been detected by spectrum analysis; the alkalies are present in variable and characteristic proportions; but soda frequently predominates, and, according to Dr. Vintras, so great is its importance that the therapeutical value of a mineral water can be almost accurately measured by the quantity of soda which it contains.

Sufficient data have been accumulated to reduce mineral waters into a system, and to arrange them according to a definite classification.

The French system consists of four main groups:—Sulphuretted, chlorinated, bicarbonated, and sulphated. There are two other groups, indeterminate, as the simple thermal and the feebly mineralized waters; and as a supplementary group, ferruginous waters.

In adopting this classification it should be observed that predominance is not decided by the mere figures furnished by chemical analysis exclusive of therapeutic value. In the sulphuretted waters, the sulphur itself exists in an inferior proportion to the other substances, yet it determines their distinctive character. The ferruginous waters contain iron always in a secondary proportion and only as a base. They cannot, therefore, be grouped amongst the waters the classification of which is due to the predominant acid which they contain; and as iron in some proportion is almost an invariable constituent, such waters are alone reckoned ferruginous where the iron exercises a distinct medicinal influence.

Taking this system as a base, Dr. Vintras proceeds to describe in rotation the best known mineral springs in France; showing in what cases they are to be recommended, and when their use would be prejudicial to the patient. The latest analysis is in each case subjoined, and the method of their application is sketched from actual investigation.

The wintering stations occupy the concluding portion of the volume, and while Nice, Pau, Mentone, Hyères, Cannes and Biarritz are fully noticed, many other less known stations are introduced to the consideration of the reader. We can hardly imagine a more useful volume as a guide to a physician anxious to relieve a patient from a long list of maladies or their consequences which do not yield to the exhibition of pharmacopœial remedies. The pharmacist may consult these pages with advantage, as he can scarcely afford to be unacquainted with a system of medication which is now decidedly in vogue. Very sensible directions are scattered through the volume, both in the way of precaution and advice.

Correspondence.

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

Spirit of Nitrous Ether.

Sir,—In reply to Mr. Abraham I have only to remark that in my paper I do not admit, as he states, "the fact" alluded to by him, namely, that the standard alkali *per se* decomposes the spirit during the estimation of acidity. The decomposition which I allude to is quite a different thing, and is discussed in the paper, means for limiting the error arising therefrom being also given.

119A, *George Street, Edinburgh.* PETER MACEWAN.

T. S.—(1) *Bryum cæspitium.* (2) *Funaria hygrometrica.* (3) *Mnium hornum.* (4) *Polytrichum commune.* There is no collective work on British cryptogams of more recent date than the second edition of 'English Botany.' A work on British mosses in now being issued in parts by Dr. Braithwaite, The Ferns, Clapham Rise.

A. M.—Your question is one that turns upon a legal point, and we are therefore unable to advise you concerning it. But with respect to the first title mentioned we fail to see upon what ground you expect to be able to register and thus acquire an exclusive right to it, when you are aware that it is already in use. For our opinion as to what constitutes a "patent medicine" see the *Pharmaceutical Journal* for May 10.

An Apprentice.—See a paper on "The Preparation of Syrups of the Lactophosphates" in *Pharm. Journal*, [3], vi., 881.

S. P. S.—An article on "The Preservation of Plants for Herbaria" will be found in the *Pharmaceutical Journal*, [3], vol. iv., p. 754. A beginner will find Holmes's 'Botanical Note-Book' a useful work.

G. E. R.—(1) Such a person could not legally carry on the business, except in the capacity of a trustee or executor, and then only with the assistance of a qualified pharmacist. (2) We understand that the publishers have communicated with you on this subject.

O. H. Bott, D. Davies, Kintyre, A. P. S. and *Cymro.*—We think it hardly desirable to publish your letters, as the context of the passage to which you object shows that, although it was written somewhat unguardedly, what our correspondent wished to condemn was an undue parade of the qualification.

J. T. Hall.—(1) We are unable to supply you with a formula for a preparation resembling the proprietary article mentioned. (2) It is difficult to obtain a satisfactory result without an admixture of wax or some similar substance.

J. C. Lloyd.—It might be beneficial on account of its antiseptic properties.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Stenhouse, Brown, Sawer, Watts, T. and H. Smith, Dott, Talbot, Davies, J. W. W.

THE ANNUAL DINNER.

The Annual Dinner of the Pharmaceutical Society took place on Tuesday evening at the Holborn Restaurant, Mr. Michael Carteighe, President, in the chair. About 200 members and their friends attended, and there seemed to be but one opinion as to the excellent character of the dinner, the wine, and all the arrangements. Amongst the guests were Dr. Farquharson, M.P.; Dr. Lyons, M.P.; Sir Trevor Lawrence, M.P.; Mr. Daniel Grant, M.P.; Mr. W. Mc Cullagh Torrens, M.P.; Lieut.-Colonel Cowan (Sheriff of London and Middlesex); the President of the Medical and Chirurgical Society (Dr. George Johnson); the Secretary of the Royal Society (Professor Michael Foster); the President of the Odontological Society (Mr. T. J. Smith); the President of the Medical Society (Mr. Durham); the President of the Metropolitan Branch of the British Medical Association (Dr. C. J. Hare); the Dean of the College of Preceptors (Mr. H. W. Eve); the President of the Harveian Society (Mr. G. P. Field); the President of the Chemical Society (Dr. Perkin); the President of the Chemists' Assistants' Association (Mr. C. Parkinson); Sir Frederick Abel, Professor W. Chandler Roberts, Dr. Meymott Tidy, Dr. Lush, Dr. Stevenson, Dr. Hubbard, Dr. B. W. Richardson, Mr. E. Wyndham Cottle, Dr. Dowse, Mr. William Sowerby, Mr. H. J. Chaney (Standards Department), Mr. F. C. Danvers (Indian Office), etc.

The PRESIDENT first proposed the health of the Queen, which was received in the usual loyal and enthusiastic manner.

The next toast was "The Houses of Parliament," proposed by the PRESIDENT, who remarked that its importance was such as would allow of a very long speech if other considerations did not interfere. As far as he could see the members of the Legislature were judged from a very different standpoint inside the House to that from which they were judged outside. He had had on various occasions to see them within the precincts of the House, and he found them a very agreeable set of persons, who led a life which must be more or less horrible according to circumstances; and this impression of their lot was very much what he had experienced in some of his holiday wanderings in Switzerland, and reminded him of what was once said of a distinguished member of the literary profession and also of the Alpine Club, Mr. Leslie Stephen. That gentleman was once told by the prince of Swiss guides that it seemed a very remarkable thing that so many English gentlemen should go to Switzerland, leaving their comfortable homes and beautiful pastures, not to sit still and enjoy themselves, but to climb mountains, and to *pay* for the luxury of so doing. It seemed to him that the members of the House of Commons were very much in the position of an average Swiss mountaineer. They had an enormous deal of work to do; an immense responsibility; and in these days they had to pay heavily for the privilege of bearing these burdens. He looked upon a member of the House of Commons who did his duty as being a pattern to his countrymen; and, with regard to the House of Lords, in his opinion the two Houses were inseparable, and though they were not in the habit of inviting members of the Upper House to attend their annual meeting, none the less did those who took an interest in politics recognize the importance of that assembly. A second chamber was recognized by all who had given any thought to the questions of government to be essential, and both Liberals and Conservatives were, he believed, agreed on this point. Considering the amount of work which was done in Parliament and elsewhere by the members, he thought their constituents ought to feel greatly indebted to them. Everyone who had held office in any society or corporation knew perfectly well the enormous demands it made on their time, and considering that the House of Commons in itself represented almost everything between the smallest club and the largest corporation in the world, one might well wonder that it had not found it impossible to go on with the work which lay before it. If anyone felt inclined to complain of the paucity of the work which was done, he should remember that those outside were constantly clamouring for more and more to be undertaken. In proportion as civilization and education advanced so must the labours of Parliament increase. If, therefore, they complained that the House of Commons talked much and did little it must be borne in mind that the constituencies were in great part to blame, inasmuch as their wants were immeasurably greater than they were even twenty years ago. Although in that assembly any question of party politics would be quite out of place it was important to remember that for all practical purposes they lived under what was practically a republic. They had all the advantages of a republic with none of its disadvantages, and if the House of Commons or the House of Lords did not altogether represent what such houses should be it was due rather to the increased exigences of the country than to any fault in the Houses themselves. He would couple with the toast the name of a distinguished member of the medical profession, Dr. Lyons, Member for the City of Dublin.

DR. LYONS, M.P., in responding, said he was called upon not only to reply for the House of which he had the honour to be a member, but also for the House of Lords, and he was, therefore, glad to see around him, and, no doubt, ready to make up for shortcomings on hi part, several distinguished members of the Legislature. There were an hon. baronet, who represented the medic profession, the hon. member for West Aberdeenshire, Dr. Farquaharson, and the hon. member who represented a division of the City of London; there was also a compatriot of his, who had for many years filled a distinguished position in the Legislature, who represented an important metropolitan constituency. The President had very ably depicted the labour which devolved upon them in the present day, and he felt that he was justified in saying that that labour was becoming more and more arduous every year. So much was the public business of the country increasing, and so much was it the custom of all, under all circumstances, to look to those who represented them in Parliament for assistance in dealing with almost every conceivable question which could occupy the human mind, that no one who had not gone through the labour of the House of Commons could thoroughly appreciate how thoroughly they were occupied from morning to night. To keep abreast, even in a moderate degree, with the various questions which agitated the public mind, and on which every member was expected to be at least somewhat informed, was no slight task. Then they were obliged, though with pleasure and advantage to themselves, to see a number of persons representing important public interests, and from that constant contact with persons of the highest intelligence, representing commerce, industry and all branches of science and the arts, they derived most important advantages. In this way they were kept in constant touch with the community, and thus they endeavoured to fulfil the arduous duties which were imposed upon them, and which occupied them the greater part of the day and night. It was no longer a question of a sort of dilettante attendance on what had been called one of the best clubs in Europe, which no doubt it was, but it was also the most hard worked body in Europe that could be named. In order to secure the respect of those who came to see them on matters of public interest, they were obliged to steal from the hours usually allotted to sleep the time requisite to study those questions, and he believed it might be fairly said that an increasing proportion of members of the House of Commons were prepared to devote themselves heart and soul to the great business of the State. Much was done by those whose names became familiar in the daily papers as taking part in the debates, but much more was done of an important character by those who did silent work on committees. It was always a satisfaction to those who devoted themselves to public work to find that their efforts were appreciated, and it was a great pleasure, therefore, to him to find that this toast had been so heartily received.

The PRESIDENT next proposed "The Sheriffs of London and Middlesex." It was said that the office of Sheriff was more ancient than that of the Lord Mayor of London, but be that as it might, they were all delighted to see the right eye of the Lord Mayor,—as the Sheriff had been called,—present that evening. It was impossible to propose this toast without some reference to the corporation of London. Those who had not taken an active part in municipal affairs had some difficulty in grasping the pros and cons of the proposal now before Parliament with regard to what might be called the enlargement of the municipal boundary, but it did seem to him, speaking without any feeling of partizanship, that it pointed to a process by which all the traditions of the ancient city of London might be extended to a greater London without getting rid of them altogether. Living, as he did, outside of the City, he should be very sorry to ask the Lord Mayor and Sheriffs to come and assist those who did public duty in his neighbourhood, and at the same time to sacrifice in any way the ancient glories of their office. The difficulties of the question were very great, but above all things they should desire, while seeking to make progress in local self-government not to lose sight of those glorious traditions which belonged to the City of London and which sprang from the time when freedom was almost crushed by the royal prerogative. It was an extraordinary sign of the times that the City should be considered old fashioned and obstructive, because it carried out the form of government which was strenuously insisted upon as the preservative of freedom many hundred years ago. He would couple with the toast, the name of Lieut.-Colonel Cowan, and he would add a hope that he and his successors would all be imbued with the same desire to do justice to their fellow citizens as had animated their predecessors.

Sheriff Lieut.-Colonel COWAN thanked the meeting for the very kind way in which it had received the toast so flatteringly proposed by the President. Under ordinary circumstances he should not have departed from the rule he generally observed, not to make any allusion to political questions, but one or two remarks had been made which seemed to invite comment, with regard to the ancient municipality which he had the honour to represent. The corporation of London had existed for many years, and had been the personification of that local government and self-government under which England had prospered. As to the remark made with regard to the extension of the corporation in such a way that its ancient privileges might be extended to the more distant parts of the metropolis, he would remind his hearers that the word "local" had some limitation, and that the interest which had prompted the citizens of London to take such a lively interest in the welfare and improvement of their own surroundings could not be felt if those surroundings were extended to the vast area contemplated by the present measure. Having said so much he would only add that he thanked them very cordially for the honour which had been paid to the ancient office which he had the honour humbly to fill.

The PRESIDENT next proposed "The Learned Scientific Societies." He said the members of the Pharmaceutical Society from their early training were probably as well able to judge of the work which these societies did for the benefit of mankind as any other portion of the British public, and he held that no toast was received in a company of pharmacists with more enthusiasm. That was hardly the occasion to say much about science, but he might be allowed to remark that one of the objects of the Society which he represented as President was in a humble way to promote science in its relation to pharmacy; and that being so they naturally felt they should be doing wrong if they did not pay a tribute to the excellent work which was being done by all the great scientific societies for the benefit of mankind in general. There were present members of several learned societies, and it was rather difficult to select one in particular, but as a pharmacist he naturally turned to medicine, which had sent to the Royal Society, the father of all the learned societies, a number of distinguished men. In that spirit he proposed the toast, and associated with it the name of a distinguished professor of King's College, a Fellow of the Royal Society, a practical physician, and the President of the Medical and Chirurgical Society, Dr. George Johnson.

Dr. GEORGE JOHNSON said if he had any pride in his composition he should have begun by saying that he was very proud to respond to this toast, but as he was notoriously anything but proud he would begin by saying that he regretted exceedingly that the responsibility of responding had not fallen upon somebody better able to do justice to it. He saw around him many distinguished Fellows of the Royal Society, but he had been probably selected as being President of the Medical and Chirurgical Society. The learned and scientific societies were very numerous; he had the honour to belong to the oldest of them, and had been present at the birth of some of the youngest, and they were all doing very good work, endeavouring in various ways to extend the boundaries of human knowledge, to increase that knowledge which, in the words of Bacon, might tend to the glory of the Creator of man's estate. Amongst the sciences which were being cultivated by those societies, that of chemistry had conferred upon mankind greater benefit than almost any other, and with that science most of the gentlemen present were connected. He had a great respect for the science which had lit that room by electricity instead of the abominable gas which poisoned the atmosphere, but by far the more important was the science which had given them two most beneficial agents, although their application was due to men of his own profession, viz., anæsthetics and antiseptics. These two were about the most beneficent agents which chemistry had brought to light. If it were not considered too medical he would venture to repeat what he had heard a few days since at a branch meeting of the British Medical Society at Colchester. At that meeting Mr. Thornton showed four remarkable specimens, two of them were urinary calculi, which he had removed from patients who were perfectly well after the operation,—not from the bladder, but from the kidneys, this being quite a modern operation; the third specimen was a spleen which had undergone hopeless degeneration, which had also been removed, and the patient was doing perfectly well. But the fourth specimen was still more remarkable. A young woman was found to have a tumour in the abdomen; first it was supposed to be in the colon; this was opened under the influence, of course, of anæsthetics, and the tumour was then found to be in the stomach. The stomach was then opened, and a concrete mass of hair was removed. It appeared that this person had been in the habit of swallowing the combings of her own hair, and the result was she had a solid cast of the interior of the stomach, which Mr. Thornton removed, stitched up the stomach again, and the patient perfectly recovered. He could not give a better practical illustration of what he had said, for without the use of anæsthetics such operations would be impossible, and without antiseptics the result of opening the stomach must have been fatal. Whatever happened, therefore, the name of his distinguished friend and colleague, Sir Joseph Lister, would be handed down to posterity as one of the greatest benefactors to the human race. Amongst the learned and scientific societies, the Pharmaceutical Society of Great Britain was doing as great an amount of beneficent work as any, and he would take that opportunity of expressing his thanks to the members for the very great help which on many occasions he had received from them. They knew that doctors sometimes made mistakes in writing prescriptions; sometimes, unfortunately, they left out the water, and sometimes prescribed $\frac{1}{2}$ dr. of morphia for a dose instead of $\frac{1}{2}$ dr. of the solution, and they were very much gratified by the polite way in which these mistakes were corrected without exposing their errors to the patient.

The Vice-President proposed the next toast, "The Medical Profession." He said the goal of human search, so moralists told us, was happiness; happiness was intimately associated with and dependent upon health; it was the special function of the medical man by wise sanitation to preserve that health and when it was lost to restore it. The profession of medicine was a truly noble one, if its function were considered as thus delineated and it was remembered what perennial powers a man required to win a place in the first rank—to be endowed with talent amounting almost to genius, and then to consecrate to his profession the noblest powers of mind and heart. He must give long, deliberate and anxious preparation for his professional life, and when that curriculum was finished and he came forth to enter on the duties of his career his attention could in no wise be relaxed. Whether they considered the delicate machine he had to deal with, the masterpiece of the great Creator, or considered that he had to deal with both mind and body, it must be admitted that he was called to a truly beneficent profession, and where in the wide world could this toast be more enthusiastically received than in the centre of light and leading, in the centre of this great metropolis? Within his own time there had been marvellous advances and discoveries in medicine, and it was now scarcely an exaggeration to say that there was not an organ or function of the human body which had not its specialist, and he ventured to think that not only was that a fitting place for such a toast, but that no body of men could more cordially propose it than pharmacists, for they trusted they were not presuming when they desired to be acknowledged as belonging, however humbly, to the medical profession. Sometimes the relations between pharmacy and medicine had been somewhat strained; they had had free lances amongst them; but he could honestly say that the *rôle* of the Pharmaceutical Society had been from its earliest days to discourage encroachments on the medical profession. He did not believe in a scientific frontier, or in strict lines of delimitation by Act of Parliament, but in that which was much better and nobler, the respect and confidence which honourable men should bear one for another. They desired to protect their own rights, but at the same time to repress any poaching on other men's manors, and if amongst their ranks men had sometimes claimed that which they did not possess, or if they possessed had no legal right to make use of, it was pre-eminently the function of the Pharmaceutical Society to discountenance such proceedings. He begged to couple with the toast the name of Mr. A. E. Durham, President of the Medical Society.

Mr. A. E. Durham, in responding on behalf of the medical profession, could say most truthfully and honestly that the medical profession at large, the best and largest part of it, thoroughly appreciated how much they owed to the pharmacists of this country. An after-dinner speech was no time for argumentation and discussion, but was a very good time indeed to express personal feelings, particularly after such a good dinner as they had had on the present occasion, when they naturally felt very cordial towards each other. He would not enter on any kind of discussion as to the relative position of pharmacists and doctors, but he did feel it was thoroughly right on the part of the medical profession to express their obligations to pharmacists. Something like thirty years ago, when he was going up for his examination at the University of London, he was in a little difficulty, because he knew he had to be examined about drugs and pharmaceutical preparations, and where he was studying he felt that the preparations were bad and the drugs rotten. It then occurred to him that possibly if he went to the Pharmaceutical Society's house, in Bloomsbury Square, although he was unknown and wanted introduction, he might have an opportunity of seeing what drugs and preparations ought to be like, and so he went; he was met in the most friendly manner possible, was shown everything he wanted to see, and was told he might come as often as he liked. That was his first introduction to the Pharmaceutical Society, and it was a very pleasant one, and this was the next time he had had an opportunity of meeting them. Pharmacists helped medical men in various ways, and, to a certain extent, they taught them how to set about their work. He believed in food, and he also believed in physic. In the case of food it was not only the material which had to be considered, but how it was cooked, and in the same way the making had a good deal to do with physic; what would be nauseous, unpalatable, and indigestible and useless as a drug in one way, when properly prepared and disguised became the most valuable medicine which could be taken. Over and over again it had happened to him in his practice to be told, "It is no use prescribing so-and-so, the patient cannot take it," but when the same remedy was prescribed in some other way it was taken without difficulty, and did the good which was expected. Not only so, but some of the best teaching books that he knew with regard to medicine, and the way of prescribing medicines, had been prepared by distinguished members of the Pharmaceutical Society. He might refer particularly to the most admirable hand-book to the Pharmacopœia by his late friend, Peter Squire, and also to a more recent book, published by a well-known member of the Society, Mr. Martindale, which was the most useful book with regard to medicine that medical men could possibly have on their tables. There was one medicine he often had to prescribe, however, which was not included in the Pharmacopœia, viz., *ferrum frigidum et acutum*, but even when that was required Dr. Johnson had pointed out how usefully chemical and pharmaceutical science came in to aid the surgeon accomplishing his work successfully in relieving the patient's sufferings.

Dr. Meymott Tidy said he had been entrusted with the honour of proposing the toast of the evening, and the enthusiasm with which it would be received would in no way be dependent upon the want of originality of thought or lack of eloquence of the proposer. He did not know whether he would be excused if he ventured to use a Greek word; pharmacy and pharmacist had been, to use a Shakespearian phrase, ill-assorted. The word *pharmakis*, from which the words pharmacy and pharmacist were derived, signified not only a compounder of medicines, but a poisoner and a witch. Awkward as that was there was some ground for it, for in days gone by necromancers lived on pharmacy, and conversely pharmacy lived on necromancers, and this was the reason which gave a special charm to those old stories of the Borgias and others, and made them fitting subjects for the drama and romance. It required a tremendous power to sever the tie that bound together witchery and pharmacy; that was the work of the older pharmacists, and they set themselves to that work in right good earnest. It required a tremendous force to teach the public that the modern compounder of medicine needed no stuffed crocodile to preside over his laboratory, and no incantations to give virtue to his drugs. This divorce being effected, it was necessary to bring about a new marriage, and in effecting that the Society had played no unimportant part. It was necessary, as they had dissolved the union between witchery and pharmacy, to show that there was relationship between pharmacy and science, and it was here that the Society crept in, and the professors appointed by it set themselves to work to prove it. There never was a time in the history of the world when pharmacy was exhibited as a science in the manner in which it was at the present time. It only needed honesty of purpose and determination to oppose every form of quackery in all its protean shapes and forms, to cement the union which he honestly believed no time could sever, and no age could rust. If they were to continue this relation of science and pharmacy, they must take their care that the professors and future practitioners were men learned in their science, for if they did not establish that, one of two things would happen, either that pharmacy would soon become a kind of dead letter, or the public would lose their faith in it, or it would again form an unholy alliance with witchery and incantation. For that reason the examinations had been established which were the very foundation on which the prosperity of the Society depended. The work was not yet done, the Society had passed no finality measure; what had yet to be done was, for the most part, work of detail, but delicacy of treatment was inseparable from the carrying out of details. It was not for him to suggest those details, but many of them were known to and acknowledged by the public. In carrying them out they required a clear headed leader, judicious, firm, far-seeing, but not sensational, one who could grasp the requirements of the public as well as he could climb a mountain; a man of science who was not above being a man of the world, and such a man he ventured to think they might find in a pre-eminent degree in his friend, Michael Carteighe. He, therefore, begged to proposed the "Prosperity of the Pharmaceutical Society of Great Britain," coupled with the name of the President, Michael Carteighe.

The President, on behalf of the Society, begged to thank Dr. Tidy for having expressed in such superlative terms the merits not only of the Society which he had the honour to represent, but also his own capabilities. It was impossible for him to reply in adequate language to what had been said, especially as the hour was getting late, and therefore he would simply say that he was much obliged for the manner in which the toast had been proposed and responded to, and that all the strength he could bring to bear tending to the welfare of the Pharmaceutical Society, had been at their service. He now begged to propose the last toast of the evening, viz., "The Health of their Guests." They had amongst them men distinguished in Parliament, in science, and in various ways, some whom he knew, and some whom he had not the privilege of knowing, but to all he tendered a hearty welcome and ventured to express a hope that their time had not been spent altogether unpleasantly. He would associate with the toast the names of three gentlemen, a Member of Parliament, a representative of science, and a representative of medicine, namely, Mr. Daniel Grant, M.P., Sir Frederick Abel, and Dr. B. W. Richardson.

Mr. Daniel Grant, M.P., having briefly acknowledged the compliment,

Sir Frederick Abel said it had been his privilege and pleasure to attend many of these social gatherings, but he had never spent a more delightful evening than on that occasion. He had been associated with Mr. Carteighe in many and arduous works, and the only fault he had to find with him was that he had not given him any warning that he would have to respond to this toast; that must be his excuse for not attempting to make a speech, but it was always pleasant for chemists to meet pharmacists, they were naturally united together and belonged to one body.

Dr. Richardson said the only objection he had to responding to this toast was that he had been so long intimately connected with the Society that he could hardly fancy himself a guest. He never met with pharmacists but what he felt one of themselves and quite at home. He was, however, very glad of the opportunity to thank them, not only for their hospitality that evening, but for the progress they were making as a Society, and for the great services they rendered to medical science. The old days seemed to have passed away when the general practitioner of medicine sent out his boy heavily laden with his basket of drugs to dispense from door to door what were called remedies, and the chemist had taken in a different way a place which seemed far more rational and useful. He noticed too that as days went on they linked themselves together as two professions still more closely. There was the Pharmacopœia, which came out under the combined influence of pharmacists and physicians. There was another book which came out regularly, not officially, edited by a member of his profession and a member of theirs, which really in its character was quite equal to the official Pharmacopœia. Wherever they turned now they found that in all the advances in medicine the assistance of the pharmacist was required, and medical men, therefore, were deeply indebted to pharmacists for the help they gave them in advancing medical science, in the prevention of disease, and in the lessening of mortality.

The evening was much enlivened by some clever musical sketches by Mr. Corney Grain.

The Pharmaceutical Journal.

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THE ANNUAL MEETING.

THE full report of the proceedings at the various meetings of chemists and druggists in the metropolis during the past week, which appears in another part of this Journal and has involved the addition of eight extra pages, renders unnecessary, and indeed precludes any lengthened description of them in these columns. It may be remarked, however, that so far as abstention from criticism may be taken as an evidence of satisfaction, the proceedings at the Annual Meeting of the Pharmaceutical Society on Wednesday may well be accepted by the outgoing Council as an indication that the members of the Society have endorsed with their approval the account of the manner in which its business had been conducted during the past year, as laid before them in the Annual Report. The course taken also supplies another refutation of the statements which have been made on more than one occasion to the effect that the Council as an executive body is not fairly representative. The meeting was moderately well attended, and the President, following the plan adopted by him last year, instead of delivering a formal address, made a running commentary upon the topics mentioned in the Report, and concluded by moving its adoption. In this way the questions which have usually given rise to more or less discussion—not unfrequently of a very desultory and unprofitable character—appeared to be all anticipated, for the motion having been seconded by the Vice-President, no person present responded to the invitation of the Chairman to raise any discussion. It was therefore put at once and was carried by acclamation within half an hour of the commencement of the meeting. The results, too, shown in the Scrutineers' report, presented at the adjourned meeting on Friday, may be regarded as a vote of confidence, since the whole of the retiring members of the Council were re-elected by a substantial majority, the number of votes given to the successful candidate lowest on the poll exceeding the number given to the unsuccessful one next below him by as many as it fell below the highest figure polled. It appears to us, however, to be matter for regret that the absence of any burning question seems to have favoured the neglect to use the voting power to even a greater degree than usual, only about one-third of the voting papers sent out having been returned. Nevertheless this also may be taken as evidence of satisfaction so far as the members of the Society are concerned. Indeed this view of the case may be pushed further, for it may be assumed that persons who voluntarily remain outside the body which so largely controls the conditions under which their calling can be followed, are not entirely without confidence in its governing capacity.

The ordinary business of the Annual Meeting having thus been disposed of, the ground was cleared for MR. GILES to bring forward the motion of which he had given notice, a duty that he performed with his habitual eloquence. The proposition that the Council should be requested to consider and report on the best means of promoting systematic research with a view especially to the initiation, examination and improvement of formulæ for the National Pharmacopœia, contained one suggestion as to the way in which this end might best be attained, and in the course of his remarks the speaker evidently showed that he would be inclined to look for the best solution of the problem in the establishment of a special laboratory, with a staff of investigators whose time should be entirely devoted to working out the many points in connection with drugs and pharmacy which are now obscure and doubtful. Assuming that pharmaceutical research is the natural foundation of a scientific pharmacopœia, and that such research is the province of pharmacy, MR. GILES argued that the Pharmaceutical Society is responsible for fulfilling this duty, since the obligation did not rest on individuals. He said he was inclined to think that while pressing the claim of pharmacists to be associated in the compilation of the Pharmacopœia, the Society had been a little disposed to overlook its own obligations, but that when these had been fulfilled in the manner he advocated, the claims of British pharmacists to be represented on the Pharmacopœia Committee would be irresistible. Admitting and emphasizing the work done by the Society in the past, in the way of organization and education, he urged that the time had come for it to take a new departure in the direction of pharmaceutical research. In the course of the discussion that followed most of the speakers expressed sympathy with the spirit of MR. GILES's motion, though it cannot be said to have received unqualified support from any one of them. MR. MARTINDALE seemed inclined to favour the establishment of fellowships, whilst MR. LUFF leaned to the offering of prizes for the best papers on given subjects. MR. SCHACHT disputed the view that a responsibility which did not lie upon individual pharmacists could be obligatory upon the multitude of individuals that formed the Society, or that the Pharmaceutical Society would under present conditions be competent to decide what were the subjects to be investigated. MR. NAYLOR thought it was equal to a confession of weakness, a losing sight of what had been already done by individual pharmacists in original research, to say that the attainment of a *locus standi* in the Pharmacopœia Committee is dependent upon the engagement of a certain number of men to do this work for pay. But the most powerful argument against the motion was that it was inopportune. This view, which was first broached by Mr. HAMPSON and then reiterated by Mr. EKIN, was subsequently put in so cogent a form by the PRESIDENT, that Mr. GILES at once responded to his request, and, with the leave of the members present, withdrew the motion, and this practically brought the meeting to an end.

With respect to what may be termed the annual festivities, it can be said that they passed off in a most satisfactory manner. More than two hundred gentlemen sat down at the Annual Dinner on Tuesday evening, and among the guests were many eminent in medical and scientific circles, the esteem in which the Society is held having been manifested by their presence as well as by the oral testimony of those who became the spokesmen in connection with the toasts. Taken altogether, we remember no previous similar occasion on which the evening went more pleasantly or the object of the gathering was more thoroughly attained. On the following evening the President, Vice-President and Council received nearly three thousand visitors at the Conversazione, which by permission was held in the South Kensington Museum.

The Medical Bill was introduced into the House of Commons on Friday the 16th inst., and read a first time. The second reading was set down for last Thursday, but it was then postponed until next Thursday week, the 5th of June.

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At a meeting of the Sheffield Pharmaceutical Association, last week, Mr. Wilkinson-Newsholme called attention to an extraordinary sample of ginger, which contained a large admixture of nux vomica seeds. The seeds, like the ginger, had been washed with lime, and, although easily recognizable by a practised eye, had thus passed through two or three different hands without notice. We understand that Mr. Newsholme is endeavouring to trace the history of this parcel, and that he proposes to bring any information he may be able to obtain before the Pharmaceutical Society at an evening meeting. We would suggest also that the names of the firms by whom this article was supplied should be made known, not necessarily for publication, but for the information of the Standing Committee on Adulteration.

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According to *Le Temps* considerable interest has been excited in Paris by a report that the child of a legal functionary had been poisoned by the administration of a suppository in which morphine hydrochlorate had been substituted for quinine hydrochlorate through a mistake in dispensing in a well-known Paris pharmacy. The affair is under investigation, but meanwhile a statement has been made to a correspondent of *Le Temps* by the owner of the pharmacy, which seems to demand, at least, a suspension of judgment until the inquiry is completed. The pharmacist states that on the 23rd of March, at 5 o'clock in the afternoon, a prescription was presented at his establishment ordering some suppositories, each containing ten centigrams of quinine hydrochlorate. The prescription, having been copied correctly, was handed to an assistant to dispense, and to prevent mistake, in consequence of the relatively unusual ingredient, a special instruction was given as to where the quinine hydrochlorate would be found. The preparation was, according to the custom of the house, checked by the manager and verified before being sent out. When the suppositories were delivered the child was somewhat better, and they were, therefore, not then used; but about six weeks later, the symptoms they were intended to relieve having returned, a suppository, said to have been obtained from this pharmacy, was administered. Shortly afterwards grave symptoms were manifested which were thought to be possibly referable to the suppository, and one was sent for examination to a neighbouring pharmacist, who, after a summary examination, came to the conclusion that it contained morphine. The child was, therefore, treated for morphine poisoning, and, after some hours, the danger appeared to have passed away; but about twenty hours afterwards the child again became worse and died.

* * *

The *Weekly Drug News* of New York, in referring to the process recently described by Professor Redwood for the exhaustion of cinchona bark, speaks of it with approval as a step towards the standardizing of pharmaceutical preparations and as yielding "an elegant extract which has the great advantage of bearing dilution with water without precipitation." But it points out that this desirable quality of water solubility is secured by the elimination of the "peculiar extractive, chiefly quinovin," and demurs to the assumption, in the present state of our therapeutic knowledge, that this "quinovin" has no medicinal value. Against the reference made by Professor Redwood to Mr. Howard's opinion, it quotes a passage from Professor Flückiger's recent work, 'The Cinchona Barks Pharmacognostically Considered,' to the effect that "chinovin participates in the medicinal activity of cinchona barks." Moreover, the *Weekly Drug News* thinks that "if elegance and water solubility are the objects to be attained, the alkaloids may be employed in preference to the bark."

* * *

The *Pharmaceutical Record* calls attention to some curiosities in prescribing and dispensing as having been disclosed in a "blue book" issued by the Canadian Government, apparently giving the results of an inquiry into the working of an Act under which the registration of sales of liquors containing alcohol by druggists was made obligatory, with a view of allowing such sales when the liquor was ordered by a medical practitioner for medical purposes only. A single quotation will be sufficient to show the extent to which the permission was abused. In one drug store, from May 1 to January 1, there were 3720 prescriptions dispensed that are noted in this blue book. One particular patient, judging from the prescriptions bearing his name, was sick all this time; in fact, his state seems to have been so serious that occasionally a second physician was called in and prescribed for him. The prescription on the 1st of May was for "Spiritus

Frumenti, one bottle." This was repeated on the 3rd, on the 5th and on the 9th, on which day there were two prescriptions, each to the same effect. Between the 1st of May and the 1st of January this patient seems to have had sixty-two of these prescriptions dispensed at the same drug store, including repetitions. During the whole of this time the treatment remained unchanged, and at its close the patient still "lingered." The bearing of this experience upon the position taken by the Inland Revenue authorities in this country in respect to this question will be obvious.

* * *

Already a second edition of the new French Codex has been issued, in which several errors that had been pointed out in the first edition have been corrected. Two or three tables have been omitted and the one showing the relations of foreign medicinal weights to the gram, the incorrectness of which we were the first to point out, has been entirely reconstructed on more exact data. A remark that we made with respect to the use of the colour bands to indicate the divisions of the work seems to have been much misconstrued. One French writer saw in the remark evidence of a desire to say "*quelques malices*" and now another tells us that "the edges no longer bear those clamorous colours which caused our neighbours to smile." M. Ferrand, in the *Union Pharmaceutique*, raises the question as to the position of those pharmacists who in obedience to the decree of the 13th of February promptly obtained a copy of the new Codex, some of the formulæ in which have already been seriously modified. In order to avoid a "therapeutic disorder, as dangerous as it is ridiculous," he recommends that the Minister should give instructions to the publisher to withdraw the first edition and give in exchange copies of the second.

* * *

The French Association for the Advancement of Science will hold its third Annual Meeting on the 4th to the 11th of September, inclusive, in the city of Blois, under the presidency of M. Bouquet de la Grye.

* * *

In connection with the next Annual Meeting of the German Pharmaceutical Association, which will be held in Dresden on the 2nd, 3rd, 4th and 5th of September, there is to be a Pharmaceutical Exhibition, for the display of pharmaceutical and chemical preparations, dietetic articles, utensils, apparatus, machines and printed matter. The President of the Exhibition Committee is Dr. E. Geissler, Schreibergasse, Dresden.

* * *

On Monday next, at 9 a.m., Mr. Wyndham Dunstan will commence the course of lectures on Organic Chemistry, in connection with the School of Pharmacy of the Pharmaceutical Society. A detailed Syllabus of these Lectures, supplemented by a Synoptical Table of the Principal Hydrocarbons and their Principal Derivatives, has been prepared and published as a pamphlet.

* * *

A meeting of the School of Pharmacy Students' Association will be held on Thursday, May 29, at 8 p.m., when some "Notes on Asafœtida" will be read by Mr. R. W. C. Pierce, and a Report on Inorganic Chemistry will be made by Mr. A. J. G. Lowe.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, May 21, 1884.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Messrs. Andrews, Borland, Bottle, Butt, Churchill, Gostling, Greenish, Hampson, Hills, Radley, Robbins Savage, Schacht, Symes, Williams, and Woolley.

RESTORATIONS.

Several Members, Associates, and Apprentices were restored to membership on payment of the usual fine.

The Council considered the business of the Annual Meeting and then adjourned.

FORTY-THIRD ANNUAL GENERAL MEETING.

The PRESIDENT took the chair at twelve o'clock.

The SECRETARY having read the notice convening the meeting, the Report was taken as read.

THE ANNUAL REPORT.

The Financial Statement for 1883 shows that the income of the Society for that year exceeded the expenditure by £1526 16*s.* 7*d.* The gross receipts from the subscriptions of Members, Associates, and Apprentices are rather in excess of the previous year, although the amount received from Members only is somewhat less. The examination fees produced upwards of £700 more than in 1882, but in consequence of the larger number of candidates there has been a proportionate increase in expenditure. The Journal account leaves a small balance in favour of the Society, which, however, is about £400 less than last year.

In pursuance of a resolution referred to at the last Annual Meeting, the Council has been engaged in seeking eligible investments in freehold ground rents for a portion of the Society's invested capital. Freehold ground rents at Paddington Green amounting to £5551 5*s.* 6*d.* have been purchased, on account of the General Fund, and also at Strawberry Hill, amounting to £1020 12*s.* 6*d.*, on account of the Benevolent Fund.

The number of candidates for examination during 1883 was 396 more than in the previous year. Of this increased number 270 were candidates for the Preliminary, 116 for the Minor, 8 for the Major, and 2 for the Modified. The new regulation by which more time for answering the questions is allowed to candidates in the Preliminary examination appears to work satisfactorily.

The attendance in the Library during the past year has been considerably higher than for several previous years. The number of books circulated has been practically the same during the past three years, in 1881, 3284; in 1882, 3250; in 1883, 3240. Although it does not appear that the Parcels Post has had much influence in increasing the circulation of books, the cost of carriage has been gradually diminished. Most important English and foreign works upon the sciences and arts in which pharmacists are interested are added to the Library soon after publication. The number of volumes added during 1883 was about 250.

GENERAL FUND—FINANCIAL

Receipts.

	£ s. d.	£ s. d.
Balance January 1st, 1883:—London and Westminster Bank Deposit	2000 0 0	
In Treasurer's hands	1862 11 8	
In Secretary's hands	75 12 8	
In Honorary Treasurer's hands (Scotland)	84 17 4	
		4023 1 8
Life Members' Fund:—Interest		87 16 11
Interest on Investments		689 10 0
Subscriptions:—1632 Members, Pharmaceutical Chemists	1713 12 0	
760 ,, Chemists and Druggists	798 0 0	
1178 Associates in Business	1236 18 0	
827 Associates not in Business	434 3 6	
1098 Apprentices or Students	576 9 0	
14 Entrance Fees	29 8 0	
	4788 10 6	
Fees paid upon restoration to the Society	48 6 0	
		4836 16 6
Examination Fees:—1609 Preliminary Examination	2887 0 0	
10 Modified ,,	10 10 0	
798 Minor ,,	2140 10 0	
112 Major ,,	459 19 0	
		5497 19 0
Journal:—Advertisements	4563 0 3	
Sales	479 5 1	
		5042 5 4
Registration Fees:—18 Fees for Restoration to the Register	18 18 0	
14 Registration Fees as Chemists and Druggists	73 10 0	
		92 8 0
Register:—Sales to the Government	146 15 0	
Sundry Sales	13 10 0	
		160 5 0
Calendar:—Sundry Sales		15 12 0
Penalties and Costs for infringements of the Pharmacy Acts		147 2 1
Investments:—Sale of £5575 New Three Per Cents		5546 10 10
Sale of old Apparatus		1 6 6
		£26,140 13 10

STATEMENT FOR 1883.

Expenditure.

	England and Wales.	Scotland.	£ s. d.	£ s. d.
Annuity—Dr. Redwood				100 0 0
Carriage of Books to or from the Library, and other parcels				24 11 6
Certificates of Death				17 18 2
Conversazione			227 15 0	
Pharmaceutical Meetings			55 7 7	
				283 2 7
Examiners, Boards of—				
Fees to Examiners	1310 8 0	337 1 0		
Fees to Superintendents—Preliminary Examination	156 9 0	22 1 0		
Hire of rooms for conducting Preliminary Examination	50 10 9	4 5 0		
Travelling Expenses	264 2 11	27 7 6		
Refreshments for Examiners	85 18 6	10 17 11		
Apparatus, Drugs, and Chemicals for Examinations and sundry charges in connection therewith	85 0 0	17 0 8		
	1952 9 2	418 13 1		
(*England and Wales*)		1952 9 2		
			2371 2 3	
Fees to the College of Preceptors			161 3 6	
				2532 5 9
Fixtures and Fittings (including Plate-glass Cases for Museum specimens)				314 10 0
Furniture				77 6 4
House Expenses:—Gas, Water, Coal, Cleaning Materials, &c.				245 10
Journal:—Editor and Sub-Editor's Salaries			575 0 0	
Paper			1210 19 10	
Printing			2199 4 7	
Publishers' Commission			574 1 7	
Contributions and Engraving			314 5 11	
Reporting			73 14 6	
Attending Conference Meeting at Southport			10 18 6	
Attending International Pharmaceutical Exhibition at Vienna			53 3 6	
Parliamentary Reports and Sundry Charges			26 3 4	
				5037 11 9
Laboratory:—Professor of Practical Chemistry—Endowment of Chair			100 0 0	
Prize Medals, Certificates, &c.			9 4 6	
				109 4 6
Law Costs				297 3 5
Lectures:—Professor of Chemistry and Pharmacy—Endowment of Chair			100 0 0	
Professor of Botany and Materia Medica—Endowment of Chair			100 0 0	
Subscription to Royal Botanic Gardens			21 0 0	
Prize Medals, Certificates, &c.			16 10 3	
				237 10 3
Library:—Librarian's Salary			220 0 0	
Purchase of Books, &c.			103 18 9	
Attending Library Association Meeting			10 10 0	
				334 8 9
Museum:—Curator's Salary			250 0 0	
Assistant's Salary			75 15 0	
Specimens, Bottles and Sundries			40 3 0	
				365 18 0
Branch of the Society in Scotland:—Secretary—Salary			150 0 0	
Rent, Taxes and Insurance			96 9 5	
Miscellaneous Expenses			65 0 1	
				311 9 6
Postage:—General			247 5 8	
Journal (Cost of transmission to Members, Associates and Apprentices)			654 0 11	
				901 6 7
Register, Printing and Publication of				166 19 9
Repairs and Alterations				591 2 8
Rent, Taxes, and Insurance of Plate Glass				379 8 4
Returned Subscriptions to Associates				14 3 6
Stationery, Engraving, Printing, and Office Expenses			303 15 2	
Publication of the Society's Calendar			128 12 9	
				432 7 11
Salaries:—Secretary and Registrar			550 0 0	
Assistant Secretary			300 0 0	
Clerks and Servants			814 6 4	
				1664 6 4
Part cost of paving the roadway in Great Russell Street with wood				170 0 0
Cost of Materials supplied to the Jacob Bell Scholars				10 0 0
Herbarium and Council Medals				5 5
Sundries				7 17 10
Travelling Expenses—Members of Council				366 16 0
Refreshments for Council				46 0 2
Investments:—Purchase of £2000 New Two and a Half Per Cents				1750 0 0
Purchase of Freehold Ground Rents at Paddington Green, London, W.				5551 5 6
Balance, December 31st, 1883:—London and Westminster Bank on Deposit			2000 0 0	
In Treasurer's hands			1490 0 10	
In Secretary's hands			156 11 1	
In Honorary Treasurer's hands (Scotland)			148 11 8	
				3795 3 7
				£26,140 13 10

BENEVOLENT FUND—FINANCIAL STATEMENT FOR 1883.

Receipts.

	£ s. d.	£ s. d.
Balance Jan. 1st, 1883		
In Treasurer's hands	599 13 7	
London and Westminster Bank on Deposit	500 0 0	
In Secretary's hands	1 0 9	1100 14 4
Dividends on Invested Capital		585 5 2
Donations	386 5 0	
Subscriptions	1535 16 8	1922 1 8
Investments:—Sale of £1000 Consols		1008 3 6
Balance due to Secretary, Dec. 31st, 1883		0 15 9
		£4617 0 5

Expenditure.

	Age	£ s. d.	£ s. d.
20 Annuitants, each received £35		700 0 0	
9 Ditto ditto £30		270 0 0	
2 Ditto, received 1 quarter at £30		15 0 0	
3 quarters at £35		52 10 0	
3 Ditto 2 quarters at £30		45 0 0	
2 quarters at £35		52 10 0	
1 Ditto 3 quarters at £30		22 10 0	
1 quarter at £35		8 15 0	
2 Ditto (deceased) 1 quarter at £35		17 10 0	
1 Ditto (do.) do. £30		7 10 0	
1 Ditto (do.) 2 quarters at £35		17 10 0	
2 Ditto (do.) 3 quarters at £35		52 10 0	
1 Ditto (do.) do. £30		22 10 0	1283 15 0
Casual Grants.			
A Member, Grimsby	age 64	10 0 0	
A former Member, Brighton	,, 66	10 0 0	
Ditto London	,, 82	25 0 0	
Ditto Bridport	,, 62	20 0 0	
Ditto Hereford	,, 76	10 0 0	
Ditto Kingston-on-Thames	,, 55	10 0 0	
Ditto London	,, 63	20 0 0	
Ditto London	,, 65	10 0 0	
Ditto Dulwich	,, 61	10 0 0	
Ditto London	,, 70	10 0 0	
Ditto Sidmouth	,, 80	10 0 0	
Ditto Leamington	,, 69	10 0 0	
Widow of a Member, London	,, 40	10 0 0	
Ditto Ledbury	,, 42	10 0 0	
Ditto Dulwich	,, 55	10 0 0	
Ditto Holywell	,, 54	10 0 0	
Widow of a Life Member, London	,, 42	15 0 0	
Widow of a Member, Torquay	,, 62	10 0 0	
Ditto Eastbourne	,, 72	10 0 0	
Ditto Penrith	,, 74	10 0 0	
Ditto London	,, 44	5 0 0	
Ditto Whittlesea	,, 47	5 0 0	
Ditto Romsey	,, 47	20 0 0	
Ditto London	,, 56	10 0 0	
Orphans of a late Member, London	,, 13&8	50 10 0	
A former Associate in Business, Penge	,, 39	10 0 0	
Widow of an Associate in Business, Carmarthen	,, 31	5 0 0	
Orphans of an Associate in Business, Ulverston	,, 8&7	10 0 0	
A former Associate, Herne Hill	,, 58	5 0 0	
Widow of an Associate, Brockley	,, 53	10 0 0	
A Registered Chemist and Druggist, Newcastle-on-Tyne	,, 60	5 0 0	
Ditto Hertford	,, 59	5 0 0	
Ditto Edinburgh	,, 57	5 0 0	
Ditto Edinburgh	,, 41	10 0 0	
Ditto Warrington	,, 71	5 0 0	
Ditto Croydon	,, 51	5 0 0	
Ditto St. Leonards	,, 76	10 0 0	
Ditto Liverpool	,, 47	10 0 0	
Ditto Edinburgh	,, 69	10 0 0	
Ditto Gloucester	,, 56	5 0 0	
Ditto Liverpool	,, 69	10 0 0	
Ditto Birmingham	,, 41	10 0 0	
Widow of Regd. C. & D., London	,, 47	15 0 0	
Ditto Salford	,, 41	10 0 0	
Ditto Acton	,, 58	5 0 0	
Ditto Falkingham	,, 75	10 0 0	
Ditto Ilford	,, 36	10 0 0	
Ditto London	,, 47	20 0 0	
Ditto Bury St. Edmunds	,, 32	10 0 0	
Ditto London	,, 59	10 0 0	
Ditto London	,, 62	15 0 0	
Ditto Brigg	,, 46	10 0 0	
Ditto Norwich	,, 53	10 0 0	
Ditto Kidsgrove	,, 71	10 0 0	
Ditto Liverpool	,, 66	10 0 0	
Ditto Wells	,, 47	5 0 0	
Ditto Barnes	,, 48	10 0 0	
Ditto Surbiton	,, 61	10 0 0	
Ditto St. Neots	,, 50	10 0 0	
Ditto Clay Cross	,, 37	5 0 0	
Ditto Sheffield	,, 51	5 0 0	
Orphans of Regd. C. & D. Cardiff	,, 18, 17, 15, 13, 11, 9, 6	10 0 0	660 10 0
The Secretary's Casual Fund			15 0 0
Second payment from the Robbins Fund			5 0 0
Printing and Stationery, etc.		29 5 6	
Postage		17 8 0	46 13 6
Investments:—Purchase of £800 Consols			819 0 0
Purchase of Freehold Ground Rents at Strawberry Hill			1020 12 6
Balance in Treasurer's hands, Dec. 31st, 1883			766 9 5
			£4617 0 5

We, the undersigned Auditors, have examined the accounts of the Pharmaceutical Society of Great Britain, as presented in the Financial Statement and Benevolent Fund Account, and find them correct. We have inspected the Deeds relating to the Freehold Ground Rents named below, and also find that there was standing to the account of the Society at the Bank of England, and in the hands of the Society's Bankers, on the 31st December, 1883, the undermentioned Stocks, viz.:—

Fund	Stock	£	s.	d.	£	s.	d.
General Fund	New 3 per Cents.	14,925	0	0			
	New 2½ ,,	2,000	0	0	16,925	0	0
	Freehold Ground Rents at Paddington Green, London, W., cost.				5,551	5	6
Life Members' Fund	New 3 per Cents				3,000	0	0
Benevolent Fund	Consols				18,400	0	0
	Freehold Ground Rents at Strawberry Hill, cost.				1,020	12	6
do. (Robbins' Fund)	South Metropolitan Gas Stock, since converted by an Order of Council into £125 Gas Light and Coke Co. 4 °/₀ perpetual Debenture Stock.				60	0	0
Secretary's Casual Relief Fund	Consols.				105	0	0
Pereira Memorial Fund	Consols.	100	0	0			
Bell Memorial Fund		2,050	0	0			
Hanbury Memorial Fund		400	0	0	2,550	0	0
Hills Prize Fund	Russian Bonds				300	0	0

W. HODGKINSON,
F. HARWOOD LESCHER,
S. LLOYD STACEY,
HENRY AYSCOUGH THOMPSON, } *Auditors.*

February 28*th*, 1884.

In the Museum considerable alterations have been made. The large and rapidly increasing collection of Materia Medica has been separated into two sections, the one specially adapted for study and examination by *students*, and the other comprising such specimens of the materia medica as are most conveniently grouped for purposes of *reference*. The latter have been placed in a series of handsome new cases erected for their reception around the walls of the large examination room. Further facilities for study are now offered by the addition of three tables in No. 1 Museum, by which a larger number of students than heretofore will be enabled to examine the specimens at the same time. A glass case has been placed in No. 4 Museum, devoted especially to the exhibition of new donations to the Museum, and of drugs and chemicals of recent introduction, and it is hoped that the concentration of such articles in one place will be of service to visitors.

The materia medica collection has been enriched by the addition of a valuable series of Cinchona barks from the Government plantations in Darjeeling, and donations have been received from the Planters' Association in Ceylon and others. The value of these barks for reference is much increased by the fact that they were accompanied by herbarium specimens taken from the same trees, and that many of them have been analysed by Dr. B. H. Paul, by whom also the Madras barks mentioned in last year's report have been analysed. The results of the analyses are attached to the specimens. To the collection of Japanese drugs has been added a large number of specimens received from the Royal Gardens at Kew. An extensive collection (numbering two hundred and fifty-seven specimens) of the materia medica of Brazil and the neighbouring countries, has recently been presented by Dr. Domingo Parodi, of Buenos Ayres, and a series of native remedies, from the Hudson Bay territory, by Mr. Walton Haydon.

The Evening Meetings during the Session have been well attended, and many important papers read. With a view to increase the interest in the meetings, the Curator has been in attendance for an hour before the Chair was taken to give information respecting such specimens and apparatus as may be placed on the table for exhibition.

During 1883 one hundred and twenty cases of infringement of the Pharmacy Act, 1868, were reported, in most of which the offences were discontinued upon receipt of notice from the Registrar. In some instances it was found necessary to institute proceedings, and penalties were recovered.

In the last report it was stated that a draft Bill for the amendment of the law relating to the sale of poisons, prepared at the request of the Lord President of the Council, had been submitted to the Government. In this draft your Council had inserted such amendments of the Pharmacy Acts as were considered necessary. The Bill was not introduced last session, and in reply to an inquiry recently made, the Government have intimated that in the Bill which they propose to introduce into Parliament during the present session it is intended to deal with the sale of poisons only. Under these circumstances the Council considers that the wisest course is to suspend all further action in the matter until the publication of the Government Bill.

The Medical Acts Amendment Bill, which was withdrawn last session, has been again introduced into Parliament, but the Council regrets to have to report that the important and reasonable request addressed to the promoters of the Bill, that provision should be made for the representation of pharmacists on the Pharmacopœia Committee, has not been conceded. A Committee of the Council has charge of this matter, and it is intended to make vigorous efforts to obtain the desired representation.

The Patents, Designs and Trade Marks Act, passed at the end of the last session of Parliament, contained, when first introduced, a clause relating to the use of the Royal Arms which might have been a source of much vexation to pharmacists and others if it had become law. A correspondence on the subject between the Council and the Board of Trade resulted in a satisfactory modification of the clause which was subsequently adopted by Parliament.

The recommendations of the Education and Examinations Committee which were included in the last Annual Report have continued to receive the attention of the Council, and with a view to carrying out these recommendations as far as practicable, alterations in the Bye-Laws are being prepared, and will be submitted to the Society in due course.

The Benevolent Fund has received the careful attention of the Council. Owing to the zeal and perseverance of many of the Local Secretaries and others the income of the previous year has been well maintained. There are, however, so many members of the trade who do not subscribe that it is hoped that every Local Secretary who has not yet made a *personal* appeal on behalf of the Fund will do so. The publication in a special issue of the Journal of a local list of subscriptions and donations reported last year was repeated in February of the present year.

Commodious and suitable premises for carrying on and developing the work of the Society in Scotland have been secured by the purchase of the house, No. 36, York Place, Edinburgh.

The presentation of the Hanbury Memorial Gold Medal took place in October last, the recipient being the eminent quinologist, Mr. John Eliot Howard, a Member of this Society. The Council regrets to have to record the death of Mr. Howard within a few weeks of his having received this well-earned honour.

The Society has also lost by death amongst others, Mr. William Squire, formerly an Auditor; Mr. John Henry Atherton, formerly a member of the Council; Mr. Benjamin Humpage, also formerly an Auditor. The names of Mr. Hatrick, of Paisley, Mr. John Bray, of Sheerness, Mr. Ralph Davison, of York, and Mr. Duncanson, of Stirling, who have served the Society as Local Secretaries, have also to be added to the list of our losses for the year.

The Council has the painful duty to record the death of that veteran pharmacist, Mr. Peter Squire, one of the founders and a member of the *first* Council of the Society, whose services to it were continued with unabated zeal from its foundation until the year 1870. He filled the office of President for three years, was a member of the *first* Board of Examiners, and remained one of the most active members of that Board for the long period of twenty-seven years.

The Council cannot close this Report without reference to the loss sustained by the scientific world in the deaths of M. Dumas, the eminent French Chemist, and Professor Balfour, both Honorary Members of this Society. To the latter the Board of Examiners in Scotland was indebted for botanical specimens for examination purposes whilst he was Regius Professor of Botany in the University of Edinburgh.

The PRESIDENT said his first business was to move the adoption of the Report, in doing which it would not be necessary to detain the meeting very long. The reports of all public bodies were more or less dry when there were no dividends to declare, but at the same time this Report was interesting as a record of what had been done, and also to a certain extent of what had not been done. But this Report did not by any means represent, nor could any report represent, the amount of work which the Executive of a body like that had to get through in the course of twelve months. They were naturally anxious not to say too much, and where they could not accomplish something definite they passed over the matter without reference. The first paragraph referred to the financial statement, which might on the whole be regarded as satisfactory. There was a special paragraph with regard to the Journal, a matter in which many business men in the Society took great interest, because that was the one branch of their work in which they might be said to be carrying on a business. They were proprietors and publishers of the Journal, and members sometimes criticized their business capacity in that respect. With regard to that point, the balance was less this year than last, which might be accounted for in several ways, but broadly it was due to a somewhat diminished receipt on the score of advertisements. The Council had recommended that there should be a special issue of the *Pharmaceutical Journal* made once a year, which should be sent to every registered chemist and druggist, with a view to assisting the Benevolent Fund, and al-o showing those members of the drug trade who did not belong to the Society the sort of work it was doing, its interests and its objects. Although this special number was largely supported by advertisements, it appeared that the general income in that respect for the year was rather below the average, and consequently the increased cost of that special issue and the increased expense of distribution had made the balance reach the sum of about £400. But this was not to be looked upon entirely as wasted or lost. In all cases of advertising, they must throw their bread on the waters and trust to its being returned in increased quantity in due time. If in the course of time it was found that this special issue did not produce good results it would be quite possible to discontinue it, but it was too soon yet to say that such was the case. The next paragraph referred to the investments, on which he might say that the resolution adopted last year to transfer a certain portion of the invested capital from the funds into freehold ground rents had been carried out, and the experience thus gained distinctly confirmed the views he expressed last year of the great advantage likely to result to the Society by so doing. Last year he referred to the possibility that the Three per Cents would or might be converted, and there was actually a proposition now before Parliament which was tantamount to a conversion, the consequence of which was that the value of ground rents and all securities of that kind had gone up very materially. Nevertheless he felt certain that it would be possible to invest a portion of the capital of the Society on perfectly good security, and with very advantageous results, even at the slightly increased price which all such securities would now command. The examinations showed a considerable increase financially, but it would also be noticed that there had been a considerable number of failures. Of course from a financial point of view every person who came up for an examination was considered a fresh candidate, but as a matter of fact the real number of new candidates was considerably less than the figures indicated, because some came up two, three, four, and even six times. The Library had been very much appreciated by both the town and country members during the year, and it was the duty and pleasure of the Council to make it as useful and profitable as possible to the members. The Museum was also a source of care and interest to a large portion of the Council, and under the watchful care and active search which the Curator made for new things it had become a Museum of which they might all be proud. The Evening Meetings had been, as usual, generally interesting, and had illustrated, to some extent, the desire there was in certain quarters for pharmaceutical research. There had been about the usual number of applications with regard to infringements of the Act, and the Council had done its best to make the law obeyed. Some members at times thought it would be well, in certain cases, not to give notice to offenders before commencing proceedings, but it appeared to him that that was a mistaken view, as might be shown by an incident which had lately occurred. The Council had recently had before it a letter from the Treasury giving the particulars of a case in which an appeal had been made to remit a fine imposed upon a man who had been trading illegally, and in corresponding with that Department it had been able to show that all fair means had been taken to carry out the Act, and that no man was taken unawares and brought before a judge. With reference to the Draft Bill, they all knew that the Privy Council had decided that they would themselves deal with the question of the sale of poisons, but would not at the present time entertain any proposition which involved an amendment of the pharmacy clauses of the Act. What the exact result would be they could hardly say until the Bill was printed, but when they had it before them they would have to consider very carefully how best to protect the interests of the whole body. But although the Government said they proposed to restrict their legislation to the sale of poisons, he had not much doubt that the subject of patent medicines would be dealt with, and that the Bill would contain provisions which would commend themselves to many of their members. If it were possible for the Society to support the Government on the broad question of the sale of poisons, it would be a great advantage, because there would be then a reasonable probability that they might be able by their own efforts in Parliament, through private members, to get the pharmacy clause amended, and the various details inserted which were required for the perfection of the pharmaceutical machinery, whereas, if they had to oppose the Government tooth and nail on this point, there would be much more difficulty in dealing with pharmaceutical questions hereafter. Be that as it might, however, the Council would give every attention to the Bill when it appeared, and possibly, if the Government did not see their way to making some efforts in legislation this year, the Council might consider the desirability of moving independently in the matter. The Medical Acts Amendment Bill was read a first time last week, and was down for second reading in the House of Commons on the following day, but it was not at all probable that it would be reached for several weeks, and it would be the duty of the Council to impress first upon Mr. Mundella and afterwards on the House itself, if necessary, the importance of formally recognizing the claims of pharmacists to be on the Pharmacopœia Committee. There was no doubt this was the feeling of the Society at large, aad although to some people it appeared to be merely sentiment, it was one of those sentiments which every right-minded pharmacist ought to respect, and he was quite satisfied that the majority of the medical profession were not indisposed to consider favourably the claims of pharmacists in this direction. The Trade Marks Act passed last session contained when first introduced a rather vague clause with regard to the use of the Royal Arms, and it was the duty of the Council to take steps to have it modified, and he thought it might claim a success in that direction, because the law officers of the Crown had stated since the Bill was passed, in answer to questions, that the clause as amended would not prevent the use of the arms on labels, and in the various ways in which pharmacists and others used them. One of the things which impressed the President of the Board of Trade more than anything else was a fact he was able to state at that time that something like two million bags to hold nuts were being made in Bristol with the Royal Arms upon them, and when the difficulties of dealing with cases of that sort were pointed out he at once saw the expediency of modifying the clause. The educational business of the Society was of the first importance, and, consequently, it was with some regret that the Council was not prepared at the present moment to bring forward the complete scheme which it had been working on for several years, but in view of the uncertainties which prevailed with regard to pharmaceutical legislation it was thought expedient for the moment to give this further consideration, and to present the scheme later on. The Benevolent Fund was making satisfactory progress. They had a fair number of donations, though not quite such a windfall as during the previous year. It might be as well to mention that they had received from Mr. Baigent the sum of 100 guineas, being the fourth donation from that gentleman, and a letter had also been received from Mrs. Squire, the widow of their late colleague, stating that £100 would be forwarded by his executors for the benefit of the Fund. He would also refer to the Secretary's Casual Fund to which sundry charitable members of the trade now and then contributed, and which was found of great value, as it enabled him without delay to relieve certain distressing cases which were hardly suitable to be brought before the Committee. The value of that Fund was much greater than many members imagined, and one case which had lately occurred might be referred to in illustration. A man who had been actually in the drug trade, but who lost his situation, walked to London, could not get employment, and would very soon have become an applicant for relief from the Fund; on inquiries being made he said he could find work in his native town, but that he had not the means of getting there. He was provided with shelter and food for a few days, and then sent home with a few shillings in his pocket, and he was now earning a very good living. With reference to the North British Branch, a house had been purchased for its use in Edinburgh. Those who had not visited the existing rooms in Edinburgh probably did not know how relatively small and inconvenient they were for the purposes of examination. As the important duty of examining in Edinburgh as well as in London was imposed upon the Council, it was certainly right that proper premises should be provided in which those examinations might be conducted, and it was also thought desirable to stimulate their friends in the North to join the Society in large numbers, and work in sympathy with them. In fact that seemed to the Council an excellent way of advancing pharmacy. The house was extremely cheap, and, practically, it would cost such a capital sum as would only represent £70 or £80 a year, which was about the same as they were now paying for one floor. During the past year they had lost, by death, Mr. Howard, very soon after he received the Hanbury Gold Medal, and rather a large number of past officers of the Society. Amongst them it was only fitting to specially refer to the late Peter Squire, and, though he had elsewhere expressed his feelings with regard to him, he might again say that their sympathies were with his family in the loss they had sustained. Many of them were able to rejoice at what he as one of the founders of the Society in common with others had done, and it was right that he as one of the young generation should bear his testimony to the value which ought to be attached to those services. They had also to regret the loss of two honorary members, and since the Report was printed they had also lost another, M. Wurtz. Both that gentleman and M. Dumas had delivered the Faraday lecture in London, and possibly some members of the Society might have come in contact with them; but it was certainly an honour to have had on their roll for so many years the names of those two distinguished men. They had also lost Professor Balfour, whose special services to the members of the North British Branch were greatly appreciated. He would conclude by moving that the Report now read be received, adopted and printed in the Journal of the Society's transactions.

The VICE-PRESIDENT seconded the motion, and as no one rose in response to an invitation to make any remarks upon it, it was at once put and carried unanimously.

The PRESIDENT then called on Mr. Giles to move the resolution of which he had given notice to the following effect:—

"That the Council of the Pharmaceutical Society be requested to consider and report upon the best means of promoting systematic Pharmaceutical Research. either by the institution of a Laboratory and Staff devoted to that purpose, or by such other means as may, after full investigation, appear best calculated to effect the object in view, which shall primarily be the initiation, examination and improvement of contemplated or existing formulæ of the National Pharmacopœia."

MR. GILES said he should introduce this resolution by making one or two assumptions which would shorten the remarks he would afterwards have to make. In the first place he assumed that all members of the Society were in accord with the principles upon which the Society itself was founded and that they desired to promote scientific pharmacy. In fact what was pharmacy if it was not scientific? what right would they have to call themselves the Pharmaceutical Society unless they desired to promote pharmacy which according to his reading meant scientific pharmacy? Next he assumed that all would agree in the efforts that the Council had recently been making to establish the claims of the Society to have a recognized *locus standi* in the body charged with the preparation of the National Pharmacopœia. Those two assumptions were really of necessity associated, because no pharmacist could claim to be represented on the Pharmacopœia Committee unless he also desired to promote scientific pharmacy. He would assume, therefore, that he might argue from these premises in favour of the resolution he had the honour to propose. But first of all he would say a word or two on its form and substance. He should like also to say that from circumstances over which he had no control, he had not been able to give that amount of attention and preparation to this matter which would enable him to present it in such a satisfactory, connected and coherent manner as he should have liked. As to the form of the resolution, although it did make allusion to a laboratory and staff devoted to the purpose of pharmaceutical research, it in no wise tied the hands of the Council to that or any other method of attaining the objects in view. He confessed he did not see any other way in which it could be attained, but he did not profess to have all the wisdom in the world, and possibly the Council might see some way of attaining the desired result without the institution of a laboratory. As to the substance of the resolution, on analysing it, it would be found to essentially consist of two propositions—first, that pharmaceutical research was the natural foundation of a scientific Pharmacopœia, and next, that pharmaceutical research was the province of pharmacy—*voilà tout.* Well, if that were so, it appeared to him the resolution was established beyond the power of contradiction. If pharmaceutical research were necessary to the formation of a Pharmacopœia, and it was the province of the Pharmaceutical Society to promote pharmaceutical research—that was all the resolution said, unless they were prepared to deny that the Pharmaceutical Society was responsible for fulfilling those obligations which unquestionably did not rest on any individual pharmacist. They had no right to demand of any given pharmacist that he should devote his energies to pharmaceutical research. If he did so, so much the better, and all honour to him; but the individual duty of the man was the practice of pharmacy, scientifically, honourably and well, and there was no duty incumbent on him to occupy his time for the common good in the prosecution of pharmaceutical research. He was disposed to think that in pressing the claim which the Society made on the authorities to be associated in the manufacture of the Pharmacopœia, the Society had been a little disposed to overlook its own obligations, and it was that conviction which had led him to bring forward this proposal. It was all very well when they went outside and discussed the matter to sink all questions of shortcomings, and to press their claims strongly; that he had done himself when opportunity offered; but in that room they were meeting in council amongst themselves, and it would be most profitable to scan carefully the position, to determine the weak points and to amend them, so that when the time came they might go with an unbroken front to those whom they had to satisfy and have no weak points in their armour. He took it that none but practical, scientific pharmacists were competent to prepare a Pharmacopœia which should be level with the advances of medical and pharmaceutical science throughout the world; in fact, that was pretty well admitted by those who were charged with the duty of making the Pharmacopœia. They did not attempt to conceal their own unfitness for the task imposed upon them. That was patent, because they delegated it to someone else, in violation of the principle *delegatus non potest delegare.* He thought that gave them a correct starting point and it rested with them to do all that was necessary on their side, and then the claim which pharmacists had to be represented on the Pharmacopœia Committee, in this country as they were in all others, would be absolutely irresistible. This question was undoubtedly the question of the hour. He made no reflection on the Society for any apathy in the past of which he did not believe it had been guilty. It had dealt wisely with questions as they had arisen and had done much, which had put it in the position to do more. It had evoked organization out of chaos. It had provided for and ultimately compelled the technical and scientific education of its members, it had obtained for them such an amount of legislative protection as no other analogous body enjoyed, but it had not yet reaped all the reward it was entitled to for its labours. It had not yet succeeded in enfranchising its members, for pharmacists and agricultural labourers were the only unenfranchised subjects of Her Majesty, since they had no voice in the laws by which they were bound. Pharmacists demanded that they should not be bound by a codex which they had no hand in preparing, but which they were really the only persons concerned in carrying out. The time had now arrived when it devolved on the Society through its Council to take a new departure, but immediately this was proposed it raised a chorus of feeble opposition. There was a sort of idea that what you did not do yesterday you had no right to do to-morrow, and that what had not been done formerly it was impossible to do in the future. He had no sympathy with that idea. But he had heard a whisper that the suggestion he made, although a laudable kind of thing, which might probably lead to some interesting discussion, was nevertheless quite impracticable, and that if any such laboratory as he suggested should be organized, there would be nothing for it to do. Now, what did this sort of objection mean? did it mean anything more after all than that it would cost some money? He admitted it would cost money, but he did not see the use of money except to expend it wisely. If they could gain any adequate advantage by spending money, or undertaking extra trouble, it was very desirable to enter on the course proposed although it might involve a new departure. Societies could not remain long in a state of inaction; they must either be growing and flourishing, or decaying. Whether that Society had done growing he did not know, but it certainly had not come to the decaying period. He believed it was flourishing, and as a feature of its vigour it ought to put out every year new branches, new leaves, and new vigour, and that the time had now arrived when its inflorescence should take the form which he was now indicating, namely, taking up that which did not offer itself at first to such a Society, but which came in due course afterwards, the prosecution of pharmaceutical research. Education came first; they had to learn what other people knew, but after that it was their duty to develop something new from which other people might learn. If it were necessary to say anything on the subject of what this laboratory should do, without attempting anything like an exhaustive list, he might refer to two or three subjects of investigation. For instance, under the head of drugs there were the different qualities of drugs, the source from which they were derived and the different species of plants, as, for instance, the cinchona bark, opium, aloes, and many others; the investigation of the purity of commercial drugs and chemicals with convenient tests for adulteration; and the investigation of the relative quantities of active constituents in various parts of the plant and the different periods of growth were very much needed. Under the head of preparations there were tinctures, with reference to their alcoholic strength, the modes of exhaustion in making galenical preparations; and the standardizing of galenical preparations, a new feature, which had already been suggested in the pages of the Journal and was likely to afford great scope for original investigation. Then there was the separation and estimation of alkaloids and glucosides, etc., in drugs, and their estimation in galenical preparations; the bases for ointments; new remedies, ascertaining their active principles, and the best mode of preparing them for medicinal use, and publishing provisional formulæ with a view to uniformity. They all knew that when anything new came out there was the greatest possible range of strength, and nobody going into one pharmacy after another could be sure that he would get the same thing; hence discredit was often brought on pharmacists in consequence of there not being any quasi-official formula by which they might be guided. Then it might be said *cui bono*? what advantage would the Society derive from this procedure? First of all it would promote scientific pharmacy. That was a general statement, but a very important one, and unless the Society was prepared to go back in all its teaching, that ground alone would be sufficient to justify it in taking some steps in this direction. But more than that, he took it this was the right course and the most probable course to strengthen the claims of the Society to be represented in the Pharmacopœia Committee. The present aspect of things was entirely in favour of a change. The Medical Council in seeking to frame the Pharmacopœia had gone admittedly to the most competent persons, and who were they? The professors of pharmacy and the sciences contributory thereto in their own institution. The organization of the Society had been turned to its prejudice; the engineer had been hoist with his own petard. He made no reflection on the professors; there was not a man within or without the Society who would have done differently under similar circumstances. At all events the fact remained that the Medical Council went to men who might reasonably be supposed to have had the most experience in pharmaceutical research, which was probably true; but, nevertheless, they were not practical pharmacists, and, unfortunately, although this was a compliment to them it reflected no credit on pharmacy; it did not put pharmacy in the position in which it ought to stand, but left it under the reproach that it was unfit to be the handmaiden of medicine, unfit to meet the professors of medicine on common ground in a co-ordinate capacity. That was a bitter reproach, and the sooner it was swept away the better. Who could do this except that Society? The point had not been sufficiently insisted upon,—for it was the most important point,—that there was no organization except that Society which represented pharmacy. Pharmacy could not make its voice heard except through that Society, and the duty of every pharmacist was to stand by the Society and not to go outside and raise up rival societies which could not occupy the same ground, that would never be listened to in the same way, and never could do the good for pharmacy which that Society could do, and had done, in raising pharmacists really from an untaught mob to a scientific body.

Mr. HAMPSON objected to the word "mob."

Mr. GILES said the only difference was they had not quite so much coherence as a mob. He did not use the term in any sense as a reproach; he was one of the mob himself. But still if anyone objected to the term he would withdraw it. He commended this resolution to the meeting, and hoped it would be discussed freely. He was quite sure it would be approached in the right spirit, and though no doubt they might differ in details there were no details insisted upon. This would be only an additional reason for referring it to the Council to consider the details and bring forward something on which they could ask the opinion of the members. He believed nothing so much as this could improve the position of pharmacists in the estimation of the world, tend to their being ultimately associated in a co-ordinate capacity with the medical profession in a Pharmacopœia Committee, and help to raise to its proper status the calling of a pharmaceutical chemist, so that he should be regarded, as he really was and ought to be, a member of a scientific body.

Mr. URWICK said he would second the resolution in order that it might be fairly discussed. There were many points in Mr. Giles's remarks which must commend themselves to every pharmacist. They always wanted a standard when new tinctures or preparations were produced. For want of that each one made a form of his own, and, perhaps, his neighbour made another, and the result was that prescriptions were brought back as being not quite the same as had been obtained elsewhere, there being sometimes a difference of colour, of strength, and so on. It would be very advantageous to the trade if a laboratory were established where investigations could be carried on, and some standard published to guide in the preparation of new remedies, which now frequently became the property of one particular house, to which all had to go when the thing was ordered, or, if it was worth while to make it themselves, differences of strength were the result.

Mr. Martindale moved as an amendment that the sentence beginning "which shall" at the end of the resolution be omitted. He thought if Mr. Giles would accept it in that form it would remove a difficulty which appeared to him to exist at present, because the resolution was almost an acknowledgment that practical pharmacists were not able to give any information or to support the Medical Council in the work they had undertaken. If that were omitted it would still meet the wishes of Mr. Giles, and leave the Council a little more free to act when the resolution came before it. As Mr. Giles had pointed out there was a want of original research, for, until comparatively recently, there had been little in the way of practical pharmaceutical education. During the past few months there had been some valuable papers in that direction, which would tend no doubt to strengthen the hands of the professors who were now preparing the new Pharmacopœia; but still it left pharmacists in a very invidious position as compared to that held by their brethren in other countries. They were in the position of traders and knew best how to prepare their goods to suit the market; unquestionably they could make preparations to suit physicians and surgeons who wanted to use them better than anyone could tell them, and they knew much better for the most part the character of the drugs they had to deal with. In fact, if any medical man wished to give directions how to make a preparation, he would have to come to a practical man first to learn how it was to be done, and then having got that information would be able to give it to others. That was taking information from a source and not acknowledging it. He was rather in hopes that Mr. Giles would have brought forward some suggestion for a Fellowship of the Society, which he thought might be a great service, to be tenable for three, four or five years, with a certain income attached to it to be devoted to the purposes of investigation. If one hundred and ninety-nine chemists would give £5 each, he would give another to form a fund of £1000, from which, with the aid of a similar grant from the Council, £40 or £50 a year might be derived to endow a Fellowship. If that were done it would be a means of attaching the old students to the institution for a few years, and they would be able to do good work, not only for the whole body but for themselves. It would be an honourable position, both while it was held and afterwards, and might to some extent prevent what often occurred now, their best students leaving pharmacy and going into other work, which they found paid better.

Mr. Howard Hall seconded the amendment.

Mr. Giles said if it would at all meet the sense of the meeting he would agree to strike out the latter portion of the resolution, though he preferred it as it stood.

The President said he thought it would be better to have the whole subject open for discussion, including both the original resolution and the amendment.

Mr. Long was very glad to find there was no burning question before them at the present moment and thought this proposition was an extremely good one. They had to lament their unfortunate position in having their rights entirely ignored, for neither their rights as traders nor yet as scientific men were acknowledged. It was not at all advisable to allow themselves to sink into the position of mere traders, and no ordinary commercial men, if called upon at times, as pharmacists were, to do the work they had to do, could possible do it, but for those services they got no compensation at all. He thought the founding of a laboratory, and a system of pursuing scientific investigation, would help forward, very substantially, their claims to assist in the preparation of a Pharmacopœia. Of course this would involve a certain amount of money, but they had quite enough money now, and it was no use heaping up money which would do no actual good. It was a question with him whether it would not be desirable so to extend the laboratory that chemists might go there and supply themselves with all those preparations for which they had now to go to special houses.

Mr. Whittle agreed with Mr. Giles's proposal, but thought it would be hardly worth while to spend money on research if they were to be ignored, as they were at present, on the Pharmacopœia Committee, for, in fact, they were in no better position, if so good, as twelve months ago. He hoped now the Council would speak with no uncertain sound on this matter. The Pharmacopœia belonged as much to them as to the Medical Council, but medical men had come to their back door to get assistance instead of coming to the front. He objected to their always going hat in hand asking for concessions when they ought to insist on their rights. Chemists should put some enthusiasm into the matter, and when the Medical Council saw they were determined to be represented they would give way. He was not opposed to education by any means, but what was the use of young men spending money and working up to pass different examinations when they really got no equivalent for it?

Mr. Cross (Shrewsbury) said Mr. Giles had introduced a most important question, but he feared there were many present to whom, like himself, it came rather unexpectedly, and he thought it would be very useful if they had some expression of opinion from the Council as to their views upon the matter. No doubt the Council had paid some attention to it as it was a very important thing which would interfere with the internal management of the house, and probably they had formed some opinion upon it. He did not agree with Mr. Giles that it was altogether a new departure, and should rather call it a fresh development, but he should like to hear the views of some members of the Council before any further discussion took place.

Mr. Hampson said it was very gratifying to find that in the twelve months which had elapsed since the last annual meeting Mr. Giles must have considered that the calibre of the Council had altered, or else he would not place in its hands such a very important matter. There was no question that the resolution now proposed was very important, and he would recommend the members to exercise the greatest possible caution in forming an opinion upon it. In one sense it was distinctly a new departure, because the resolution asked the Council to consider this matter, and report upon it, which would appear to show that there still lingered in his mind some want of confidence in the Council that it had not hitherto done its duty. He thought it had, and he made bold to say that the cultivation of pharmacy was quite abreast with the times, though it was not utilized to its fullest extent of development by their medical friends. He shared Mr. Giles's strong desire to develop pharmaceutical research. What intelligent man could have any other opinion? But, on the other hand, the establishment of a committee, which would really be the result of the resolution if carried, would be most inopportune at present. Let them wait until the Medical Council recognized them on the Pharmacopœia Committee. If they looked through the Journal for the last few years there was plenty of material, and there were plenty of men capable of occupying a substantial position on any committee and to carry out as much scientific pharmacy and further research as it was necessary to meet any possible demands which medical men were likely to make. He did not oppose the resolution from any spirit of antagonism, but he thought it reflected on the Society. Its real meaning was that they had not done their duty in the past. What had the Pharmaceutical Conference been working at for many years, but pharmaceutical research; had they not voted funds year after year for the purpose?—and there was even a difficulty in appropriating the money. How were they to find a number of men to carry on this work, when no demand was being made upon them. Once let their position be properly recognized and there would be plenty of men to carry on all the research which was necessary.

Mr. Naylor said he largely sympathized with the observations made by Mr. Hampson. It seemed to him not at all flattering to them as pharmacists to be told that if they desired to be represented on the Pharmacopœia Committee some day they must attain that *locus standi* by paying a certain number of men to investigate subjects directly bearing upon their own interests, and the production of a British Pharmacopœia. He regarded that as a confession of weakness, and thought it was very illogical to come there year after year and complain of their lack of social position, and what not, and at the same time to say, here we are, why are we not represented on the Pharmacopœia Committee? If this resolution were carried they would be simply showing that the great majority were totally inadequate to the carrying out of the task, and were not fit to be entrusted with it. The resolution proposed to carry out a very important object, but he could not agree with the way in which it was proposed to be done. Mr. Giles had made a comparison between pharmacists on the Continent and themselves. He was not personally acquainted with the matter, but he should like to know whether they had become recognized by paying a certain number of men to do such work, or to acquire a certain amount of knowledge, or whether it was not due to the fact that as a body they were better educated. Moreover, Mr. Giles had largely overlooked the efforts of pharmacists in the past and in the present. Was not the present Pharmacopœia indebted to the pharmacists of the past, and would not the Pharmacopœia of the future be indebted to the research and careful investigation conducted by pharmacists of the present day? There was no doubt it would, although it might not fall directly into their hands to do it. It seemed to him that if they continued their investigations and continued to show that they possessed the necessary knowledge the time was not far distant when the Medical Council would invite their co-operation in this very important task.

Mr. Schacht said he should have been very glad, if he could have done so with a free conscience, to have endorsed this project. The motive was so clearly to stimulate them in the right direction that he felt some pain in being obliged to oppose it; but it was more in form than in substance that he differed from Mr. Giles, and he hoped to show that he was perfectly reasonable and logical in approving of the general principles, but not of the mode in which he wished those principles to be urged forward. He did not charge him with having any *arrière pensée*, but still the resolution seemed something like pledging them by a side wind to a principle which had not yet been admitted. They were not yet at all pledged to the promotion of systematic pharmaceutical research, and he hardly thought that Mr. Giles had sufficiently considered the full import of those words. Systematic pharmaceutical research was a very different thing from anything the Society had ever attempted before. As he understood the words he did not mean doing that which they had been accustomed to do, promoting scientific research indirectly, which up to the present time had been the limit of their obligations. Mr. Giles said there was no obligation on any individual pharmacist to investigate difficulties, but strangely enough he seemed to think that because there was no obligation on an individual there was an obligation on a multitude of individuals forming the Society. It seemed to him that there was no more obligation on the Society than there was on an individual member, for this reason, pharmacy was an integral portion of the medical art; it was not an independent science at all, it was simply pharmacy because it was associated with medicine. Now if they, as a part of the profession of medicine, could co-operate with other portions of the medical art for the investigation of medical subjects, well and good; but it seemed to him, as Mr. Hampson had said, that they had done their share, and that any shortcomings which existed came from the medical side proper rather than from the pharmaceutical or purely scientific. If there is one thing he should rejoice to see more than another it would be some organization which should be instituted primarily from the higher domains of medicine, the object of which should be the investigation of the conditions of the application of remedies to disease. As far as he knew no such attempt had ever been made systemically. Individuals had attempted to do this, and had more or less succeeded, but where was there any medical organization which set that duty before itself? Let anything like an approach be made to them for co-operation in such an enterprise, and then would be the time to begin to think about the systematic prosecution of pharmaceutical research. Then the difficulty incidentally arose in his mind, who is to determine what should be investigated? Mr. Giles had formulated a number of things which he thought it desirable to investigate. He (Mr. Schacht) might have as many more, and everyone else would have their own ideas to which others might object. What were those opinions worth medically? Absolutely nothing. If anything were to be investigated on the responsibility of a society it must be those subjects which the scientific medical world declared to be the proper subjects of inquiry. Then the standardizing of preparations had been referred to; but what was the use of his idea of a standard? He had no right to such an idea other than to such an one as they could all form in the shape of putting so many grains of a definite chemical into a definite solution; but he could not standardize a pharmaceutical preparation, because there was not any medical authority which had determined the medical value of any one of the things he was going to standardize. Let medical authority somewhere or other declare that such and such questions wanted to be settled, and then they might undertake to settle them, but they were required by this resolution to pledge themselves to a course which would carry them beyond what had ever been attempted by other sections of the medical art, and, therefore, it seemed to him to be premature. That was the chief objection he had to the resolution. He should like to know if any other scientific society had come to such a conclusion as this. There were many ways in which chemical observation could be be effected, but he knew of no organization which said, Here is such and such an amount of money devoted to the development of science in the abstract, nor did he know how this would constitute advance with regard to the Pharmacopœia. If the Medical Council chose to elect professors engaged in that school as experts, why should not they employ the very men who would be appointed to carry out these investigations in the same way. An investigation committee might be chosen from the rank of experts; they could hardly consist of men engaged in business. But their rights were that as practical pharmacists they should be consulted, and at the present moment their claims were at least equal to those of the medical gentlemen sitting on the Committee.

Mr. Ekin regarded this proposition as being not so much premature as inopportune, and had no doubt many would have a difficulty in voting upon it on that ground. While he heartily sympathized with Mr. Giles in the suggestion that there should be a distinct effort to promote scientific research, he feared that any effort of that sort at the present time would be misunderstood. It was a pity it should be so, but there was no doubt about it. Many of the difficulties Mr. Schacht had raised were after all only difficulties of detail. There would be no difficulty in finding subjects to investigate, and if anything of the sort were ever carried out the Council would probably nominate a certain number of their own men, possibly associated with an equal number of others, who would choose the subjects. There might be a practical difficulty in finding suitable men to carry them out, and the more one thought about it the more one realized how great those practical difficulties would be. At the same time there was no reason why they should be insuperable. With reference to one point mentioned by Mr. Giles, the probability or the possibility was that almost every different drug should be treated by a different strength of spirit, instead of their all being treated with one or at most two strengths. That was a very important work which no one individual could undertake, but which might be taken up by a society. It was quite practical, and would be very useful, and would be to the credit of the Society. At the same time he felt that if this resolution were carried now, it would be very much misunderstood.

Mr. Luff cordially agreed with the assumptions with which Mr. Giles prefaced his remarks, and he presumed all the other members would do the same, for it was not only desirable that the Pharmaceutical Society should be officially represented as regards the construction of the Pharmacopœia, but they had a right to demand that position. Mr. Giles saw that their body was wandering in the wilderness of official Pharmacopœia neglect, and this resolution was to him a pillar of cloud by day and a pillar of fire by night which should lead them to the desired Canaan of official Pharmacopœia recognition. But, much as he sympathized with that, with one part of the resolution he could not agree, and that was the introduction of a system of co-operative research work, a system which would very much imperil if not entirely destroy the existence of individual research. It would be putting forward a forced and exotic plant in place of the strong indigenous plant of private individual work. He did not say that all men engaged in research would put forward this objection; but would there not be many who would say, Why should I spend trouble and time in doing work that is provided for by the Society in its official laboratory? Mr. Giles saw no other way of accomplishing the result, but with all deference he would point out another. If it were necessary that an additional incentive should be given to pharmaceutical research it might be done by offering good prizes for essays on certain subjects which were supposed at the time to specially require investigation. In that way a number of good papers would be obtained which would be adjudicated upon by the Committee, and the prizes awarded to the best men. But certainly if the majority of members present did not wish to give a crushing blow to individual research they might amend the resolution by suggesting that the Council be requested to consider the advisibility of offering prizes for researches.

The Vice-President thought they were much indebted to Mr. Giles for having brought forward this subject. In one sense there was great opportuneness in it, although it was inopportune in another, for it came before them at a time when their thoughts were prominently directed to their recognition in connection with the National Pharmacopœia. That question would be shortly before the House of Commons, when he trusted the collective energy of the members of the Society would be put forth to such a degree as would compel recognition. His own impression was that there was an almost entire consensus of opinion amongst the profession as to their rights. One or two medical men on the previous evening had expressed to him their astonishment that their claims had not been conceded before. He took it Mr. Giles wished them to direct their attention especially to pharmaceutical works, though he used the phrase original research, which covered a much larger extent of ground. But he differed from him as to his suggestion for a laboratory, which he feared would, as had been pointed out by Mr. Luff, tend very considerably to repress individual energy.

The President said this matter had not come before the Council in such a way that any definite conclusion had been come to, because it was felt desirable to hear Mr. Giles's interpretation of his own resolution. He would remind the meeting that it was not necessary to discuss details at the present moment; the first point was, did they want to commit the incoming Council to set to work on these lines? and if so, was this the best time to do it? Every educated pharmacist must thoroughly concur in the spirit of the resolution, but he did not think it was at all opportune, and should have much preferred if it could have been kept altogether from the public gaze for another year or two. It had two aspects, one, the simple one in which Mr. Giles presented it, that of true pharmaceutical research, and no doubt there was a great deal of good work which might be done in various ways without stifling individual energy. There was a deal of work which could only be done in such a way as had been sketched out; for instance, such a matter as was referred to by Mr. Ekin could not possibly be done by individuals. Nevertheless he did not believe that providing very great facilities for research necessarily tended to promote its advancement. But he would rather not discuss those details; the object of the resolution evidently was to move the Council on to advance pharmacy. But the present Council, and he was quite sure the incoming Council, was anxious to do so, and it had power to do all that was required without coming to the Annual Meeting for instructions. Requests made to a public body, either to the Conference or to the Society, with regard to original work in pharmacy had been practically few and far between. As to the institution of medals, prizes and things of that kind, he did not think they would be so satisfactory as the plan Mr. Giles recommended. But the resolution had another aspect, and that was a political one. There was a certain Bill now going through Parliament which deeply interested them, and in that aspect it was unfortunate that the resolution should have come forward. As it had come forward he was bound to ask the members to reject it, unless Mr. Giles, as he hoped, would withdraw it, not because they disapproved of it, but because it was most distinctly inopportune. He thought Mr. Giles might very well content himself with the expressions of opinion he had heard, and with the fact that there was likely to be on the new Council a certain number of men who entirely sympathized with him in spirit. They might depend upon it that when the time came he for one should not be slow to move in the direction he had referred to. There could be no better way of spending money than in the promotion of the object contemplated; but because at that particular moment such a resolution would perhaps be misunderstood, and might have a bad effect on the minds of the medical profession, and might even be regarded by some of their own body as somewhat of a slur on the Council, he would ask the meeting to join with him in urging on Mr. Giles and Mr. Martindale to withdraw both the motion and the amendment.

Mr. Giles said he would at once respond to that request, and he could only say that if he had had any idea of this objection the resolution would never have seen the light. He had not the slightest idea that he was acting contrary to the wishes of the President, or he would not have moved in the matter, and, in fact, he had expressed a wish to see the President before the notice was published, but had not been able to do so. He had heard quite enough to satisfy him that this motion would have better success in his hands than it would in his own, and he was quite content to leave it there. One or two things had been said which were a little debateable on which he would not enter, and would only say this, that the observations made might be divided under two heads, those who went against the laboratory part of the scheme, which was merely an incidental suggestion, those who went against the resolution; but if he dismissed all who went against the laboratory, which was merely an incidental matter, he did not know what there would be left to answer.

Mr. Lomas thought sufficient notice had hardly been taken of the slight put upon members of the Society by the way in which the new Pharmacopœia was being prepared. If he was rightly informed the Committee had come to the professors of the Society, and having done so he thought it was rather remiss of those gentlemen not to have mentioned the President and Council of the Society as being the most proper persons to assist them in the forthcoming Pharmacopœia.

The PRESIDENT said he had reason to know that that course had been recommended by the professors; but it was obviously not within their power to compel those who were engaging them as professional experts to follow their advice.

Mr. MARTINDALE having expressed his willingness to withdraw the amendment,

The PRESIDENT said it was very gratifying to find both gentlemen so ready to accede to the suggestion made. The Council had already shown that it was capable of dealing with large questions and of spending money when required on good objects. When the opportune time came no doubt the then Council would face this question in the best interests of pharmacy. Although it was important that they should be represented on the Pharmacopœia Committee, he hoped they were not going to neglect pharmacy because they were not so represented. It would be their duty to advance pharmacy as much in the future as they had endeavoured to do in the past, and by all available means.

Mr. VIZER asked if any approach had been made to the medical profession itself with regard to the Pharmacopœia Committee. The Bill was now in the House, and it seemed to him a very opportune time to make their influence felt amongst members of Parliament who at the present time might be anxious to do what they could to support them. He believed if the medical profession were directly approached by the agency of the local secretaries they would receive a large amount of support.

The PRESIDENT said this idea had not been lost sight of, and they were preparing to make use of their medical friends in the way suggested. In fact, last August something was attempted in that way, though, unfortunately, very few medical men were then in town.

Mr. URWICK suggested that deputations should wait on members of Parliament; a deputation told better than letters, and letters better than printed forms.

Mr. SYMES said when they were getting signatures last autumn on this question, forms of petition were prepared for signature by medical men and he obtained some. He spoke to a great number of medical men on the subject and did not remember one who disagreed with the view he put forward; but when he presented the petition he found very great difficulty in getting signatures, because they did not like to sign anything which appeared to be against the wishes of the Medical Council.

Mr. MACKENZIE said this question of representation on the Pharmacopœia Committee was really the burning question of the day. He had hardly any faith in getting much through the medium of medical men, and would rather advocate going direct to members of Parliament. Last year, a deputation waited on the Scotch members, when he was told by a very prominent member, the highest legal authority in Scotland, that if they wanted to get what they had a right to have, and which he was surprised they had not, they must try to influence their individual members in counties and boroughs. He said that he would use his influence with his friend who had charge of the Bill, and he could not see how a reasonable man could refuse to grant their request. This appeared to be a very opportune time for pressing this question upon the various members of Parliament.

Mr. WARD (Sheffield) endorsed the remarks of Mr. Symes with regard to the difficulty of getting medical men to sign petitions. As local secretary he waited on the leading physician in Sheffield last year, who expressed much sympathy with his object; but when he presented the petition he told him he was pledged to the present Bill, and could not sign anything against it. After that, of course, he knew it would be perfectly useless to go to any other medical man in the town.

Mr. ALLEN said his experience was quite the reverse of that of Mr. Symes and Mr. Ward. He had taken occasion to call on a few practitioners in London and obtained signatures from all, except one, whom he called upon.

The PRESIDENT said there was no doubt the sympathy of the medical profession was with them, and where signatures were refused it was from the fear that in signing a petition of that sort they would be opposing their own Bill, and medical men were naturally anxious not to interpose any difficulty in getting that Bill through Parliament.

The VICE-PRESIDENT remarked that with regard to this question of approaching medical men, no doubt experiences had been diverse, but the great value of the signatures of medical men was to influence members of Parliament.

Twenty-five gentlemen were then appointed scrutineers of the balloting papers.

Mr. GILES then proposed a vote of thanks to the President for his courtesy in presiding on that occasion, and to the Council for the manner in which they discharged their important duties during the past year.

Mr. HOWARD HALL seconded the motion, which was carried unanimously.

The PRESIDENT called attention to the registers placed upon the table, pursuant to Act of Parliament.

The meeting then adjourned until Friday at 12 o'clock, to receive the report of the Scrutineers.

ADJOURNED GENERAL MEETING.

Friday, May 23, 1884.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The adjourned meeting for receiving the report of the Scrutineers was held on Friday, May 23.

The Chairman of the Scrutineers read the following report:—

SCRUTINEERS' REPORT.

We, the undersigned Scrutineers, appointed at the Forty-third Annual General Meeting of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us, and report the following:—

Voting papers reported by the Secretary to have been issued	3672	
Voting papers received	1287	
Voting papers issued but not returned		2385
Voting papers received		1287
Voting papers disallowed:—		
Informal	18	
Received by post too late	62	
	—	80
Voting papers registered		1207

Result of the Poll.

Atkins	1092	Robbins	899
Schacht	1067	Butt	863
Greenish	1044	Squire	855
Savage	1036	Borland	848
Radley	988		
Woolley	985	Shapley	594
Gostling	980	Young (John R.)	551
Churchill	974	Dyer	524
Young (Jas. R.)	951	Baldock	510
Williams	943		

GEORGE S. TAYLOR, *Chairman.*

Chas. J. Mead.	Chas. B. Allen.
Edwd. B. Stamp.	W. Pickard.
I. Bourdas.	Jas. T. Tupholme.
David Hooper.	J. W. Bowen.
J. Horncastle.	M. Mitchell Bird.
Alfred E. Tanner.	Philip Princep.
Robt. Rowe.	Pelham C. Maitland.
W. H Symons.	John Morris Broad.
Geo. F. Bindloss.	Wm. Gulliver.
Wm. Matthews.	Henry Mathews.
T. Edwd. Greenish.	R. Fisher Young.
Robt. Saml. Bathe.	T. Howard Hall.

The New Council.

The Chairman then declared that the following gentlemen would constitute the Council for the ensuing year:—

Andrews, Frederick, 34, Leinster Terrace, Hyde Park, W.

Atkins, Samuel Ralph, Market Place, Salisbury.

Borland, John, 7, King Street, Kilmarnock.

Bottle, Alexander, 37, Townwall Street, Dover.

Butt, Edward Northway, 13, Curzon Street, Mayfair, W.

Carteighe, Michael, 180, New Bond Street, W.

Churchill, Walter John, 46, New Street, Birmingham.

Gostling, Thomas Preston, Market Hill, Diss.

Greenish, Thomas, 20, New Street, Dorset Square, N.W.

Hampson, Robert, 205, St. John Street Road, E.C.

Hills, Walter, 225, Oxford Street, W.

Radley, William Valentine, 42, Hampton Road, Southport.

Richardson, J. G. F., Elmfield, Stoneygate, Leicester.

Robbins, John, 147, Oxford Street, W.

Savage, William Dawson, 4, Park Road East, Brighton.

Schacht, Geo. F., 52, Royal York Crescent, Clifton, Bristol.

Squire, Peter Wyatt, 413, Oxford Street, W.

Symes, Charles, 14, Hardman Street, Liverpool.

Williams, John, 16, Cross Street, Hatton Garden, E.C.

Woolley, George Stephen, 69, Market Street, Manchester.

Young, James Robertson, 17, North Bridge, Edinburgh.

Auditors.

There being only the requisite number of candidates (five) for the office of Auditors, the Chairman declared the following duly elected for the ensuing twelve months:—

Hodgkinson, William 198, Upper Whitecross Street, E.C.

Hopkin, William King, 16, Cross Street, Hatton Garden, E.C.

Lescher, Frank Harwood, 60, Bartholomew Close, E.C.

Stacey, Samuel Lloyd, 300, High Holborn, W.C.

Watts, William Manning, 32, Lower Whitcross Street, E.C.

The meeting concluded with a vote of thanks to the Scrutineers for their services.

BOTANICAL PRIZE FOR 1885.

A Silver Council Medal is offered for the best Herbarium, collected in any part of the United Kingdom, between the first day of May, 1884, and the first day of June, 1885; and should there be more than one collection possessing such an amount of merit as to entitle the collector to reward, a second prize, consisting of a Bronze Medal, and also Certificates of Merit, will be given at the discretion of the Council. In the event of none of the collections possessing sufficient merit to justify the Council in awarding medals or certificates, none will be given.

Competitors must be Associates or Apprentices or Students of the Society, and under twenty-one years of age.

The collection must consist of phanerogamous plants and ferns, arranged according to the natural system of De Candolle, or any other natural method in common use, and be accompanied by lists, arranged according to the same method, with the species numbered.

The collector must follow some work on British botany (such as that of Babington or Hooker), and state the work he adopts. The name of each plant, its habitat, and the date of collection must be stated on the paper on which it is preserved.

Each collection must be accompanied by a note, containing a declaration signed by the collector, and certified by his employer, or a pharmaceutical chemist to whom the collector is known, to the following effect:—The plants which accompany this note were collected by myself, between the first day of May, 1884, and the first day of June, 1885, and were named and arranged without any other assistance than that derived from books.

In estimating the merits of the collections, not only will the number of specimens be taken into account, but also their rarity or otherwise, and the manner in which they are preserved, and should a specimen be wrongly named, this will be erased from the list.

The collection must be forwarded to the Secretary of the Society, 17, Bloomsbury Square, on or before the first day of July, 1885, indorsed "Herbarium for Competition for the Botanical Prize." After the Prize Distribution in October, collections will be retained one month, under the care of the Curator of the Museum, for the inspection of persons connected with the Society, and then returned to the collector, if required.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly stated meeting of this Society, was summoned for Wednesday, May 7, at three o'clock, but did not take place, owing to there not being a quorum present. Six members, including the President and Vice President, attended; but as the regulations require that no business shall be transacted unless seven members be present, there was no meeting.

Chemists and Druggists' Trade Association of Great Britain.

The Annual Meeting of this Association was held on Tuesday, the 20th inst., at the Inns of Court Hotel. The proceedings commenced as usual with a

MEETING OF THE GENERAL COMMITTEE

at 11 o'clock. Mr. John Harrison (Sunderland), President, in the chair.

The Secretary read several letters from members regretting their inability to be present, one of which made some remarks as to the financial management of the Society and the mode of audit, which were explained by Mr. Haydon.

The Report, of which the following is an abstract, and Financial Statement were taken as read.

The Report of the Executive Committee stated that the Association had successfully defended three of its members in the law courts during the past year in summonses issued against them under the Sale of Food and Drugs Act. The cases, which were referred to in detail, have already been published in this Journal. Since the last Annual Meeting the Executive had been compelled to refuse to defend one of the members in proceedings under this statute, on account of his having refused to accept the sealed sample of the drug purchased when offered at the time of purchase by the inspector. The Executive therefore took the opportunity of again impressing upon all members of the trade the advisability of invariably accepting samples when offered by inspectors under the Act, as refusal to do so places them in a very unfortunate position in the event of proceedings being commenced, and may, as in the case referred to, prevent the Association placing the services of their solicitor at the disposal of the defendant. During the past year proceedings had been successfully taken by the Association against four persons residing in Birmingham, London, Oldham, and Peterborough, for infringements of the 17th section of the Pharmacy Act, and it was stated that since the formation of the Association in October, 1876, the solicitor and officials had succeeded in convicting thirty-six illegal traders residing in all parts of the country under that section of the Act. Full reports of the hearing of these cases have appeared from time to time in the trade journals. Cases of illegal trading in poisons are, however, frequently brought before the Executive in which the requirements of the 17th section of the statute as to the labelling of the article have been complied with. In such cases the Association is powerless to institute legal proceedings against the offender under the 15th section for the sale of such poisons, power to sue under that section being, by the provisions of the Act, vested solely in the Council and Registrar of the Pharmaceutical Society. The Report then went on to say that no statute directly affecting the interests of chemists and druggists had been passed since the last Annual General Meeting, but the Executive had, nevertheless, given watchful attention to the proceedings of Parliament. The Bill introduced into the House of Lords last Session dealing with the amendment of the Medical Acts had been again brought into that House and passed during the present Session, and would probably at an early date be placed before the Commons. No action had been taken on the part of the Executive in regard to this Bill, as it contains no provision inimical to the trade, and expressly stated that:—"Nothing in this Act contained shall in anyway prejudice or affect the lawful occupation or business of chemists, or druggists, or, so far as relates to selling, compounding or dispensing medicines, the rights, privileges or employment of duly licensed apothecaries in Ireland." A Bill to restrict the sale of patent medicines had been introduced into the House of Commons in February last, by Mr. Warton and Dr. Farquharson, but was thrown out on the second reading by a large majority. In accordance with the instructions contained in a resolution passed by the last Annual General Meeting of the members of the Association, the Executive had considered the advisability of approaching the Council of the Pharmaceutical Society, with a view to united action in support of an amended Pharmacy Bill, and at their meeting on September 7th last, instructed the Secretary to write to the Secretary and Registrar of the Pharmaceutical Society, to arrange an interview between the Pharmaceutical Council and a deputation from the Executive of the Association before the introduction of such a Bill into Parliament. An interview was arranged, and took place on November 6th last. The proceedings, at the request of the President of the Pharmaceutical Society, were not reported. At the interview, a long discussion took place on the amendments proposed by your Executive to the draft Pharmacy Bill prepared by the Pharmaceutical Council, when it was ascertained that the Council had already settled the lines of the measure with the Privy Council. At the subsequent request of the President of the Pharmaceutical Society, the President and Vice-President of the Association again met the Law and Parliamentary Committee of the Pharmaceutical Council in reference to the matter, and eventually the Executive, at a meeting held on February 8th last, passed two resolutions to the effect that a small deputation should be appointed to accompany a deputation from the Council of the Pharmaceutical Society to the Lord President of the Privy Council in support of legislation on the general basis of the Bill now in the hands of the Government, and that the deputation should consist of the President, Vice-President, Mr. Barclay and the Secretary. These resolutions were in due course communicated to the Secretary and Registrar of the Pharmaceutical Society, who subsequently received a letter from the Privy Council Office, stating that Her Majesty's Government had decided to confine the Bill which they proposed to introduce to the question of the sale of poisons, and not to include in that Bill any amendments of the Pharmacy Act in relation to the status or the organization of the Pharmaceutical Society, and that the Lord President, after the Government Bill had been introduced, would be willing to receive a deputation on the subject. In compliance with a resolution passed at the last Annual General Meeting directing that a memorial, signed by the officers of the Association, should be presented to the House of Commons in support of the claim of pharmacists to be associated with members of the medical profession in a legally constituted committee for the purpose of preparing the British Pharmacopœia, and instructing the Executive to take such steps as they thought desirable in the matter, a petition had been drawn up and presented to the House of Commons by the Right Honourable Joseph Chamberlain, President of the Board of Trade, and a print of the same had been transmitted to all Local Secretaries of the Association, with a circular, asking them to request their parliamentary representatives to support its prayer in the house. Two cases having come under the notice of the Executive in which members of the Association had been threatened with prosecutions by the Inland Revenue authorities for having sold, as finish, methylated spirit, said to contain an insufficient quantity of gum resin, although the members themselves maintained that the spirit, when sold, met the requirements of the general order of the Board in that particular, the Executive applied for an interview between the Commissioners of Inland Revenue and a deputation from the Executive Committee of the Association, for the purpose of urging upon the Inland Revenue authorities the advisability of issuing an order making it compulsory on excise officers when purchasing spirit for analysis to leave with the seller a portion of the spirit sold. The Commissioners of Inland Revenue having expressed their willingness to receive the deputation, an interview took place and the Vice-Chairman of the Board, promised that the wishes of the deputation should be complied with. A General Order to that effect had since been issued to Excise officers throughout the country. At the Annual Meeting of the Scottish Branch, ten members had been nominated and duly elected by the Executive at their meeting held on May 21st last. The Executive regrets to report that the strength of the Association had declined during the past year, the total number of members on the Register at the time being 3340. It was thought there was no doubt that this was attributable to the severe and long continued depression in trade, which had so seriously affected many societies depending for support on voluntary contributions. The financial statement would show that 2632 annual subscriptions, and £68 13*s.* in donations have been received during the year, as against 2743 annual subscriptions and £63 4*s.* 6*d.* in donations during the previous financial year. The total expenditure during the same time had decreased from £903 9*s.* 3*d.* in the financial year, terminating April 15th, 1883, to £774 10*s.* 9*d.* during the present financial year.

The financial statement from 16th April, 1883, to 15th April, 1884, was as follows:—

Receipts.

	£ s. d.	£ s. d.	£ s. d.
Balance brought forward from last Account, viz.:			
Balance at Lloyds' Banking Company, Limited, Deposit Account		479 12 9	
Ditto in hands of Treasurer		18 1 0	
		497 13 9	
Deduct Balance due to Bankers on Current Account .	211 16 10		
Law Costs, unpaid	26 9 6		
		238 6 4	
			259 7 5
2632 Subscriptions at 5*s.* each			658 0 0
Donations			68 13 0
Interest allowed by Bankers on Deposit Account less Interest and Commission charged on Current Account			1 12 5
			£987 12 10

Payments.

	£ s. d.	£ s. d.	£ s. d.
Advertisements			4 16 0
Auditors' Charges			12 12 0
Canvassing Expenses			4 19 2
Hire of Room for Public Meetings . . .			4 15 0
Law Costs, viz.:—			
Solicitor's Charges		42 15 8	
Ditto Travelling Expenses		20 9 0	
Witnesses' Charges and Expenses . .		42 17 3	
			106 1 11
Office Expenses, viz.:—			
Cleaning		2 1 0	
Gas		7 17 5	
Rates and Taxes		8 9 4	
Rent		26 0 0	
			44 7 9
Postages			69 9 4
Reporting			43 8 9
Salaries, viz.:—			
Secretary		150 0 0	
Assistant Secretary		85 15 0	
Clerk		18 6 0	
			254 1 0
Stationery and Printing			58 4 8
Sundries			15 9 1
Travelling Expenses, viz.:—			
Executive Committee		125 2 7	
Secretary		25 1 6	
Assistant Secretary		6 2 0	
			156 6 1
Balance carried forward to next Account, viz.:—			774 10 9
Balance at Lloyds' Banking Company, Limited, Deposit Account		491 14 6	
Ditto in hands of Treasurer		11 19 3	
		503 13 9	
Deduct Balance due to Bankers on Current Account	266 5 10		
Law Costs, unpaid . . .	24 5 10		
		290 11 8	
			213 2 1
			£987 12 10

Mr. Urwick moved the adoption of the Report and Financial Statement. He said the only thing to be regretted was that members of the trade did not support the Association better. If it were not for that Association chemists and druggists would often be in a very unfortunate position, the Pharmaceutical Society not seeing its way to defend persons who were prosecuted, though it appeared to him that it might fairly subscribe towards the expenses of such cases.

Mr. Mackenzie (Edinburgh), in seconding the motion, said chemists and druggists ought to look upon this Association as a peace of mind insurance society, and it was a great pity it was not more appreciated.

Mr. Cross (Vice-President) said the value of organization was not sufficiently understood amongst chemists; but it must be remembered that they were engaged in an onerous occupation, which demanded their constant attention, and this led them to let outside things alone. The difficulty which both the Pharmaceutical Society and their own body had always had when dealing with the constituted authorities was that they did not directly represent the whole body of chemists, only a fractional part being subscribers. When this Association was started, the idea was to enlist the whole body in the kingdom, the subscription being fixed at the lowest point with that view. The result though favourable was not so much so as was hoped, and to-day, after several years' existence, they stood in a worse position than they did to begin with. Still, though it was disappointing, he saw no reason for despair; he believed there had been no time when chemists had been more harassed and worried than they were now, and it seemed to him, therefore, inevitable that they would awake to their own interests and the necessity of protecting them. If any burning question were to arise, no doubt they would quickly respond, and the apparent apathy would disappear. The Report was very interesting, and he hoped it would be carefully studied; the only matter to which he would specially refer was the proposed legislation. The Executive had discussed this matter with the Pharmaceutical Council under the gravest sense of responsibility, and as those very moderate proposals had not been accepted by the Government, he hoped a much stronger Bill would be brought forward and pushed to a successful conclusion.

The President, in putting the motion, made a few remarks on the financial position of the Association, which was not at all satisfactory, the expenditure having exceeded the income. He wished to draw special attention to the large amount of subscriptions in arrear, and hoped that the members of the Committee would each in his own district endeavour to get these arrears paid up; if this were done there would be a surplus on the year of over £100. He must take exception to the remark of the Vice-President that the Association was in a worse position than when they began. They were certainly poorer, but they were not worse, for they had a history behind them and could show for the money which had been expended, a large amount of work. If, as Mr. Mackenzie had suggested, the Association secured peace of mind to the members, it did an immense good, and perhaps it was the sense of security which prevailed which accounted for the apparent apathy which they all deplored.

The motion was then put and carried unanimously.

Messrs. Laird, Bingley and Arblaster having been appointed scrutineers of the ballot papers for the nomination of the Executive,

Mr. Ellinor (Sheffield) moved that the Committee recommend for adoption the amendment in Rule 6, of which Mr. Jervis had given notice, viz., that Rule 6 be amended to read as follows:—"The Executive Committee shall consist of twenty-four members, to be elected by ballot at each Annual Meeting. Five members to form a quorum. It shall be the duty of the General Committee to prepare and recommend to the Annual Meeting a list of the names of members to serve on the Executive Committee for the ensuing year. A President, a Vice-President, a Treasurer and an Honorary Secretary shall be elected by and from the Executive Committee."

Mr. Mackenzie seconded the motion.

Mr. Alderman Maltby opposed the motion on the ground mainly that it would detract from the interest felt in the Annual Meetings, if the election of President were not decided there. At the same time he should be glad if nominations were made so that the members might know something more about the matter than they now did.

Mr. Urwick also opposed the motion, because he thought the present rule worked very well, and it was a pity to alter it.

Mr. Barclay (Birmingham) thought it desirable that as much power as possible should be placed in the hands of the trade; he was opposed to the Executive doing anything which could be done by the members at large.

Mr. Mackenzie asked, if a system of nominations were adopted as suggested, any one could be elected President or Vice-President who had not been nominated.

The President said he thought the existing rule would allow of nomination being made, as the decision would still remain with the members, and would be taken by ballot.

Mr. Symes (Liverpool) hoped Mr. Jervis would not press his motion.

The Vice-President (Mr. Cross) opposed the motion. He thought it better that the President and Vice-President should be able to speak as elected by a large constituency rather than as the officers of an Executive.

Mr. Vizer supported the motion.

Mr. Jervis admitted that the rule had worked well up to the present, but they had been very fortunate in their officers, and the same good fortune might not always attend them; and he contended that the Executive were much better able to select good officers than the members at large.

Mr. Hampson said he had been much disposed to support the motion at first, but on further consideration, and after hearing what had been said by other gentlemen, he did not think it would be opportune to press it at the present moment.

After a few words from the President in favour of the present state of things, the motion was put to the vote, and negatived by 11 votes to 4.

The Scrutineers having made their report, the Committee adjourned to the General Meeting.

General Meeting.

The Annual Meeting took place at half-past twelve o'clock, Mr. John Harrison, President, in the chair.

The attendance was somewhat meagre.

The Chairman, in moving the adoption of the Report, expressed his regret that the attendance was so small. He was very sorry to find that so few members found it consistent with their duties to be present at the Annual Meeting, when matters connected with the trade were to be discussed, and he was more surprised because from time to time they heard great injury was being done to the trade, and that united action was required, and yet when opportunity for discussing these matters and of providing a remedy was afforded only a small number availed themselves of it. It might possibly be said that this showed perfect satisfaction on the part of the trade with the work the Association was doing. If it were otherwise members would come to the meeting to call the Executive to account, so that the fact of their absence might be taken as indicating general satisfaction with the work which was done. A *résumé* of that work would be found in the Report, and he might say that every case brought forward which, in the judgment of the Committee, seemed to be one which should be defended had been undertaken, and he was proud to think that they had been so remarkably successful. It showed in the first instance that chemists had been unduly pressed by the authorities, and in the second place that the Executive exercised due care with regard to the case presented to them. It was not necessary to specify the particular nature of the case, but he might refer to one in which their old friend the milk of sulphur was brought forward. Probably the gentleman who brought it up must have thought that the Association was defunct or asleep, but with his usual ill-luck he had failed. If anything could prove more conclusively than another the necessity for such an institution, it was that now and again these cases would crop up, and he might very fairly say that if that Association were not in existence and prepared to defend members there would very soon be great cause for dissatisfaction. The Committee called attention, and very properly so, to one matter which had arisen probably in reference to these cases, viz., the refusal on the part of some chemists when a purchase was made for the purpose of analysis to receive the sealed sample, and he would urge on all members whenever this was done not to do so, because it placed the society in a great difficulty and the vendor also. He could understand that a man might feel so thoroughly in the right that it was like making himself an accessory after the fact to receive the sample at all; but that was not the way to look at it. He must remember that the reception of the sample enabled him to prove before an independent authority that the articles he sold were perfectly genuine, and it also showed that in his own mind he was so convinced that he had only done what was right that he was willing and anxious to retain a proof of it in his own hands. Proceedings had also been taken against traders in various parts of the country, which had been uniformly successful. Whenever the Committee had received information that illegal trading had been carried on, if they found there was a reasonable prospect of success in taking up those cases they never failed to do so. The next matter referred to in the Report was the proceedings in Parliament. First, in reference to the Bill which was introduced in the House of Lords last year for the amendment of the Medical Act, as it contained nothing prejudicial to their interests no action was needed. The second Bill was one for regulating the sale of patent medicines, introduced by Mr. Warton, but that came to an untimely end. The most important matter, no doubt, was the proposal for the amendment of the Pharmacy Act, and on that he should wish to say a few words. At the last Annual Meeting, a resolution was passed that it was desirable that united action should take place between the Pharmaceutical Society and themselves, if possible, to obtain such an amendment of the Pharmacy Act. The Pharmacy Act was then before them, and had received very full and fair discussion. Possibly had they been in possession of more information, that discussion might have been shorter, and much that was said might have been omitted; but they proceeded then on the principle that the measure was before them then for discussion, and were not aware that the details had been settled beyond all controversy. He then took occasion to remark that if these lines had been laid down by a superior authority, as a loyal subject, he should be prepared to accept them, but he was under the impression that the Bill had been brought before the Council of the Pharmaceutical Society in the character of experts who had been asked to frame a Bill for the better prevention of accidents by poisoning, and that they were asked to give their opinion as to what that method should be, and he considered the Bill then before them was the answer of the Pharmaceutical Society to that proposition. It was found afterwards that that was not the case; that although they had been asked to bring in such a Bill, they had also been restricted as to its nature, and that certain clauses had been inserted by a superior authority carrying out the views of the meeting. The Executive sought an interview with the Privy Council, when they learnt for the first time definitely the real state of the case. There was much in the Bill with which they did not both agree; there were several points on which they were in thorough agreement; there were some points they considered objectionable, while there were several others which they thought very valuable, for instance, the restriction of dispensing, and the sale of patent medicines containing poisons to chemists and druggists, and the proposition that the law should apply to companies as well as individuals. These were matters of the greatest possible importance, and, therefore, although there were other points with which they did not agree, they felt it was a Bill which they ought to support, as those on which they differed were the very points which had been settled by a higher power. There were three courses open to them, either to assume the position of actual hostility, and to go to the Privy Council and to Parliament and oppose the Bill, tooth and nail; to take up a position of perfect neutrality, saying to the Pharmaceutical Society, We have had no part in framing this Bill, and you must take all the responsibility of it yourselves; or, thirdly, they might say that there was much in it which they agreed with, and, therefore, although there were other points on which they did not, they would support the Bill for the sake of the important advantages it contained. The Executive decided on the latter course, as he believed very wisely. He should not have liked to stand there to-day and have to excuse himself and his colleagues for the fact that no legislation was attempted when there was such a general feeling that legislation was required. He should not like to stand there in the character of an obstructionist, and, therefore, he accepted what was good and swallowed as best he could what he did not like. The lesson to be drawn from the proceedings which led up to the Act of 1868 ought not to be forgotten. That Act was rendered, to a large extent, useless by the divisions which existed in their own ranks, and that weighed very considerably with the Executive, because they felt that if they took up a position of hostility the Government would say, Here are two bodies, representing, to a large extent, the same people, coming to totally different opinions on the same question, and the result would have been that they would have said, "Gentlemen, you had better go home and settle these differences amongst yourselves, and in the meantime we will legislate as we think proper." What had actually taken place? Last year a bill was brought forward in the House of Lords with regard to a Pharmacopœia Committee and on that bill their claims were entirely ignored. The Council of the Pharmaceutical Society and their own Executive took measures to petition the House of Commons with a view to providing that chemists and druggists should be represented on that Committee. Nothing could be fairer in principle, and, in fact, it had been acknowledged to him by several members of Parliament that the claim appeared to be thoroughly reasonable, and that unless there was some very good reason to the contrary, it would have to be considered. Everyone seemed to think there must be something mis-stated or omitted, or their claims would have been recognized before. However, although they made this strong and joint representation, showing no division in their ranks, the Bill had been re-introduced and their claims were again ignored. To his mind, nothing could prove more conclusively the necessity for union, for if they were ignored when they were united, what would be their position when, on the one hand, the Pharmaceutical Society advocated one thing, and they, on the other hand, another? Their great necessity was organization. An old Hebrew hero was represented as saying, "Justice with courage is a thousand men;" but had he lived now he would have said, justice with organized force is a thousand men. Unless they were thoroughly organized and worked well together it was no use indulging in wild declamations as to nothing being done, for nothing could be done. But if they could go forward to the country and to Government and say they spoke in the name of ten thousand men who were determined to have justice done to them there would be a very different response. He hoped every chemist and druggist would bear in mind that if they wanted a Pharmacy Act which would be of any use, which would give them that justice which they had a right to demand, that demand must go straight to the Government from a united people. What was the extent of the support they received at present? They only spoke in the name of scarcely three thousand members. This was a sad reflection on the times and showed a want of appreciation amongst chemists which, to say the least of it, was disastrous to their interests. There was nothing else special in the Report to which he need allude, except one matter which was brought forward at the last meeting, the question of selling methylated spirit; that was brought forward in consequence of several complaints made with reference to the purchase of finish having been made which was found, after a considerable lapse of time, not to contain the quantity of resin which it ought, and the Executive were requested to seek an interview with the Inland Revenue authorities on the subject. In due time a special deputation waited on the authorities at Somerset House, where they were received with great courtesy, and so thoroughly convinced were the authorities with the few observations made by the deputation that they at once said they would recommend the Board to issue the order which was asked for. Nothing could prove more conclusively that if they could unite themselves together with the view of obtaining justice, it would not be long withheld. Another matter to which he wished to refer was the strength of the Association. That was discussed by the Committee on the previous evening, when it was pointed out they were strongest where there were active local secretaries, and he would, therefore, suggest that if there were any local secretaries present who were not active that they should either become active at once, or if they could not do so, resign in favour of someone else who could. Every man in his own district should bring the claims of the Association forward with the view to increasing their numerical strength, for it was only in that way they could go forward, and speak with power and effect.

The Vice-President (Mr. Cross) seconded the motion, and said he had very few remarks to offer except to emphasize what had been already said by the President. With regard to the works of the Association, both of attack and defence, the fewness of the cases which had been undertaken argued in favour of the policy hitherto adopted; for if the Association had not done its work well there would no doubt have been many more. But, in fact, there had been no cases come before the Committee which had not received full attention. With regard to the sealed samples also of articles purchased for analysis, however indignant an innocent man might feel, he should remember the object for which the sample was furnished to him, and also that his refusal to receive it might be attributed to very different motives. With regard to the revised edition of the Pharmacopœia the organization stood them in good stead, for although the result of their action was *nil*, he believed their position was considerably improved. Several members of Parliament were communicated with, and from personal interviews he had with them, he believed that the justice of their claims had largely impressed them, for when the time came the matter could be taken up where it was then left, and be carried on with success. With regard to the deputation to the Inland Revenue, it was very gratifying to hear Mr. Adam Young say that the Inland Revenue authorities wished as much as possible that the sale of methylated spirit should be in the hands of chemists and druggists, because they were a body of men in whom the authorities had confidence.

Mr. Whittle regretted the constant decrease in the numbers of the members of the Association, and was astonished to find that chemists did not to a greater extent support a society which they knew was so valuable and was ready to come forward at any moment and defend them when they were unjustly attacked. He feared, however, that too many of them did not care who paid the expenses so long as they did not, and fancied they were quite as safe as if they subscribed. He contended, however, that they were not safe in their present position, for the Association ought to have at least £500 to £1000 in hand. It would never do to take up a case which they could not go through with. He had never met a single chemist who did not think the Society had done marvellous work for the amount of money it had received; but, unfortunately, chemists and druggists were about the weakest specimens on the face of the earth, though if united they might do some good. Many of them were like the pendulum of a clock, they went from their shop to bed, and from their bed to the shop, and would never spend 5*s.* for anything unless they could get an immediate 7*s.* 6*d.* They lost the sale of patent medicines through the same parsimony; they wanted to have the privilege for nothing, and thought two guineas was too much. They got it down to 5*s.*, and now they had to a great extent lost the trade; and serve them right. It was the want of unity which was their great weakness. They would never get a Pharmacy Act which would do them any good unless they stood shoulder to shoulder and showed the public they were an educated body of men who had confidence in themselves. Many persons looked upon this Association as a sort of double of the Pharmaceutical Society, and all the more since several members of the Executive were also on the Council. No doubt those gentlemen worked well in both Societies, but it had occurred to him that it would be as well if the two bodies were kept more distinct, and if the members of their Executive were not members of the Pharmaceutical Council.

Mr. Walker (Coventry) said no doubt the remarks just made were intended in the most friendly spirit, but as a member of the late Executive he must say that those gentlemen who were also on the Council of the Pharmaceutical Society had been of the greatest possible use to the Trade Association, and instead of doing anything to suggest that they were simply nominees of the Pharmaceutical Society, they had always taken the greatest possible interest in trade matters, and had given many very valuable hints with reference to the possibilities of the train of thought which the Pharmaceutical Society might take on any given subject. Hence their presence, instead of being an element of weakness, had been positively a source of strength. With reference to the cases which had been taken up, as the President had said they had always done their best to take up a case when there was any chance of success, and that no doubt was true, and he might add that every case was carefully considered on its merits. Burns said we only know the evil done, but never what is resisted, and if members knew the number of cases which came before the Executive and which were carefully considered, they would feel sure that the Executive were not by any means deaf to the requests which reached them from all quarters. As a member of the wholesale trade he often heard reports that the Executive had not sufficiently attended to the interests of trade; that they had not taken up this, that and the other case. But he could only say that all such reports were founded on an entire misconception, and that if any case were not taken up there were very good reasons for it.

Mr. Hampson said he was one of those unfortunate members of the Executive who happened to be a member of the Pharmaceutical Council. He believed that the fact that members of that Council had also been on the Executive had been a decided advantage. It might not be without alloy, for there were very few things in this life free from alloy. He must express great satisfaction with the opening address of the President. It had an excellent ring of strength about it, and he hoped if it did not reach every chemist's shop in the kingdom it would at any rate reach a great many, and would meet with the response it deserved. He regretted that the meeting was so small, and also that the strength of the Association was not greater, but other organizations suffered from the same state of indifference. It was a universal complaint, but on the other hand it ought to make them more determined to utilize to the utmost the strength that they had. Although they were not numerous they were representative, and if they used the strength they possessed at the right time they would be able to make themselves felt. If he had any special interest with regard to this Association, it was that they should on all possible occasions work harmoniously with the Pharmaceutical Society. He knew that the Pharmaceutical Society was not without fault, that it had done many things which it ought not to have done, and on the other hand it had not done many things it ought to have done. But what was the cause? Just the same as they had to complain of there, the want of support from outside, the want of the invigorating agency which the members gave, and which ought to be given in a much greater measure to both Societies. On the other hand, the Pharmaceutical Society was a fact, its position was most important with regard to pharmacy, and this Association might on all occasions without loss of dignity unite with the older Society in carrying out all worthy objects. He was extremely gratified to find that within the last year the two Societies had approached each other. He might almost say they had shaken hands. At any rate there was a friendly feeling; the old feeling of distrust was gradually vanishing, and in a short time the two Societies might be able to work each in its own manner without any feeling of suspicion or jealousy. He was much struck with the point made by the President, when he referred to the fact that notwithstanding their united action with regard to the Pharmacopœia, they did not seem to have made themselves felt; to a certain extent that was true, but he believed they had made themselves felt. There was another Medical Bill in the House of Lords, and they would have another opportunity of exercising their power, and if they did so in conjunction with the Pharmaceutical Society he thought they might obtain a just recognition at the hands of the Legislature. If any other reason were needed for uniting and for increasing the strength of the Association, there was the fact that the Government were about to legislate with regard to the sale of poisons, for notwithstanding that the Pharmaceutical Society had had the ear of the Medical Department of the Privy Council, and had had numerous conferences, it had up to the present time utterly ignored their representations. That appeared to be a melancholy state of things, and they might have to oppose the Patent Medicine Bill; very likely they would. Surely that was another reason for uniting their strength and acting harmoniously with the elder body.

Mr. Mackenzie (Edinburgh) having been on the Executive from the very first, said he could speak with the fullest confidence as to the advantage which had been derived from the presence of gentlemen who were on the Council of the Pharmaceutical Society. At the early meetings they looked upon it as a fortunate day when they had the presence of those who were not sent from the Pharmaceutical Society to the Trade Association, but rather from the Trade Association to the Council of the Pharmaceutical Society, and if they would analyse the voting papers from year to year, he thought it would be found that those members who stood highest on the poll were not those who had least to do with the Trade Association, but rather the reverse. He hoped that any misunderstanding which might exist on that point would be corrected, and that these gentlemen would remain on both Boards for a long time to come. With regard to the Pharmacopœia they must cease to look to high quarters for patronage or support, and rely more upon themselves. Each of them represented districts widely scattered, from all of which members were returned to Parliament, and their influence would be best used by communicating directly with those members. After the last meeting he went to the House of Commons, and saw the Lord Advocate, who acknowledged that their position was a very strong one, and advised him to see other members, which he did, and explained the true position of matters, so that he believed they would get a good deal of support when the time came. The day might not be far distant when these gentlemen would be wanting votes again, and that was a very favourable time to produce an impression upon them. If there were apathy in the trade he believed it arose from their success; and if they were to resolve to wind up the Association, there would be an immediate outcry all over the country.

Mr. Allen (Kilburn) remarked that though gentlemen from the country came up in great force the Londoners kept behind their counters and would not attend. One gentleman had alluded to the good which might be done by local secretaries, and he understood that the London Committee were considering whether district secretaries should not be appointed in London who should endeavour to induce more members to join. Almost the first paragraph of the report related to an important prosecution in the North of London, and with regard to that he might mention another good result of organization, which was not stated in the report. Three highly respectable members of the trade were summoned by the analyst connected with the Hampstead Vestry, but in each case, by the help of the *Referee* and the efforts which the Executive put forth, the prosecution broke down. Shortly afterwards a circular was sent round bearing the signatures of the three prosecuted members, referring to the fact that the appointment of the analyst was with them, and urging chemists and druggists in the neighbourhood to oppose his appointment. He appended his own signature and saw one or two members of the Hampstead Vestry on the subject, and the result was that shortly afterwards another gentleman was appointed.

Mr. Barclay said the past year was one in which they had been able to do very little, but they would have done more had their hands not been tied, to a great extent, by the Pharmacy Bill. He, for one, did not feel at all sorry that this Bill had received its *coup de grace*, and that they might now start *de novo*, for they might very easily get a better Bill than the one which was proposed to be introduced. Professor Attfield, whom he was glad to see present, in the remarkably able address which he gave as President of the Pharmaceutical Congress, had laid down some lines on which chemists might set to work to try to obtain legislation. The advantage which would have been obtained by the trade had the Pharmacy Bill passed in its entirety would have been but very small, and he thought if they boldly set to work and made up their minds as to what they ought to have, and go to the country and use their influence with members of Parliament and the public, they might do a great deal better than they had reason to expect from the past. Something had been said about organization, and they were supposed to know something about that in Birmingham; but he might say that Birmingham organization was powerful because of the large numbers at its back. It was easy to organize if you had numbers, but it was difficult and useless to obtain an organization if you had nothing to organize with. They ought all to endeavour to obtain a large increase of numbers in face of the legislation Government was about to introduce, which would probably not be very satisfactory, and, therefore, they might anticipate the necessity for fighting which would no doubt stimulate all the local secretaries to go to work. As the Chairman had said, they could not agree with the Pharmacy Bill on all points, but it was a question whether they should take it in its entirety, stand aside altogether, or oppose it, and they felt that they could not take the responsibility of dividing the trade, and hence they supported the Bill. He should be very glad if the meeting would come to some practical conclusions, so that the incoming Executive might be able to gather the opinions of the chemists throughout the country as to the lines on which they should endeavour to act. In the proposed Bill certain poisons were to be termed poisonous, and were to be allowed to be sold by anyone if properly labelled. This was a question which chemists ought to look at very seriously. He thought it would be a retrograde step altogether to allow other persons to sell poisons under these restrictions. If it were once admitted, the schedule of poisonous articles would be continually added to by the Privy Council, and chemists would in the end be seriously injured. The public mind was made up pretty generally to go for something more than the Pharmacy Bill had attempted, to give the chemists more powers, and to place around strong medicines, as well as poisonous medicines, restrictions in favour of chemists. He thought it would be well if a resolution were passed for the Executive to endeavour to obtain the opinion of chemists throughout the country as to the lines of a Bill, and to approach the Pharmaceutical Society, stating their views, and endeavour to arrive at harmonious and united language. They must be united if they were to do anything at all, but, at the same time, being a distinct association, they might help the Society a great deal more if they were allowed. It was quite impossible for the Executive to fight for a bill which was not its own, and it could only be its own if it commanded the sympathies of the Executive, which it would not do thoroughly unless the Executive had some hand in framing it. He was glad to find that the Pharmaceutical Society and that Association were more in harmony than they had ever been in the past, and trusted they would continue so, but if they were to pursue a common course and assist each other, there ought not only to be united action, but common ground on which they were to work. He was sorry to see that the strength of the Association had gone down, but still there was no need to despair. During the eight years of its existence something like £8000 had been raised, and a great deal had been done for it, and seeing these successes in the past he trusted chemists would not be so blind as to allow the Association to expire.

Mr. Symes, of Liverpool, feared some of the remarks made as to the numerical strength of the Association would look as if they were ringing its death knell, but he trusted that was not the case. He looked around to see what others were doing as the best means of bringing the trade together, and stemming the downward course which it seemed to be running. If they looked to the Continent they found that their pharmacy was more of a science, and was not so much regarded from a trade point of view, so that their experience would not be exactly applicable; but their brethren in America were very much in the same condition as themselves. They were harrassed by co-operative societies, and by certain black sheep amongst their own body who were known by the popular name of "scalpers." All sorts of means had been devised for dealing with these difficulties and for giving a healthier tone to the commercial character of pharmacy, and restoring something like a prosperous condition to the business. After proposing several methods of boycotting the persons who supplied these "scalpers," and forming co-operative societies amongst themselves, they had fallen back on exactly the same course as had been adopted in this country of forming a national trade association, in which the most substantial and most thoughtful men reposed the greatest confidence for getting over their difficulties. It seemed to him that just at the time when they had come to a low point in their history it was rather encouraging to find that people like the Americans, who were proverbially cute, could devise no better method than the one which had been adopted here for eight years for bringing the trade together.

Mr. Vizer remarked that fire insurance offices always regarded conflagrations as one of the best things which could happen to them, because when a large establishment was burnt down, a lot of small ones rushed in to insure. It seemed to him that they wanted something of the same kind in order to stir up their brethren to come forward and join the Society. If he recollected rightly the Association had its origin almost in the embers of a large conflagration which occurred some years ago. He saw Mr. Haydon shake his head, but at any rate at that time a large number of chemists united in consequence of the great excitement that existed in order to meet a common evil. It seemed to him that when prosecutions were brought against chemists at the present time, disagreeable as it might be to the individual, it did good to the Association, because it led men to see there was danger ahead. When he was local secretary in Brighton, he took a great deal of trouble, and there was not a chemist in the town who was not either written to or spoken to on the subject; but the greatest obstacle he met with was the idea that there was no danger immediately threatening them. With regard to representation on the Pharmacopœia Committee, it occurred to him that something might be done by approaching the medical profession on the subject, for his experience was that as a body, they would support the presence of chemists upon that Committee. He thought if the medical profession were approached in the proper manner a great power might be brought to bear on the Government by which their end might be attained. He rejoiced at the harmonious spirit which existed between that Association and the Pharmaceutical Society, and there was certainly no reason why they should be antagonistic.

Mr. Haydon said he could not agree that the Association was founded on the embers of any other.

Mr. Diaper said in his view the Pharmacy Act Amendment Bill proposed by the Pharmaceutical Society was such an emasculated one that it was not worth supporting, but if they put forward one founded on the lines set forth by Professor Attfield it would be enthusiastically supported.

The President thought Mr. Vizer had rather confused the birth of that Association with the former one, the United Society of Chemists and Druggists. The origin of the Association really was the unfair prosecution by public analysts and the unfair attacks by the medical profession; these matters led to the formation of this Association for the reasons stated in rule 2, namely, "the protection of the legitimate interests of chemists and druggists from unfair attacks and encroachments and the promotion of their common welfare."

The resolution was then put and carried unanimously.

Mr. Jervis, being called upon to move the resolution which stood in his name, said that as there had been a considerable discussion on this matter in the General Committee, and as he found that the time had not come in the opinion of many members for introducing the amendment he proposed in rule 6, he should withdraw it.

Election of the Executive Committee.

The Secretary having read the following list of names which had been recommended by the General Committee for election as the Executive for the ensuing year, it was moved by Mr. Allen (Kilburn) and seconded by Mr. Kay (Stockport) and carried unanimously that they be elected.

Andrews, Frederick, London.	Maltby, J., Lincoln.
Arblaster, C. J., Birmingham.	Parker, W. H., Nottingham.
Barclay, Thomas, Birmingham.	Pasmore, G., Exeter.
Bell, C. B., Hull.	Southall, William, Birmingham.
Chapman, Henry, Scarborough.	Symes, Charles, Liverpool.
Churchill, W. J., Birmingham.	Walker, G., Coventry.
Cross, W. G., Shrewsbury.	Williams, F. P., Manchester.
Davis, H., Leamington.	Yewdall, E., Leeds.
Ellinor, G., Sheffield.	
Hampson, Robert, London.	*Scotland.*
Harrison, John, Sunderland.	Ettles, John, Elgin.
Holdsworth, T. W., Birmingham.	Laird, G. H., Edinburgh.
Jervis, W., Sheffield.	Mackenzie, James, Edinburgh.

Mr. Alderman Maltby (Lincoln) begged leave in accordance with the opinion which had been expressed at the meeting of the General Committee to nominate Mr. Harrison as President for the ensuing year.

Mr. Barclay (Birmingham) seconded the nomination.

Mr. Bell (Hull) then nominated Mr. Cross as Vice-President, which Mr. Jervis seconded.

Mr. Hampson proposed and Mr. Andrews seconded the nomination of Mr. Southall as Treasurer.

Mr. Ellinor moved and Mr. Symes seconded the re-appointment of Mr. W. J. Churchill as Honorary Secretary.

Messrs. Lance, Whittle and Candy were appointed Scrutineers of the ballot papers.

During the examination of the voting papers Mr. Kay (Stockport) drew attention to the question as to the use of the royal arms, and stated that he understood that its legality would be tried: that although the Solicitor-General said that the prohibition of the use of the royal arms was not intended to apply to chemists who had it over their shops, he had reason to believe that the Lord Chamberlain believed it to be his duty to prevent its use as much as he could.

Mr. Symes said he had given some attention to this subject, and he believed the legal position to be this—the introduction of the clause in question arose from the fact of patent agents, especially, using the royal arms over their door as a means of misleading the public and inducing them to believe that they had some Government appointment. It was the determination of the promoters of the Bill in question to prevent such a thing being done; but as long as the arms were used merely as an ornament and not in any way to mislead the public, he thought there would be no danger of prosecution.

Mr. Andrews said there was no doubt the use of the royal arms had been much abused, especially in the neighbourhood of London, and it was much safer to discontinue it.

Mr. Allen suggested that it would be well for the Executive to watch the publication of the *Trade Marks Journal*, for he feared many labels at the present time were getting on the Register, which, to a certain extent, seemed to be limiting the use of the English language, and unless some body like the Trades Association took it upon themselves to watch the matter, it would be possible to register a name such as "Jockey Club," which would be very inconvenient to the trade at large. Some persons claimed the use of the word "tablets," which had been used almost from time immemorial, and he knew of persons having been threatened with prosecution for using that word.

Mr. Haydon said some four years ago he accepted the office of Secretary to the Birmingham Exchange and Chamber of Commerce, and in that capacity he had a great deal to do with trade marks. It was quite impossible for any such words as "Jockey Club" to become a trade mark. "Jenner's Liver Mixture" had been registered as a trade mark, but not simply the words, but in combination with a distinctive outline and device, and in the same way "Jockey Club" in a distinctive device might be registered, but the trade mark would not consist in the words "Jockey Club," but in the device which those words included. With regard to the word "tablets" having been registered by a firm who claim the exclusive right to do so he might say that they took pretty good care not to carry that contention into a court of law. The matter had been considered by the Executive, and if any member of the Association were threatened with an action for the use of that word he believed the Association would be prepared to defend him.

Mr. Barclay said it was possible formerly to register words as a trade mark, but now there must be a design.

Mr. Allen said that if any gentleman who was threatened upon such grounds would write to the Association he would be informed whether he had good grounds of defence or not. If the Association were to undertake the watching of the Trade Mark Register it would necessitate a vast amount of work, because it would involve the reading up and carefully indexing of the whole of the marks already registered, which would be a work of great magnitude.

The scrutineers here reported that the following officers had been elected:—

President, Mr. John Harrison; Vice-President, Mr. W. G. Cross; Treasurer, Mr. William Southall; Hon. Secretary, W. J. Churchill; and, on the motion of Mr. Maltby, seconded by Mr. Laird, of Edinburgh, they were appointed accordingly.

The President and Vice-President having briefly expressed their acknowledgments of the honour which had been conferred upon them, the proceedings terminated with a vote of thanks to the President for his conduct in the chair.

Proceedings of Scientific Societies.

ROYAL INSTITUTION.

The Dissolved Oxygen of Water.

A lecture of some interest, owing to its relation to the sewage question, was delivered by Professor Odling before the Royal Institution on Friday, the 16th inst., under the title of "The Dissolved Oxygen of Water." Since the discovery of the weight of the atmosphere in 1640, and the difference in weight of the so-called fixed air, inflamable air and vital air, now known respectively as carbonic acid gas, hydrogen, and oxygen, Faraday has shown that the atmosphere is nothing else than the gas of a liquid, which gas by a sufficient abstraction of heat could be reduced to a liquid state. In 1823 he also reduced many of the known gases to a liquid state, and some tubes containing gases liquefied by Faraday were exhibited by the lecturer. Three methods may be used for the liquefaction of gases; by a lowering of the temperature, by pressure, or by making a solution with water, or a combination of these methods. The solubility of different gases in water was shown by Professor Odling in a tabular statement; at a temperature of 15° C., 2 volumes of hydrogen, 1½ of nitrogen, or 3 of oxygen are dissolved in 100 volumes of water, whilst 4356 volumes of sulphurous acid, 45,780 volumes of hydrochloric acid gas, or 78,270 volumes of ammonia are dissolved in the same volume of water. An increase of solubility is obtained with a reduction of temperature, though the rate of increase differs with the gas, that of sulphurous acid increasing at about five times the rate of that of hydrochloric acid. Professor Odling then stated that at a summer temperature of 70° F. water contained 1·8 cubic inches of oxygen per gallon, and 2·2 cubic inches at the winter temperature of 45° F., equivalent to four to five grains of oxygen per cubic foot. From calculations based upon this data it will be seen that at a temperature of 70° F. there are 2·58 tons of oxygen in every ten million cubic feet of water, increasing to 3·16 tons at the temperature of 45° F., thus showing a difference of over half a ton per ten million cubic feet between the summer and winter temperatures. It has been computed that during dry weather sixty four-million cubic feet of water pass Teddington Lock, which would contain seventeen and a quarter tons of oxygen; by the time this volume of water has reached Somerset House it is found to have lost from twelve to thirteen tons of the oxygen, which must have been taken up in the oxidation of sewage matter. In some experiments made by Dr. Tidy in June, the water from Teddington to Battersea showed an average percentage of aëration of 78, as compared with possible aëration; at Greenwich 38 per cent., and at Purfleet 26. Experiments carried on from July to November by Dibdin and Dupré showed that the percentage of aëration at Richmond was 86, decreasing to 40 per cent. at Woolwich, and as low as 24 per cent. at Erith, but by the time the water had reached Southend it had nearly recovered its first aëration, showing a percentage of 75. Dupré also made some experiments at Erith which showed a range of 50 percentage of aëration at high water to 40 percentage at low water, and results obtained by Dr. Tidy on the Colne confirmed these conclusions. It has been calculated that if a volume of water containing 35 per cent. of sewage matter be allowed to flow for one mile exposed to the air, the whole of the sewage would become oxidized. It has also been found by experiment that a closed vessel containing water with 5 per cent. sewage gives only 32 per cent. of aëration on the fourth day as compared with 84 per cent. on the day when introduced into the vessel. The results of these experiments tend to show that although no doubt the self-purifying power of the water of the river is sometimes overtaxed, it still retains the power of oxidizing the sewage matter, but the question as to whether it has the power of ridding itself of living bacteria still remains to be solved. During the lecture Professor Odling incidentally mentioned that the old method of ascertaining the quantity of oxygen present in water, by boiling in a vacuum and analysing the gas evolved, had been completely superseded by the use of a hyposulphite, introduced by Schutzenberger, of Paris. This compound not only acts as an oxidizing agent but also as a deoxidizer, speedily decolorizing indigo, magenta, iodide of starch, etc. As the colour is not destroyed until all the oxygen has been absorbed by the hyposulphite the amount of oxygen can be readily ascertained by the use of a burette.

Parliamentary and Law Proceedings.

Illegal Sale of Poison.

Before the county magistrates at Exeter, on Tuesday, the 20th inst., Thomas Elliott Pitt, agent and dealer, was summoned for selling half an ounce of strychnine, on April 20, at Kenton. Mr. Friend prosecuted and Mr. Brown defended.

Mr. Friend said that the proceedings were taken under the 31st and 32nd Vic., chap. 121, section 17, which stated that poison should be labelled when sold, and the person buying the same should leave his signature and address with the seller. On April 20, in consequence of the loss of a number of domestic animals, the police at Starcross had been spoken to on the subject. They made inquiries, and found that half an ounce of strychnine had been sold to a gamekeeper by the defendant, who is a grocer and ironmonger, and it appears that the poison was tied loosely to a packet of groceries which was sent to the gamekeeper. Mr. Friend did not know how it was the defendant was a chemist and grocer in one, but he was. The penalty for a first offence was £5, and in a second case £10.

Mr. Brown pleaded guilty on behalf of the defendant, and said that the gamekeeper had promised to come and sign the book, but he had failed to keep his promise, and the police had come upon the defendant. The bottle of poison had not been opened, and he asked the magistrates to dismiss from their minds the fact that animals had been poisoned through any act of the defendant.

The Bench fined the defendant £2 and £1 0*s.* 3*d.* costs.

ANSWERS TO CORRESPONDENTS.

David.—(1) *Vaccinium Vitis-Idæa.* (2) Probably *Achillea Millefolium*, but it is impossible to say with certainty with only a fragment of a leaf.

J. Humphrey.—(1) *Sanicula europæa.* (2) *Polygala vulgaris.* (3) *Poterium sanguisorba.* (4) *Orchis mascula.*

Australian.—The Board of Examiners has no power under the Pharmacy Act to accept the diploma referred to in lieu of any part of the examination.

Communications, Letters, etc., have been received from Messrs. Smith, Moore, Lloyd, Page, Bear, Bennett, Dymock, Shepperson, Brookes, Braithwaite, Christy, Foot, J. H. A.

"THE MONTH."

Messrs. Heckel and Schlagdenhauffen have recently (*Comptes Rendus*, April 21, p. 996) investigated the chemical constituents of the bark known as "bois piquant" in Cayenne, and "clavalier jaune ou épineux" in the Antilles. The bark of this plant has been used for some years in the south of France, and particularly at Marseilles, as a febrifuge. It is derived from *Zanthoxylum Caribæum*, Lk., and *Z. Perrottettii*, DC., which is regarded by the authors as only a variety of the former. The bark has been described accurately by Guibourt ('Hist. des Drogues,' 6th ed.), who confounded it with that of *Z. Clava-Herculis*. It bears some resemblance to cusparia bark in appearance, but its microscopic structure is quite different. The authors have obtained from the bark a crystalline principle in colourless needles, soluble in alcohol, and represented by the formula $C_{12}H_{24}O$. It is not coloured by contact with concentrated nitric, hydrochloric or sulphuric acid, and melts at 285° C. The bark also yields an alkaloid in minute quantity, of which the formula is promised when a larger quantity has been obtained. It is prepared by digesting with water an extract made from the alcoholic solution left after removal of the crystals, treating the aqueous solution with lime, evaporating to dryness and exhausting the residue with boiling alcohol. This alkaloid is coloured bright red by nitric acid, but it differs from brucine in the fact that the nitric solution evaporated on a water-bath and treated with a drop of solution of stannous chloride does not assume a violet colour, while concentrated sulphuric acid colours it blue and an alcoholic solution of bromine gives with it a blue coloration lasting for a long time. The aqueous solution of the alkaloid in the dose of ·005 gram administered hypodermically to a frog caused a rapid general paralysis, the respiratory and circulatory functions gradually ceasing and death ensuing in half an hour. Similar effects were produced on guinea pigs and rabbits. The authors have also obtained from the bark a substance of resinous aspect (amorphous alkaloid?), of alkaloidal character and producing similar effects in similar doses. It is soluble in water. The bark itself gives, when macerated in water, a yellow, bitter, slightly acid infusion, which is turned brown by ferric chloride and a bright red by nitric acid, and gives yellow precipitates with mercuric chloride, stannous chloride, tannin, picric acid, the double iodides and phosphomolybdic acid.

Although boldo has been known to contain an alkaloid since 1876, when Messrs. Bourgoin and Verne detected boldine, the base was obtained in such a small quantity that it seemed doubtful if the medicinal properties of the plant were due entirely to it. This doubt has recently given rise to a fresh investigation by M. P. Chapoteaut (*Comptes Rendus*, xcviii., 1052), who has found that boldo also yields a glucoside. This is extracted by making an alcoholic extract of the leaves, treating it with water acidulated with hydrochloric acid, so as to completely eliminate the alkaloid, and after freeing the liquid from mucilaginous matter as much as possible, shaking it with ether or chloroform. On evaporation a syrupy transparent body is left, of a yellowish tint and having an aromatic odour and taste. A kilogram of the leaves yields about three grams of the glucoside. On analysis it gave results corresponding to the formula $C_{30}H_{52}O_8$. Heated with very dilute hydrochloric acid, it was found to split up into glucose and a body of a syrupy consistence, soluble in alcohol and benzine, but insoluble in water, and represented by the formula $C_{19}H_{28}O_3$. The glucoside is considered by the author to be an ether in which glucose plays the part of an acid. The physiological effects of the glucoside have been studied by Dr. Laborde, who finds that when introduced into the body, either by hypodermic injections (tried on guinea pigs) or by the mouth (tried on dogs), it produces rapidly a tranquil sleep, lasting a longer or shorter time in proportion to the dose; from this sleep the animals awake in a natural manner and without any appreciable effect on their appetite, health, or habits. When subcutaneously injected into the dog, Dr. Laborde has observed that this glucoside excites and augments the secretory functions, causing an increase in the amount of bile, saliva, and urine. The results thus obtained seem to indicate that a very valuable addition has been made to the list of useful hypnotics and cholagogues. The bark of the shrub forms an article of commerce in South America, and it would, perhaps, be worthy of investigation if the glucoside be contained in larger quantity in it than in the leaves.

In a memoir published a few months since (*Journ. Ph. et de Chim.*, [5], viii., 5), Messrs. Regnauld and Villejean gave their reasons, based upon chemical analysis, for believing that the product at that time supplied to surgeons under the name of chloride of methylene was often, if not always, a simple mixture of chloroform and methylic alcohol. Subsequently, with a view of pursuing the subject physiologically, they prepared what they claim to have been pure chloride of methylene, the action of which was tested on dogs and other animals, comparative experiments being also made with chloroform. They report (*Journ. Ph. et de Chim.*, [5], x., 384) that the results confirm their previous belief and that the misnamed mixtures owe their properties to chloroform only. The physiological action of chloride of methylene was found to differ entirely from that of chloroform, except that both compounds produce insensibility. But the symptoms resulting from the inhalation of chloride of methylene (CH_2Cl_2)—contractions of the muscles, clonic movements, epileptiform and choreic seizures—were so constant and of such an alarming character that the authors think its employment as an anæsthetic during surgical questions is out of the question, and they doubt if it has ever been so employed.

In connection with this last expression of opinion, however, it may be mentioned that Dr. B. W. Richardson, in a note in the last number of the *Asclepiad* on the administration of chloroform and methylene bichloride, expressly refers to the contraction of muscular fibre produced by all anæsthetics of the chlorine series. This, he says, he is in the habit of counteracting by the administration of four to six fluid drachms of pure ethylic alcohol (sp. gr. 0·830) mixed with eight ounces of water, at a temperature of 95° to 100° F., about twenty minutes before the chloroform or bichloride of methylene is to be inhaled.

Ammoniated chloroform is recommended by Dr. B. W. Richardson (*Asclepiad*, p. 156) for the temporary preservation of *post-mortem* specimens. A fluid drachm is introduced into a wide-mouthed bottle of sixteen to twenty ounces capacity, previously filled with coal gas, and the bottle is then closed with a stopper coated with glycerine, until required for use. Ammoniated chloroform is also used by Dr. Richardson as an inhalation to reduce pyrexia. It is prepared by mixing together equal parts of strong alcoholic solution of ammonia and chloroform, the small quantity of water that separates after a time being removed by means of bibulous paper. The compound is described as a clear, pleasant-smelling liquid, with much less pungency than ammonia. About two drachms are placed in the inhaler, and gradually breathed during half an hour. The inhalation may be repeated as often as required, and carried on until the narcotic action of the chloroform is clearly but not deeply manifested.

Another subject mentioned by Dr. Richardson (*Asclepiad*, p. 165) is the internal administration of amyl nitrite, which he speaks of as advantageous in some cases, especially in asthma. The most convenient formula he has found to be as follows:—

Amyl nitrite, pure, ...	♏xxxvj.
Ethylic alcohol (sp. gr. 0·830), .	ʒvj.
Pure glycerine, to	℥jss.

Dose, 1 fluid drachm in a wineglassful of warm water, to be swallowed slowly and repeated every two or three hours if necessary.

A new variety of menthol is likely to be placed on the American market during the coming summer. A sample of the crystals, which have been presented to the Museum of the Society, have the same crystalline form as the Japanese menthol and are white and dry, but have an odour quite different, resembling that of the American oil of peppermint. Mr. A. M. Todd, of Nottawa, Michigan, claims to have discovered a process for obtaining this menthol in crystals from the oil of *Mentha piperita* in sufficient quantity to meet public requirements. A sample of the menthol is in the hands of Professor Flückiger for examination, who will doubtless publish any results that he may arrive at in due course. Mr. Todd considers, as the result of his experience during seventeen years in the distillation of oil of peppermint, that the tests for its purity are not accurately known, or, at all events, are not accurately given in the United States Pharmacopœia. He finds in the oil a resinous principle which hinders the crystallization of the menthol, and in order to obtain the menthol easily, the oil needs careful rectification. By forcing sprays of steam through it and by recondensation, its crystallizing tendency is considerably increased. The price of this menthol from the true peppermint is likely to be about 50*s*. per pound.

Herr Dieterich states that an emplastrum adhæsivum c. iodoformo has met with much acceptance in Germany, it being prepared of two strengths, one containing 20 and the other 30 per cent. of iodoform. This plaster, if applied directly to the previously cleansed surface in the case of slight burns and small wounds, is said to cause a very rapid healing. According to the same authority an addition of salicylic acid to ordinary "lip salve," and a previous treatment of the almond oil used with benzoin, increase the healing powers of the ointment.

Being convinced of the advantage of presenting phosphate of lime to the stomach in the gelatinous form, rather than in the pulverulent form to which it is usually brought for convenience of washing, M. Tanret sought for a plan by which the monocalcic phosphate should be treated with just a sufficiency of slaked lime to convert it into tricalcic phosphate (*Journ. Pharm. Chim.*, [5], ix., 389). This he effects by mixing with the solution of acid phosphate the molecular proportion of lime dissolved by the aid of sugar. He finds that practically to obtain a given quantity of gelatinous phosphate the proportions to be taken are the same quantity of acid phosphate and half as much slaked lime.

The German Pharmacopœia orders the removal of the oil from powdered ergot by means of ether. Messrs. Denzel and Wacker having examined the oil so removed (*Archiv*, xxii., 314) found it to contain ecbolin, one of the active constituents of ergot; they therefore think the official instructions defective. A similar result was obtained when carbon bisulphide was used. On the other hand, with benzine or light petroleum spirit a very pure oil was obtained, free from any trace of ecbolin. The superiority of light petroleum spirit for this purpose is also affirmed by Herr Dieterich, who further recommends the same solvent for removing the oil from the powders of henbane, sabadilla, staphisagria and mustard seeds, as well as from cochineal.

Bearing in mind the varying composition of many tannin compounds, and considering that the reasons that sometimes call for their use do not exist in the case of "cannabinum tannicum," Herr Bombelon was induced to prepare some pure cannabinum by treating the tannin compound with zinc oxide. He obtained it as a greenish-brown powder, not agglutinating upon exposure to the air, and volatilizing without residue from platinum foil. In doses of 0·05 to 0·10 gram it produced sleep without previous excitement, whilst cannabinum tannicum was found to act more unequally and require higher doses. "Pure cannabinum," prepared in this way, is described (*Pharm. Zeit.*, May 10) as tasteless, insoluble in water, and readily soluble in alcohol, ether and chloroform. As the best vehicle Herr Bombelon uses pulv. coffeæ tost., or pulv. cacao exoleat., and it is given as a powder, in pills or as an emulsion.

The use of corrosive sublimate as an antiseptic is rapidly increasing. Dr. P. Negri who has used it extensively in the Maternity Hospital, at Novare, states (*Practitioner*, p. 377) that the toxic effects of a solution of 1 part in 1500 or 2000 is almost *nil*; in one case only he observed slight mercurial exanthema. He considers that the weaker solution is sufficiently strong to prevent puerperal sepsis, and that it will completely replace that of the 2 per cent. solution of carbolic acid, over which it has the advantage of being cheaper and of having no odour.

Sulphate of copper is also being used with success as an antiseptic in obstetric practice (*Med. Times*, May, 24, p. 207). The solution is used of a strength of 1 per cent., and is warmed before use to 36 to 38° C. It possesses the advantage of having no odour, not causing discoloration like perchloride of iron, while possessing similar astringent and coagulating properties, and if employed several times in the twenty-four hours during eight or ten days it has no other effect than slowing the pulse and lowering the temperature.

In the *Lancet* (May 3, p. 795), Mr. S. Gamgee, consulting surgeon to the Queen's Hospital, Birmingham, describes a substitute for sponge which he has invented, and which combines absorbing power with elasticity, while it is cheap enough to be burnt after use. This he proposes to make permanently antiseptic by enclosing a thin ball in the centre containing any desired antiseptic, which could be set free by cracking the capsule with a squeeze. The chief constituents of the artificial sponge are cocoa-nut fibre and absorbent cotton. These sponges are said to absorb sixteen to eighteen times their weight of fluid, and readily fill and squeeze out again like an ordinary sponge.

The value of crushed ice as a dressing for burns and scalds, first pointed out by Sir James Earle, is confirmed by Dr. Richardson (*Asclepiad*, 164). The ice after being reduced by crushing or scraping to a fine state of division, as dry as possible, is mixed with fresh lard into a paste, which is placed in a thin cambric bag and laid upon the burn. This is said to banish all pain until the mixture has so far melted that a fresh dressing is necessary.

Having accidentally received some splashes of brown fuming nitric acid upon the skin of the face, and reasoning that the action of the acid was one of intense oxidation, Mr. Irving tried the effect of a dilute solution of sulphurous acid that happened to be available, and he describes it (*Chem. News*, May 2) as astounding. The action of the nitric acid seemed to be immediately arrested, and the pain removed, whilst the wound healed afterwards very rapidly.

In a comparison of the notices hitherto occurring in literature of nonylic acids (pelargonic acids) of various origin there is a certain degree of correspondence observable, but not such to warrant any conclusions as to their identity. Herr Bergmann was, therefore, induced to prepare and compare samples of nonylic acid (1) from the normal octyl alcohol of heracleum oil, (2) by oxidation of oleic acid, (3) by oxidation of methyl-nonyl ketone, (4) from the distillate of the leaves of *Pelargonium roseum*, (5) from the fusel oil of beet molasses, and (6) from undecylenic acid. The results obtained, which the author describes in detail, as well as the methods of preparation (*Archiv*, xi., 331), leave scarcely any doubt that the six different products were all identical with one another.

In an interesting contribution to the "histo-chemistry" of plants (*Monatshefte*, v., 94) Herr Rosoll illustrates the light that can be thrown upon vegetable principles by studying them microchemically *in situ* in the plant. The first plant mentioned is the *Helichrysum bracteatum*, the yellow flower heads of which are well known as a variety of "everlasting flowers." This yellow colour is very persistent, but when the dried flower heads are dipped in borax solution to which hydrochloric acid has been added, the involucral leaflets become a beautiful ruby-red colour. Further investigation showed this yellow pigment to be a hitherto undescribed quinone-like substance, which Herr Rossoll has named "helichrysin." In the younger leaflets it exists in combination with protoplasm, whilst in the older leaflets it has its seat in the residual cell contents. Helichrysin is soluble in water, alcohol, ether and organic acids; insoluble in benzol, chloroform and carbon bisulphide; is coloured purple-red by mineral acids and alkalies; and is precipitated by metallic oxides and their salts as a red coloured extract. The same body appears to be present in *H. orientale*, *H. fœtidum* and *Statice Bonduelli*. Passing to the fungi, the organs of fructification of the *Peziza aurantia*, with their yellow disk and lighter outer side, were examined. It was found that the orange colour is due to a new yellow pigment, that has been named "pezizin," which is present in the form of extremely minute drops combined with an oil-like substance that occurs dissolved in the plasma of the paraphyses. The pigment, which occurs also in *P. convexula*, may be dissolved out by alchol or ether. Saponin was ascertained to occur in the living roots of *Saponaria officinalis* and *Gypsophila Struthium*, dissolved in the cell juice, from which it can be separated in small amorphous white particles by treatment of thin slices of the root with absolute alcohol or ether. In the dried roots and in quillaia bark it occurs as an amorphous white or grey substance. By treatment with concentrated sulphuric acid and exposure to air, which gives rise first to a yellow, then a bright red and afterwards a beautiful blue-violet colour, saponin can be detected in the contents of all the cells of the parenchyma of the middle bark, the medullary rays and wood parenchyma of the fresh and dried roots, as well as in the contents of all the parenchyma cells of the middle bark of *Quillaia saponaria*. But the most interesting of these observations from a pharmaceutical point of view was one establishing that strychnine occurs in the seeds of *Strychnos Nux-Vomica* and *S. potatorum* dissolved in oil droplets suspended in the contents of the endosperm cells.

As a microchemical test for solanine, Herr Schaarschmidt lays the section to be examined in moderately concentrated sulphuric or nitric acid and then brings it under the microscope, when in a few seconds the presence of the alkaloid is marked by a beautiful rose colour (*Chem. Zeit.*, May 11). In this way the author recognized the presence of solanine in *Solanum tuberosum*, where the principal seat of the alkaloid is in the stalk, and especially in the tuber; also in *S. nigrum*, *S. Dulcamara*, *Capsicum annuum*, *Lycopersicum esculentum* and *Mandragora officinalis*.

In attempting to introduce hydrogen into the coniine molecule ($C_8H_{17}N$) to form octylamine ($C_8H_{19}N$), by distillation of the dry hydrochlorate with zinc dust, Dr. A. W. Hofmann found that hydrogen was given off instead, and a new base formed, having the composition represented by the formula $C_8H_{11}N$, and standing in the same relation to coniine as pyridine to piperidine (*Ber. Berl. Akad.*, 1884, 161). This base, which has been named "conyrine," is a colourless liquid, showing a beautiful blue fluorescence, lighter than water, boiling at 168° to 170° C., and having an odour resembling pyridine and picoline, but less pungent. When oxidized by means of solution of permanganate, conyrine yielded pyridinmonocarbonic acid (*Berichte*, xvii., 825). This and other considerations pointed to the probability that conyrine was orthopropylpyridine, while coniine was orthopropylpiperidine, or orthopropylpyridine hexahydride. An attempt was therefore made to regenerate coniine from conyrine, which was completely successful, and it therefore only remains to convert pyridine into orthopropylpyridine (conyrine), which, probably, will not be difficult, to complete the synthesis of coniine.

Ordinary commercial sulphuric acid seldom contains more than 96 per cent. of sulphuric monohydrate (H_2SO_4), and only exceptionally 98 per cent., since the acid is decomposed by the heat required for evaporation at about this degree of concentration. But it is reported that at Griesheim, in Germany, it has been found that the monohydrate can be obtained in crystals on the manufacturing scale by submitting the "acid" to a sufficient degree of cold (98 per cent. to a little below 0° C., and 96 and 97 per cent. to about −10° C.). The first crystallization still retains some mother-liquor, but the pure monohydrate is obtained by melting the crystals and repeating the operation. The reduction of temperature due to heat becoming latent in the liquefaction of the crystals is utilized to cool a further quantity of crystals.

Dr. Olszewski has determined the solidifying temperature of several of the gases that Faraday failed to solidify in consequence of not being able to produce a sufficiently low temperature (*Monatshefte*, v., 127). The refrigerating medium used by Dr. Olszewzki was liquid ethylene, in conjunction with an air pump, by which means he was able to reduce the temperature, if required, to −139° C. At −102° C., under ordinary pressure, chlorine formed an orange liquid, in which there was a separation of yellow crystals, and at a lower temperature the whole liquid formed a yellow crystalline mass. At the same temperature hydrochloric acid gas formed a colourless liquid, which solidified at −115·7° C. to a white crystalline mass that began to melt again at −112·5° C. Arseniuretted hydrogen also formed at −102° C. a colourless liquid and a white crystalline mass at −118·9° C., melting again at −113·5° C. Ethylic ether, freed from alcohol and water, solidified at 129° C. to a white crystalline mass, which passed again into a liquid at −117·4° C. Pure amylic alcohol formed at −102° C. an oily liquid, had the consistence of soft butter at −115° C., and froze at −134° C. to a hard semi-transparent body.

Dr. Phipson records the observation (*Chem. News*, May 2) that the odour of ether which appeared to be given off by lemons after having been kept for a time in a damp cupboard was coincident with the development of *Aspergillus glaucus* upon them. He thinks the odour is due to the breaking up of citric ether (triethylic citrate) under the influence of the fungus, and makes a suggestion as to what probably takes place. Under the influence of warmth and moisture some of the sugar in the ripe lemon undergoes fermentation, and the alcohol formed combines immediately with citric acid to form triethylic citrate, which is split up by the fungus into free ether, which is volatilized, carbonic acid, and, probably, other intermediate products. It may be remembered that in a communication to this Journal some years since ([3], v., 201), Mr. F. M. Rimmington attributed the development of an odour of acetic ether in some concentrated infusion of quassia to the formation of acetate of ethyl under the influence of cryptogamic life.

In a recent communication to the Asiatic Society of Japan (*Nature*, April 24), Mr. O. Korschelt gave some very interesting information respecting the constituents of Japanese lacquer. He considers the raw lacquer juice to be an emulsion which contains a peculiar acid (urushic acid), a gum, a nitrogenous body, water and traces of a volatile acid. The hardening of the juice that takes place when it is exposed in a thin layer to moist air at a temperature between 20° C. and 27° C. is due to the oxidation of urushic acid to oxyurushic acid under the influence of the nitrogenous body, which acts as a ferment. Whilst the gum is useful in maintaining the condition of an emulsion, its presence in the hardened lacquer is injurious, as it gives rise to blisters in contact with water. The reduction of the proportion of gum by the admixture of raw juice with separated urushic acid is, therefore, advantageous; but on the other hand, if this admixture be carried beyond five parts of acid with one part of juice the activity of the ferment is interfered with. The ferment is an albumenoid, but contains much less nitrogen than albumen, and it cannot be replaced by diastase or ptyalin. The quality of the lacquer seems to be dependent upon its richness in urushic acid and poverty in water, the durability of the finished work being due to the oxyurushic acid, which is singularly negative in its reactions, resisting all solvents tried, and being affected only by strong nitric acid. What is known as lacquer poisoning is stated to be due to urushic acid, which gradually disappears; the best antidote for it is sugar of lead.

Mr. J. M. Wood, the Curator of the Botanical Gardens, at Durban, Natal, writes that he has received plants of the true Socotrine aloe, *Aloe Perryi*, direct from Socotra, and that there is a probability that the cultivation of the plant for the sake of the juice will be commenced very shortly in Natal. The specimens sent from Kew to Jamaica appear to have died, according to Mr. D. Morris's report, and it is therefore interesting to learn that there is hope that Socotrine aloes of good quality may again become a commercial article in a few years. Mr. McAlpine, a botanist who has just started for Tasmania, has in view the cultivation of medicinal plants in that island and intends to include among them this aloe. He hopes in the course of a year or two to be able to supply the Antipodes with better samples of henbane, belladonna, etc., than they at present receive from this country.

Mr. T. Darwin, in an article in *Nature* (May 1, p. 7), on the "Absorption of Water by Plants," shows that the rate of absorption is influenced by the dampness or dryness of the air, being more rapid in dry air, owing to the more rapid evaporation from the leaves, and more rapid in sunlight than in shade. He also confirms Baranetzky's statement that a small disturbance, such as a slight shake, by increasing the transpiration from the leaves increases the rate of absorption, while cutting off a twig rapidly diminishes it. A. Sorauer, however, found in some experiments on gourds that the removal of leaves from plants on two occasions did not alter the amount of evaporation in the least; and even when half the leaves were removed from another plant, although a reduction in the amount of evaporation ensued at first, after eleven days the evaporation was equal to that of an untouched plant (*Journ. Chem. Soc.*, xlvi., 627).

The rapid changes of temperature and the dry winds during the last few weeks must have had an injurious effect on the hop gardens exposed to their influence, since according to A. Schwartz (*Journ. Chem. Soc.*, xlvi., 629), these conditions bring about an unhealthy state of the plant under which it readily falls a prey to mildew and aphides, which is not the case with plants sheltered by trees or hills or otherwise protected from the changes of weather, nor with those which being planted late are less liable to be subjected to changes of temperature.

A correspondent, writing from Parkstone, near Poole, Dorset, remarks that the vegetation in that neighbourhood is about three weeks behind owing to the continued east winds. The broom is only now in full blossom, while the elder is just beginning to burst into bloom. In the gardens the bay tree, *Laurus nobilis*, is covered with flowers. The different species of pine, chiefly *Pinus sylvestris* and *P. maritima*, which render the air so fragrant and healthful for many a mile in the neighbourhood of Parkstone, are becoming lit up as it were by the bright green shoots, which contrast pleasantly with the dark tints of the last year's foliage. The abundance of the purple orchis in the meadows suggests that it would be no difficult matter to obtain salep in this country if it were so much valued as in the east.

A number of medicinal plants may be looked for this month. The pretty flowers of the buckbean, *Menyanthes trifoliata*, are in good condition for collection in bogs and marshy ground. The buckthorn may be seen covered with its small green blossoms in hedges in chalky or marly districts. The feathery plumes of the *Pulsatilla* make it recognizable in spots where the flowers might easily be overlooked. The black and white mustard are beginning to give a yellow tint to fields and railway hedge banks, and the red poppy has commenced to give a little brightness to the monotonous green of the cornfields.

At the drug sales during the past month the root of *Ionidium Ipecacuanha* has been offered for sale as the true drug, being classed in the list under the head of ipecacuanha, without any intimation that it differed from the rest of the packages. A quantity of spurious cubebs, which had been sent from this market to America and returned to London, has again been put in the market here and some of it purchased under the belief that it was genuine.

FURTHER NOTE ON WARAS.

BY W. T. THISELTON DYER, M.A., C.M.G., F.R.S.

By an odd coincidence no sooner was my note on this very curious substance printed in the pages of this Journal, by the obliging courtesy of the Editor, than I received a further most interesting communication on the subject from Major F. M. Hunter, Assistant Resident at Aden. It contained a memorandum giving the complete history of the collection of the drug with a further specimen in fruit of the plant producing it, the pods bearing the epidermal glands still undetached. There can be now no sort of doubt that the "waras" plant is really that described by Mr. J. G. Baker, F.R.S., in the 'Flora of Tropical Africa,' as *Flemingia rhodocarpa*.

But my colleague, Professor Oliver, F.R.S., whose kindness is only equalled by his sagacity, has made the curious discovery that a *Flemingia* apparently confined to South India, *F. Grahamiana*, W. and A., is not specifically distinguishable from *F. rhodocarpa*; the pods are in fact clothed with the same peculiar epidermal glands so characteristic of that species. The "waras" plant is therefore really to be found in India after all.

In creating a new species for the "waras" plant, Mr. J. G. Baker pardonably neglected the comparison of the material he was working upon with specimens of the species occurring in so remote and botanically widely severed an area as the southern part of the Indian peninsula.

I trust that room may be found for Major Hunter's memorandum, which I append in its entirety.

NOTES ON "WARS" COLLECTED AT HARRAR IN FEBRUARY AND MARCH, 1884.

"In the neighbourhood of the city 'wars' is not now raised from seed sown artificially, and it is left to nature to propagate the shrub in the surrounding terraced gardens. The plant springs up, among jowari, coffee, etc., in bushes scattered about at intervals of several yards more or less. When sown, as among the Gallas, it is planted before the rains in March. If the soil be fairly good a bush bears in about a year. After the berries [pods] have been plucked the shrub is cut down to within six inches of the ground. It springs up again after rain and bears a second time in about six months, and this process is repeated every second year until the tree dies. Rain destroys the berry [pod] for commercial purposes, it is therefore only gathered in the dry season ending about the middle of March. The bush grows to a maximum height of six feet and it branches close to the ground. The growth is open and the foliage sparse. Each owner has a few acres of land.

"In the middle of February, 1884, the following processes were observed:—

"The leaves [? fruiting shoots] of some plants were plucked and allowed to dry in the sun for three or four days. (The picking is not done carefully and a considerable quantity of the surrounding twigs, etc., is mixed with the berries [pods].) The collected mass was placed on a skin heaped up to about six or eight inches high and was tapped gently with a short stick about half an inch thick. After some time the pods were denuded of their outer covering of red powder which fell through the mass on to the skin. The upper portion of the heap was then cleared away and the residual reddish green powder was placed in a flat woven grass dish with a sloping rim of about an inch high. This receptacle was agitated gently and occasionally tapped with the fingers, the result being the subsidence of the red powder and the rising to the surface of the chaffy refuse, which latter was carefully worked aside to the edge of the dish and then removed by hand. This winnowing was continued until little remained but red powder. (No great pains are even taken to eliminate *all* foreign matter.) A rotl was sold in 1884 for about 13 piastres = 1 rupee 10 as. nearly.

"'Wars' is sent to Arabia, chiefly to Yemen and Hadhramaut, where it is used as a dye, a cosmetic and a specific against cold. In order to use it, a small portion of the powder is placed in one palm and moistened with water, the hands are then rubbed smartly together, producing a lather of a bright gamboge colour, which is applied as required."

SORGHUM SUGAR.*

BY OSCAR HOUCK, PH.G.

The different kinds of sorghum (*Sorghum saccharatum*) now under cultivation in the United States, are varieties and hybrids from two main groups; the one the Chinese sugar cane, or sorgho, or sorghe, from China and India, and the second the African sugar cane, or imphee, from the south of Africa. As varieties of the first group, we have the regular sorghum, Honduras cane, honey top, sprangle top, etc. Of the second group the most important are the Liberian imphees, white African, white mammoth, Iowa red top, and wolf's tail. As hybrids, the early amber is the most common, early orange and a

* From the *American Journal of Pharmacy*, May, 1884.

number of others. These hybrids need, as also their names indicate, a shorter time to attain maturity, and are, therefore, especially adapted for the more northern range, Wisconsin, Minnesota, etc., where the season is rather short; while the countries further south, with a longer season, have the advantage that they can utilize both the early and late varieties, and thus be able to supply the mills for a longer time; besides that they also can utilize the other qualities, desirable in good cane, as saccharine richness, large percentage of juice, and large stalks. A rather sandy loam is said to be the most favourable soil for its cultivation.

The first seeds of the new sugar cane were brought to America in 1854, from France, where they had been imported from China only a few years previous. Not long afterwards also seeds of the African variety found their way over here. And now sorghum is to be found cultivated almost in all parts of the United States, where the climate is favourable to its growth; and it is said that where maize will thrive sorghum also will.

Its principal use has, until lately, been confined to the mere production of syrup, as a very sweet, and, to most persons, agreeable article of this kind may be prepared by means of quite inexpensive machinery. But the production of a cheap, marketable sugar from it has, until the last three years, met with no success. Sugar has, of course, been produced from it long before this, but on account of inferior machinery and limited means it would not pay. It is also said that a fatty substance is contained in the juice of sorghum, which hindered the crystallization of the sugar, and necessitated another process than that used for the common sugar cane. The first sugar reported obtained from sorghum was made by a farmer in Wisconsin (according to Professor Carl Mohr). In 1858 J. S. Levering, a chemist of Philadelphia, received the gold medal from the United States Agricultural Society, as an acknowledgment for his successful and meritorious experiments in sugar making from sorghum (*Amer. Journ. Pharm.*, 1855, p. 182; 1858, p. 105). In spite of the publication of his process no attempt was made to utilize it. Later, through the Commissioner of the Department of Agriculture at Washington, G. W. Le Duc, a great deal was done in order to arouse the interest for it, that new experiments should be undertaken. Steward, a Pennsylvania chemist, also treated the subject, and showed at the Centennial Exhibition, in 1876, samples of sugar which he had obtained by his experiments. With still greater energy Dr. Collier, chemist of the Agricultural Department at Washington, took up the work, and of the results of his thorough investigations he has given a minute account in his several reports, which has thrown much light on the subject.

At the same time Professor Swenson, of the University of Wisconsin, was occupied with investigations of the same kind, and when the United States Government, through the Agricultural Department at Washington, offered a prize of 1200 dollars for the best method of treating sorghum cane it was awarded to him.

Some New York capitalists, after having corresponded with Professor Swenson and secured his service, determined to establish a sugar mill in some portion of the country, where the cane could be grown successfully and cheaply. The Arkansas river valley was decided upon, and in 1882 the mill was built at Hutchinson, Kansas. As an experiment some sugar was successfully made, already late, the same season. Last fall (1883) they made as an average forty barrels of sugar and about two hundred gallons of syrup a day. This was the first undertaking on a large scale, and, as it proved a success, others have followed their example, and many more are likely to follow.

The process used in the above-named mill I have not seen myself, but will give it as it has been described. The cane, having been examined by the chemist and found in the desirable ripe condition (when it contains most saccharose and least glucose), is cut, topped, and hauled to the mill without stripping. Arrived there it is placed on a long endless belt, which acts as an elevator to carry it to the crusher, which consists of huge iron rollers. The cane is passed through this crusher at the rate of twenty-five tons per hour. The juice, as it runs from the rollers, passes into a large tank, from which it is pumped into the defecating room. Here it is run into six defecating pans, capable of holding three tons of juice each. In these are coils of copper tubing, through which steam is passed to heat the juice. To the lukewarm juice is then added milk of lime, until slightly alkaline, in order to neutralize the acids, which are always contained in it, and to coagulate the albuminous matter present. It is then heated as rapidly as possible to the boiling point, and the steam is shut off when the thick scum, which rises to the surface, begins to swell and break. After a few minutes the juice is skimmed, and it is again heated, this time to a quiet ebullition, and again skimmed. This is repeated a few times, and the result is a very clear juice, almost free from sediment. From the defecating room the juice, containing 84 parts of water and 16 parts of sugar, passes to the evaporating pans, where it is boiled down to 54 parts of water and 46 parts of sugar, when it is called "semi-syrup." This passes into a small vacuum pan, and from there into the bone-black filters. These are six in number, and are each cylindrical in shape, 4 feet in diameter and 20 feet high. Here the syrup is decolorized and deodorized, after which it is pumped into the large vacuum pan. This is ovoid in shape, made of boiler iron, and looks like a huge retort. It is 7 feet in diameter, 9 feet high, and will hold more than 1000 gallons. In this the semi-syrup boils at 70° C. under diminished pressure, instead of 110° C. in free air. This is a great advantage, as it is a well-established fact that high heat and much exposure to the air quickens the conversion of saccharose into invert sugar. From the vacuum pan the syrup is put into large iron waggons, which hold about 240 gallons each, and in them is run into the crystallizing room. This room is kept at a temperature of 55° C., and in it the syrup is allowed to stand for several days until it crystallizes. The "melado," as the syrup at this stage is called, is then run into the mixer. This is a long bar with fingers attached, the whole revolving in an iron box. In this the melado is thoroughly mixed and made ready for the last process. From the mixer the melado is run into the centrifugals. These, four in number, are tubular vessels about three feet in length and two feet high, open above and closed below. Each is lined with fine copper sieve, a space of perhaps two or three inches intervening between the sieve and the outer wall of the centrifugal. The centrifugals are set in motion at the rate of 2000 revolutions per minute, and the melado is run into them, falling upon a revolving disk in the centre. From this the melado is thrown with great force against the side of the vessel, striking upon the copper sieve, which is also in rapid revolution. The force of the projection throws the syrup through the sieve, while the crystallized sugar remains behind, whitening the longer it "spins," as the process is called. It is generally allowed to spin about fifteen minutes, after which the raw sugar is taken out and put into barrels, and the process is completed. Each centrifugal is capable of spinning 200 lbs. of sugar in those fifteen minutes. Besides these details, the process has, of course, its secrets, which are also kept as such.

From the above-named factory I obtained a sample of sugar, of which I made an analysis, which shortly will be explained. In appearance the sugar looks very much like the common raw sugar of commerce. But in odour and taste it differs somewhat, as it has retained some of that peculiar sorghum flavour, which is not disagreeable, and in which place in common raw sugar is found a taste and smell of burnt sugar.

In my analysis of the sorghum sugar I found the following constituents:—

Saccharose	92·00 per cent.
Glucose	4·50 per cent.
Moisture	1·50 per cent.
Ash	1·10 per cent.
Impurities	0·90 per cent.
	100·00

The amount of saccharose was ascertained by the use of the Wilde polariscope, which as an average showed 92°. With the same instrument I examined samples of different sugars with the following results (the strength of the solutions was 10 grams of sugar and water sufficient to make 100 c.c.):—

White rock candy polarized	100°
Yellow rock candy polarized	93°
Best granulated sugar polarized	99°
White A sugar polarized	94°
Common raw sugar polarized	84°
Sorghum sugar (4 experiments)	90°, 92°, 93°, 92°

Common raw sugar was also subjected to analysis for comparison:—

Saccharose	84·00 per cent.
Glucose	11·80 per cent.
Moisture	2·50 per cent.
Ash	0·70 per cent.
Impurities	1·00 per cent.
	100·00

The moisture and ash of granulated sugar were also ascertained and found to be respectively 0·55 and 0·44 per cent. This shows in reference to the moisture, that the more glucose contained in the sugar, the more moisture is absorbed. As to the sorghum sugar the comparison is very satisfactory, as it contains 8 per cent. more saccharcse than the common raw sugar, and only 2 per cent. less than the A sugar, which has gone through a refining process. This very satisfactory result is due to the improved machinery, of which the vacuum pan and the centrifugals are the most important, and without which the idea of sugar making, from sorghum, at the present sugar prices, might be given up as almost hopeless. But as it is, sorghum sugar can compete with other sugars, both in price and quality.

CRITICISMS, FROM A CHEMICAL POINT OF VIEW, ON SOME FAVOURITE PRESCRIPTIONS.*

BY HENRY LEFFMANN, M.D.

The few points that I present to the College this evening will include little that is absolutely new, but I think the time will not be entirely wasted, as I know that the prescription list of most of our drug stores will give numerous examples of the violation of chemical principles here mentioned. My attention was called to this topic by my being shown by an apothecary a prescription calling for syr. hypophosph., tinc. ferri chlor., acid. phos. dil., concerning which he said that in the proportions ordered he could never make the mixture up clear. I examined the precipitate, and found in it, as I had expected, a large proportion of the iron and other basic ingredients This is a simple case of incompatibility. Turning the matter over in my mind, it has seemed to me that while some attention is paid to cautioning students as to the general nature of incompatibility, very little or none is given, especially in the shallow chemical teaching of many medical schools, to the properties and qualities of chemical substances in their relations to the animal tissues and the manner of administration. I present here, therefore, a brief consideration of a few well-known remedies.

Under the name of *colourless tincture of iodine* several preparations are used, depending for their popularity on the fact that they do not stain the skin. They are prepared either by the use of ammonia or of sodium sulphite or hyposulphite. They owe their particular property, or rather absence of property, to the neutralization of the iodine, and just to the extent that the iodine is decolorized is it to the same extent deprived of virtue. The free active affinity of the iodine, to which its local action must be due, is destroyed in these preparations, and the destruction is not slow or uncertain, but in two of the methods mentioned it is sufficiently rapid and definite to be made the basis of a method of quantitative analysis. It is certainly difficult to see how any person could go so wide of simple chemical principles as to invent or employ this mixture.

Potassium chlorate, or, as it is still erroneously called by many, chlorate of potash, is a remedy concerning which extraordinary claims have been made, based upon most erroneous notions of its chemical qualities. It is employed in the laboratory as a source of oxygen. Knowledge of this fact has led to its employment as an oxidizing agent in diseases which have been supposed to express deficient oxidation. I have nothing to say here as to the clinical results obtained from potassium chlorate in any disease,—although I believe it is much less in favour than formerly,—but I enter a protest against any advocacy of its usefulness as an oxidizing agent. Under temperatures and conditions such as those which it meets in the human system it is one of the most stable of bodies, does not part with its oxygen or chlorine, and, indeed, will not begin to do so except under very high heat. I have found by actual experiment that ten grains of the salt kept for two hours at a temperature of 100° F. in contact with an artificial gastric juice did not develop oxidizing qualities sufficient to oxidize one-sixtieth of a grain of phosphorus. This experiment is merely confirmatory of what everyday experience with the substance teaches.

Potassium permanganate has been more or less in favour with physicians for a score of years. It is well known as an oxidizing agent; its powers in this respect are well marked. It is as little suitable for internal administration for such purpose as the body just considered, but for an opposite reason. Its chemical properties are developed by almost every substance, and in the doses in which it is given it will be decomposed and rendered inert very shortly after being swallowed. Within a very recent period the salt has come into notice as a remedy for amenorrhœa, and great has been the tribulation of apothecaries. It has been given in pill form, and all the usual excipients have been unavailable. I have made a few tests of the permanganate pills now in the market, and I find with regard to those made by one of the most reliable houses in this city that the permanganate is all decomposed and converted into the insoluble manganese dioxide. The preparations of two other manufacturers made up with some mineral excipient, probably kaolin, were in good condition, but as soon as placed in a mixture of hydrochloric acid and pepsine they begin to decompose into insoluble manganese oxide. These pills vary in strength from one-eighth to one grain. This small quantity of permanganate certainly must soon decompose in the stomach, and the only virtue which it can have is from the manganese itself, and if this is effective common sense would seem to suggest that the result could be best obtained by exhibiting some definite compound of manganese, such as the chloride or sulphate. When we consider the chemical relations of the salt, and almost certain inertness of it in small doses, the gravity with which the learned English therapeutists, who recommend it in amenorrhœa, have discussed the possibility of its producing abortion, becomes almost burlesque. I do not

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desire, of course, to impugn the clinical observations that have been recorded on this point, but I feel obliged to say that if the insoluble and variable decomposition products of one-eighth of a grain of potassium permanganate can affect the function of any one organ, then the difference between us and the apostles of the infinitesimal is small indeed.

I cannot dismiss these two compounds, which owe their popularity to mistaken notions of their properties, without saying a word or two as to the exhibition of oxidizing agents. If rational therapeutics or physiological study indicates remedies of the so-called oxidizing class, then it will be found that no better agents are known to us than those which have long been in our hands. In nitric acid, nitro-muriatic acid and chlorinated soda we have substances which are sufficiently stable to resist the organic bodies of the saliva and gastric juice, and are sufficiently active to give oxidizing effects if such (other than local action) can be obtained. I have grave doubts whether the nutritious fluids of the body can be oxidized by any method, but there can be no doubt whatever that such effect cannot be attained by either a body—potassium chlorate—which yields its oxygen only at a red heat, nor by one—permanganate—that decomposes the moment it touches any form of organic matter. Some years since a correspondent in one of our medical journals gravely recommended the use of raspberry syrup to disguise the taste of potassium permanganate. It was, of course, entirely successful, the taste was destroyed, so was the compound.

Caffeine citrate is a remedy much in favour and is a remarkable instance of how much physicians take for granted in the remedies they use. There is no caffeine citrate in the market, and it is doubtful whether any such a salt can be prepared. The commercial preparations are either pure caffeine or variable mixtures of it with citric acid.

The manufacturers in this city each furnish a different article, except in cases in which they buy from a common source; and a house in a neighbouring city furnishes an article which contains no citric acid. Some of the samples are purely bitter in taste while others are distinctly sour. Analyses of some of the commercial salts are recorded in a paper read before the last meeting of the American Pharmaceutical Association, by Dr. G. C. Wheeler. He found the quantities of caffeine varied from 96·5 per cent. to 63·5 per cent.; of citric acid from 63·5 per cent. to 3·5 per cent.; none of these figures correspond with the proportion of a true citrate.

It seems to me that accurate clinical observation cannot be made with a preparation of so uncertain a character; for, as seen by these figures, the proportion of active ingredient may vary 33 per cent., and the lesson that these analyses teach us is that when the effects of caffeine are wanted they are best obtained by the use of the pure alkaloid and not by a pretended and uncertain compound of it.

PSEUDOMORPHINE.*

BY O. HESSE.

In his first communication on this alkaloid, which he obtained from opium, the author stated his belief that it was identical with the oxymorphine of Schützenberger, and that its formula was $C_{17}H_{19}NO_4$. Brockmann and Polstorff (Abstr., 1880, 408) contended that this oxymorphine had the constitution $(C_{17}H_{18}NO_3)_2$, and based their assumption principally on the fact that nitric oxide was evolved in its production from a solution of morphine hydrochloride and silver nitrite, whereas the formula $C_{17}H_{19}NO_4$ would require an evolution of nitrous oxide. The author now shows that if an aqueous solution of morphine hydrochloride is mixed in molecular proportions with a solution of potassium nitrite, and the whole heated for some time at 60°, crystals of oxymorphine are formed and a gas evolved which does not turn red in contact with the air, and is consequently not nitric oxide. The formation is evidently due to the decomposition of morphine nitrite,

$$2C_{17}H_{19}NO_3,HNO_2 = 2C_{17}H_{19}NO_4 + N_2O + H_2O,$$

and the author points out that an evolution of nitric oxide, when silver nitrite is used, might also be explained by the equation—

$$4C_{17}H_{19}NO_3,HNO_3 = 4C_{17}H_{19}NO_4 + N_2 + N_2O_2 + 2H_2O.$$

The author now finds that the body $C_{17}H_{19}NO_4$ is a hydrate of the real base, and that the formula for oxymorphine is, therefore, $C_{17}H_{17}NO_3$. The hydrate loses its water at 130°, but the base is so very hygroscopic that it is only by taking special precautions that rehydration can be prevented. The less crystalline the specimen in question, the more marked is its hygroscopic character. The alkaloid is best purified by solution in ammonia, from which it crystallizes in colourless crusts containing $1\frac{1}{2}H_2O$, which it loses at 130°. The *hydrochloride*, $C_{17}H_{17}NO_3,HCl$, crystallizes in scales containing, under varying conditions, respectively 1, 2, 3 and 4 mols. H_2O. A *basic hydrochloride*, $(C_{17}H_{17}NO_3)_2,HCl + 6H_2O$, is obtained in microscopic crystals from a hot neutral acetic solution on the addition of sodium chloride: from a cold solution, the basic salt crystallizes with $8H_2O$. With platinum chloride both the neutral and basic salts yield a yellow flocculent platinochloride

$$(C_{17}H_{17}NO_3)_2,H_2PtCl_6.$$

The *hydriodide*, $C_{17}H_{17}NO_3,HI + H_2O$, loses its water when exposed to the air: the *chromate*,

$$(C_{17}H_{17}NO_3)_2,H_2Cr_2O_7 + 6H_2O,$$

loses $4H_2O$ at 80°: the sulphate crystallizes with $6H_2O$, and effloresces slightly in dry air, but when crystallized from boiling water it is stable: the *oxalate* yields shining scales, with $8H_2O$: the *acid tartrate*,

$$C_{17}H_{17}NO_3,C_4H_6O_6 + 6H_2O,$$

crystallizes in needles or prisms. Heated for two hours at 120° with acetic anhydride, pseudomorphine yields *diacetylpseudomorphine*, $C_{17}H_{15}(C_2H_3O_2)_2NO_3$. It crystallizes from ether in concentrically grouped flat prisms, containing $4H_2O$, which it loses in the desiccator. It is moderately soluble in ether and chloroform, very soluble in alcohol, in which it yields a strongly alkaline solution. It contracts at 250°, but does not melt until 276°. It gives no coloration with ferric chloride. With hydrochloric acid it forms a salt crystallizing in quadratic tables, easily soluble in water. With platinum chloride this salt yields a pale yellow flocculent *platinochloride*,

$$[C_{17}H_{15}(C_2H_3O)_2NO_3]_2,H_2PtCl_6 + 6H_2O.$$

The di-acetyl compound is easily reconverted into the original base by heating it with alcoholic potash. It is clear, therefore, that the hydroxyl-groups of morphine are still present in pseudomorphine. The author was unable to obtain a methyl compound by the action of potassium hydroxide and methyl iodide. He, however, obtained pseudomorphine methyl-hydroxide,

$$C_{17}H_{17}NO_3,MeOH.$$

The author also believes pseudomorphine to be identical with the substance which E. L. Meyer (*Ber.*, iv., 121) obtained by the action of moderately concentrated sulphuric acid on a nitro-compound which he had obtained by passing a strong current of nitrous anhydride into water in which morphine was suspended.

* From *Annalen*, ccxxii., 234–248. Reprinted from the *Journal of the Chemical Society*.

THE COMPOSITION OF OIL OF GAULTHERIA.*

BY HARLAN P. PETTIGREW, PH.G.

The author gives a brief account of the investigations made by Professor Procter on the oil of sweet birch (*Amer. Jour. Phar.*, xv., p. 241), and of the information

* From the *American Journal of Pharmacy*, May, 1884.

furnished by G. W. Kennedy (*Ibid.*, 1882, p. 49), regarding its manufacture on a large scale and its sale in place of oil of gaultheria; and he refers to his chemical investigation of this oil (*Ibid.*, 1883, p. 385), which showed it to be methyl salicylate. The first experiments on the chemical composition were made by Procter (*Ibid.*, xiv., 211); afterwards a fuller chemical investigation was made by Cahours (*Ibid.*, xv., 241, from *Jour. de Phar. et de Chim.*, May, 1843). To the latter is generally attributed the statement that this oil contains 10 per cent. of terpene; but in the French journal named no mention is made of a terpene, and the presence even of methyl alcohol was not conclusively proved, as the following abstract from that paper shows:—"On treating this oil with a solution of potassa of 45° B., to which fragments of that alkali were added, and submitting the mixture to a regulated heat and distilling, a distillate was obtained in the receiver which, after being treated several times with lime, furnished a liquid more volatile than water, and burning with a pale blue flame." The original papers on "Salicylic Compounds," published by Cahours in *Annales de Chimie et de Physique* and in *Comptes Rendus*, could not be consulted.

Two different specimens of oil of gaultheria were examined by the writer; one was obtained by Professor Maisch, from Messrs. Underhill, Concord, N. H., and was distilled by them: the other was obtained directly from a distiller in Ellenville, N. Y., and both were guaranteed to be absolutely pure. These oils, when received, had already acquired a very slight reddish tinge, but upon redistillation were obtained as bright, colourless and quite highly refractive liquids, having the sp. gr. 1·17, both corresponding in this respect with the sp. gr. of oil of wintergreen as determined by Procter.

The oils were treated separately, 190 grams being operated upon in each case. The plan followed in the investigation of this oil was the same as that adopted in the analysis of the oil of birch (*Amer. Jour. Phar.*, 1883, p. 385), namely, saponification by treatment with a concentrated solution of potassium hydrate and boiling over a sand-bath in a flask fitted with an inverted condenser. After complete decomposition of the oil, the contents of the flask were submitted to distillation upon a sand-bath until the residue remaining in the flask was nearly dry. The distillate thus obtained presented a milky appearance, and globules of a yellowish oily substance were seen floating upon the surface. This is one striking difference between this oil and the oil of birch, as the corresponding distillate obtained from the latter was perfectly clear and transparent. The distillate was then agitated in the flask in which it was collected, with several successive portions of ether, and the ethereal solutions were carefully separated from the aqueous liquid, and the ether recovered by distillation upon a water-bath. The residue remaining in the flask then consisted (besides a few drops of water) of a yellowish oily substance, which was lighter than water and possessed a very strong peculiar odour entirely different from that of the oil of birch or wintergreen. The terpene was then weighed without any attempt being made to purify it, as the amount was small. This determination was only approximate, yet the amount of terpene found amounted to but 0·3 per cent. of the weight of the oil.

The aqueous liquid which remained after extracting the terpene by agitation with ether, and which contained the methyl alcohol, was perfectly clear and transparent, and the alcohol, which was obtained by repeated distillation of the liquid from a water-bath, collecting only the lighter portions which passed over first, and further rectifying these by distilling from caustic lime, possessed the same odour, and was of the same sp. gr. and boiling point as methyl alcohol.

The salicylic acid was obtained by making an aqueous solution of the salicylate of potassium, which remained in the flask after the first distillation, and decomposing this by the addition of a slight excess of hydrochloric acid, the chloride of potassium formed remaining in solution, while the salicylic acid formed as a dense white precipitate which, after washing with water and drying, was obtained pure by crystallizing from hot petroleum benzin.

Both specimens of oil examined yielded about the same amount of terpene, but as a portion of one of them was accidently lost, no attempt was made to weigh the small amount remaining.

These results show that oil of gaultheria, sp. gr. 1·17, does not contain 10 per cent. of a terpene; for, if it did, the specific gravity of the oil would necessarily be very much lower than that of the oil of birch, in which the absence of a terpene has been conclusively proved.

Whether the oil of gaultheria which has been distilled in the spring or summer contains more of the terpene than that distilled in the fall, is not known; but from results obtained by experiments made upon a specimen which was distilled in the spring, it seems that there is a difference, as this oil was found to have a sp. gr. of but 1·0318, and the absence of alcohol was shown upon application of several of the tests for that substance.

After referring to Mr. Kennedy's paper read before the American Pharmaceutical Association (see *Amer. Jour. Phar.*, 1883, p. 533; also 1883, p. 85), the writer continues:—According to information upon this subject obtained from a distiller of oil of gaultheria, the oil, which is seen floating in small globules upon the water, will, if allowed to stand twenty-four hours, all collect together into large drops, and settle to the bottom of the containing vessel. This alone shows that this oil cannot consist of a hydrocarbon, but to decide the question conclusively, a small amount of water, which was taken from the receiver just as it came over from the still, was agitated with several successive portions of ether, the ethereal solutions, being carefully separated from the water, were evaporated, whereby only a very small amount of oil was obtained, which did not possess any odour of the terpene, and which consisted only of the pure oil of gaultheria. This shows that the terpene does not become separated in the process of distillation.

The results of these investigations may be briefly summarized as follows:—

I. Oil of birch is not identical with oil of gaultheria, in that it consists entirely of salicylate of methyl, and contains no terpene.

II. Oil of gaultheria, sp. gr. 1·17, does not contain 10 per cent., but only a very small amount, of terpene, to the presence of which is due the slight difference in odour and specific gravity between the two oils.

THE ALKALOIDS OF COPTIS TRIFOLIA.*

BY JOHN J. SCHULTZ.

To find the proportion of alkaloids in *Coptis trifolia*' 5 pounds of carefully selected coptis, in moderately coarse powder, were moistened with officinal alcohol and packed firmly in a properly prepared cylindrical percolator. Officinal alcohol was then added in successive portions of 2 gallons each. The last portion was acidulated with 4 ounces of acetic acid. After each addition, maceration was conducted for twenty-four hours, and percolation was continued until the percolate finally passed almost colourless and devoid of any bitter taste.

Five gallons and 5 pints of percolate of a yellowish brown colour and decidedly bitter taste were obtained. The dregs after having been removed from the percolator and dried at a temperature of 110° F., weigh 4 pounds and 8 ounces, showing a loss of 8 ounces.

* From the *American Journal of Pharmacy*, May, 1884. These experiments were carried on in the laboratory of Professor J. U. Lloyd, upon authentic specimens furnished by him. We take this opportunity to thank him for the attention shown us.

To 4½ pints of this percolate, representing 8 ounces of drug, an excess of sulphuric acid was added and the mixture set aside in a cool place.

To 1 pint and 2 ounces of percolate, representing 2 ounces of drug, an excess of hydrochloric acid was added and the mixture set aside with the foregoing.

After standing forty-eight hours a precipitate had formed in each, that of the sulphuric acid being light yellow, while that of the hydrochloric acid was yellowish brown.

The supernatant liquids in each case were bitter and retained a decided yellow colour, characteristic of berberine, showing that the precipitation of the berberine had been incomplete.

Two pints and 4 ounces of the original percolate, representing 4 ounces of drug, were then subjected to distillation, until the residue was of a syrupy consistence. The retort was then rinsed with 8 ounces of water, the result placed in an evaporating dish, and the last traces of alcohol vaporized. A dark greenish fixed oil and a lighter coloured resin began to separate as the alcohol evaporated, and these were completely precipitated by allowing the liquid to stand in a cool place for twenty-four hours. The contents of the dish were then thoroughly agitated with water and filtered. The filtrate was now evaporated to a syrupy consistence and 8 ounces of alcohol added. This was divided into two equal portions, and one was strongly acidulated with sulphuric, the other with hydrochloric acid, and both set aside in a cool place.

After standing twenty-four hours, the portion acidulated with sulphuric acid had formed a considerable amount of a brownish-yellow precipitate, but the supernatant liquid was still bitter and retained its yellow colour. The portion acidulated with hydrochloric acid showed only a slight cloudiness, and did not precipitate even after standing for two weeks.

The foregoing processes are the ones usually employed for the separation of berberine, and neither, in these instances, gave a satisfactory result.

Through the courtesy of Professor J. U. Lloyd, we were enabled next to employ his scheme for the determination of berberine, as stated in the manuscript of his work upon 'Drugs and Medicines of North America,' and which is based upon the insolubility of picrate of berberine in most menstruums.

The first step was to separate the second alkaloid, discovered by Mr. E. Z. Gross, as follows:—Of the remainder of the percolate, 4 gallons and 1 pint, representing 4 pounds of drug, were subjected to distillation, and the oil and resin separated in the manner heretofore described. To the resulting filtrate, officinal water of ammonia was added until slightly in excess. This produced a dark brown flocculent precipitate, which was collected on a filter and thoroughly washed with water. The filtrate, after having been slightly acidulated with sulphuric acid, and allowed to stand for several hours, was brought to an alkaline reaction by the addition of water of ammonia, when a second precipitation took place similar in appearance to the first. This and the foregoing precipitate after having been mixed and dried spontaneously, were treated with successive portions of chloroform. The chloroform was then distilled, and the residue exhausted with dilute sulphuric acid. The resulting solution when filtered and made alkaline by addition of ammonia water, gave a precipitate which, when dried spontaneously, weighed 3·42 grains.

A portion of this precipitate when dissolved in water acidulated with acetic acid, gave precipitates with the following reagents for alkaloids:—Platinic chloride, molybdate of ammonium, solution of iodine in iodide of potassium, and test solution of iodide of mercury and potassium.

A chloroformic solution of the remainder of this precipitate when evaporated on a slide formed microscopic crystals, but the quantity obtained was too small to admit of further investigation. (This was the second alkaloid as found by Mr. Gross.)

To a portion of the filtrate, from the foregoing precipitates, solution of carbonate of sodium was added without producing any precipitate, and it was positively shown that there was no more of this second alkaloid present.

To the entire filtrate and washings thus obtained from the second alkaloid, and which were of alkaline reaction, a solution of carbazotate of ammonium was now added. This produced a bulky yellow precipitate of carbazotate of berberine, which, when collected on a filter and dried spontaneously, weighed 292·8 grains, corresponding to 228·03 grains of sulphate of berberine.

In order to test the filtrate for any remaining alkaloids, a portion was evaporated nearly to dryness on a water-bath, and agitated successively with ether, chloroform, benzol and carbon disulphide.

The several solutions were evaporated, the residue dissolved in water and portions of it separately tested with test solution of iodide of mercury and potassium, molybdate of ammonium, and chloride of platinum, without producing any precipitate, thus showing the previous complete separation of all the alkaloids.

Recapitulation.—The foregoing experiments show, that *Coptis trifolia* yields to U.S.P. officinal alcohol, slightly acidulated with acetic acid, 10 per cent. of its weight of extractive matter. That it contains two alkaloids, as previously shown by the investigations of Mr. E. Z. Gross (*Am. Journ. Pharm.*, 1873). That the berberine of *Coptis trifolia* is only partially separated by the processes usually employed for the determination of berberine. That it contains of berberine an amount equivalent to 0·8 per cent. of sulphate of berberine, or 57 grains of sulphate of berberine to the avoirdupois pound. That the amount of the second alkaloid is very small, 0·012 per cent., or only 0·855 grain to the avoirdupois pound having been obtained.

PINKOS TUBERS.

Under the name "Pinkos-knollen," a very hard red woody substance has lately been introduced into the Vienna market, probably from Australia, which is found to be almost as valuable for turning purposes as ivory. Dr. Franz von Höhnel has subjected this substance to careful examination, and has determined, from the following characters, that it is the product of a coniferous tree belonging to the family Araucarieæ:—1. The absence of true vessels. 2. The absence of resin passages. 3. The extremely thin-walled medullary rays, consisting of a single row of cells, comparatively large, and placed in bulgings of the tracheids. 4. The remarkable pits which indicate the tracheids on the borders of the medullary rays. 5. The large bordered pits of the tracheids, which meet from opposite sides, usually placed in two rows, and then nearly polygonal. 6. The sclerenchymatous pith, from 4 to 5 millimetres wide. The so-called "tubers" are turnip-shaped, 15–40 centimetres long and 7–16 broad: broad and apparently broken off at one end, running out into a point at the other end. The transverse section shows a sclerenchymatous pith, 4–5 millimetres wide, surrounded by a number of very narrow annual rings, the older of which are concentric, the outer ones strongly excentric. They are usually covered by rotten wood and soil, and are probably gigantic knots which have fallen out of decaying and mouldering trunks in the primeval forest. Of the genera of Araucarieæ they must be derived from either *Araucaria* or *Dammara*, and very probably from *Araucaria Bidwillii*, the "bunya-bunya pine," a native of New South Wales.

The Pharmaceutical Journal.

SATURDAY, MAY 31, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

THE REGISTRAR-GENERAL'S RETURNS AS TO DEATHS BY POISONING.

WHITSUNTIDE is at hand, and Parliament has adjourned over the last ordinary recess in the session; but up to the present time the Government has given no sign with respect to the Poisons Bill which it has promised to introduce into the House of Lords. The introduction cannot, however, be much longer delayed, if the promise is to be fulfilled at all, so that the issue of another annual return of the Registrar-General, including among other things the statistics as to the deaths by poison that occurred in England in the year 1882, is opportune as furnishing information that will no doubt be quoted should the question reach the stage of legislative discussion this year. It is to be regretted, however, that the information which these statistics convey is not more precise, since they are lacking in just those details which would be most valuable at the present time. But probably the form in which a large proportion of the returns as to deaths by poisoning are at present received by the Registrar-General would render futile any attempt at making the classification much more definite.

The total number of deaths returned as due to poisoning during the year 1882 was 599, or 30 in excess of the previous year. Of these 246 deaths of males and 120 of females are referred to the division "accident and negligence," 117 males and 111 females to "suicides," and 5 to "murders." As the deaths from all causes in England in 1882 numbered 516,654, those that were attributed to poison therefore amounted to 1 in 863 of the whole. But it requires very little consideration to see that a very large number of these "poisoning" cases were such as would not be affected by any provisions likely to be included in a Poisons Bill. In the first place in 228 of them poisons were used by persons intent upon destroying their own lives, a class out of whose reach it is almost as hopeless to attempt to keep poisons as it would be razors, ropes, and rivers. Then out of the 366 deaths by poisoning referred to "accident and negligence" it is probable that not a few would be more fitly dealt with in a Noxious Trades Bill, as, for instance, the majority of the 78 deaths that are attributed to lead poisoning. It is of graver import in connection with the expected legislation that of the residue of the 366 deaths, after making deductions on account of sanitary shortcomings, no less than 115 are referred to mishaps with substances that are more or less narcotic. It will also be of interest to note respecting the substances which in the Draft Pharmacy Bill it is proposed to include in the schedule of "poisonous articles," that in this same class of deaths through "accident and negligence," 8 are referred to sulphuric acid, 4 to nitric acid, 7 to hydrochloric acid, and 15 to carbolic acid. It would be hardly worth while, however, to go through the details *seriatim*; but it may help to the formation of a judgment of the relative importance of the Registrar-General's statistics if we bring the principal facts together in a tabular form.

NAME OF POISON.	Total No. of Deaths.	ACCIDENT, ETC.		SUICIDES.	
		Male.	Female.	Male.	Female.
Arsenic	15	4	5	4	2
Mercury	10	3	—	4	3
Lead	78	63	15	—	—
Copper	1	1	—	—	—
Antimony	1	1	—	—	—
Caustic Potash . .	1	1	—	—	—
Ammonia	8	4	3	—	1
Soda	3	—	3	—	—
Lime	1	1	—	—	—
Phosphorus . . .	17	5	6	1	5
Sulphuric Acid . .	11	3	5	2	1
Nitric Acid . . .	8	3	1	1	3
Hydrochloric Acid .	17	7	—	8	2
Oxalic Acid . . .	26	2	—	13	11
Carbolic Acid . . .	34	13	2	6	13
Opium, Laudanum, Morphia	116	56	28	20	12
Godfrey's Cordial .	2	2	—	—	—
Winslow's Soothing Syrup	1	1	—	—	—
Soothing Syrup . .	1	1	—	—	—
Poppy Tea	1	—	1	—	—
Paregoric	1	1	—	—	—
Chloroform . . .	5	3	1	1	—
Chlorodyne . . .	6	3	3	—	—
Chloral	15	9	5	1	—
Alcohol	26	18	6	1	1
Ether	1	—	1	—	—
Camphor	1	—	1	—	—
Paraffin	1	1	—	—	—
Benzoline	1	—	—	1	—
Prussic Acid and Oil of Almonds . . .	15	3	1	8	3
Potassium Cyanide .	16	2	—	10	4
Strychnia and Nux Vomica	23	3	1	8	11
Vermin Killer . .	28	4	—	7	17
Belladonna . . .	5	3	1	—	1
Aconite	4	2	—	—	2
Digitalis	1	1	—	—	—
Water Hemlock . .	1	1	—	—	—
Fool's Parsley . .	1	—	1	—	—
Lobelia	1	1	—	—	—
Tobacco	1	1	—	—	—

Name of Poison.	Total No. of Deaths.	Accident, etc, Male.	Female.	Suicides. Male.	Female.
Laburnum Seeds. .	2	—	2	—	—
Ergot	1	—	1	—	—
Yew Berries . . .	1	—	1	—	—
Savin	1	—	1	—	—
Putrid Meat . . .	1	1	—	—	—
Poisonous Fish . .	7	4	3	—	—
Liniment	2	1	—	1	—
Lotion	1	—	—	—	1
Overdose of Medicine	1	1	—	—	—
Gripe Water . . .	1	—	1	—	—
Sweet Nitre . . .	1	—	1	—	—
Oil of Tar	1	—	1	—	—
Disinfecting Fluid .	1	—	—	1	—
Crayons	1	—	1	—	—
Kind of Poison not stated	67	12	18	19	18

The second reading of the Medical Acts Amendment Bill in the House of Commons stands as the fifth order of the day on Thursday next. But notice of motion that it be read that day six months has been given by no less than six different members.

* * *

The New Brunswick Legislature has recently passed a Pharmacy Act for that division of the Dominion of Canada. Under its provisions the New Brunswick Pharmaceutical Association is incorporated, and its provisions are described as being very similar to those in the Ontario Pharmacy Act, published before on p. 892. It appears, however, to differ in one important respect, in that although there is a schedule of poisons that can only be sold legally by qualified persons, there is no provision as to the registration of the sale of any of them. We hope shortly to receive a copy of the text, and will then refer to the Act more fully.

* * *

The City of Boston boasts of an "Inspector of Vinegar," whose last annual report to the city council has just come to hand. It appears that the standard for vinegar adopted by the inspector is an acidity equivalent to the presence of not less than 5 per cent. by weight of absolute acetic acid, and for cider vinegar, which is the variety most favoured in Boston, a fixed residue at 212° F. of not less than 1·5 per cent. of "cider vinegar solids." The report states that the means of determining whether any vinegar conforms to these required limits are simple and may be obtained from any dealer in chemical apparatus or from one of the apothecaries, and then goes on to describe how the acidity may be ascertained by means of a volumetric solution of soda and an alcoholic solution of phenol phthalein, and the residue by evaporation. But unhappily for the peace of mind of the amateur analyst who may aspire to test his own purchases it is afterwards hinted that the acidity may have a mineral origin and that of cider vinegar should give the reactions for malic acid.

* * *

In a recent report on the commerce of the port of Loanda, Mr. Consul Cohen says the natives of Angola smoke, besides tobacco, the leaves of a plant which they call "liamba." These leaves are alleged to produce highly stupefying and narcotic effects exceeding those following the use of opium, confirmed smokers, among whom are included many Europeans, becoming idiotic and useless in a few years. Mr. Cohen says he is not aware that any chemical analysis of the plant has yet been made.

* * *

According to an official statement the number of candidates who in the year 1882-3 became qualified pharmacists in the German empire was 315, of whom 139 qualified in Prussia, 59 in Bavaria, 52 in Saxony, 12 in Würtemberg, 14 in Baden, 5 in Hesse, 6 in Mecklenburg, 11 in the grand duchy of Saxony, 9 in Brunswick and 8 in Elsass-Lothringen. This shows a falling off as compared with the previous year for the second year in succession, whilst during the same time there has been a considerable increase in the number of medical men who have become qualified.

* * *

In a communication to the *Medical Tribune*, Dr. Kunze states that while passing through a large New York drug store in the third week of January, he was surprised to notice two open barrels filled with fresh roots of *Convallaria Majalis.* Upon closer examination and inquiry he found that these roots were from forced hothouse plants, from which the flowering stem and leaves had been cut off for the flower market, and that this practice of turning the exhausted roots to account was not uncommon. Under these circumstances Dr. Kunze thinks it is not surprising that physicians fail to obtain the results expected from the use of preparations of convallaria, and he suggests that the old astrologers, in requiring that a plant intended for medicinal use should be gathered under certain planetary influences, had the advantage in practice, since the gathering of the plant in the best possible condition was probably thus secured.

* * *

At the last meeting of the Philadelphia College of Pharmacy it was resolved that the museum, laboratories and hall of the college should be open daily for the inspection and use of visitors during the meetings of the British Association and the American Pharmaceutical Association in September.

* * *

A correspondent of the *Ceylon Observer*, in giving an account of a visit to Japan, says that the Japanese tradesmen are among the greatest adepts at adulteration in the whole world. Even in drugs they have begun to imitate foreign articles with complete success, save that the English labels occasionally baffle them. Thus in shops in the native quarter of Yokohama boxes labelled "Hallaway's Pills" are sold at ten sen (4*d.* to 5*d.*) a box, as the manufacture of Professor Holloway. A foreign resident mentioned that his servant having been sent to a foreign druggist for some magnesia went to a native store, in order to get his squeeze, and brought back what appeared to be roughly ground chalk.

* * *

It is announced that the first open surgical scholarship of the Society of Apothecaries of London has been awarded to Mr. Sidney Plowman, St. Thomas's Hospital.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The ordinary monthly meeting was held in the Society's Rooms, on Wednesday evening, May 14, Mr. Preston, the President, in the chair.

The Secretary, Mr. Newsholme, having read the minutes of the previous meeting, placed upon the table a sample of ginger mixed with nux vomica beans.

Mr. Newsholme said the sample was supposed to be African ginger. It weighed 4 ounces; out of this weight he had picked $\frac{3}{4}$ ounce of nux vomica beans or about 20 per cent. of the whole (7 lbs. contained $1\frac{1}{2}$ lb. nux vomica).

A paper was read by Mr. George Ellinor, entitled "A Short Description of some Cinchona Barks."

A discussion ensued, which was joined in by most present, and at the conclusion, a hearty vote of thanks was awarded Mr. Ellinor for his paper.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, May 15. Dr. W. H. Perkin, F.R.S., President, in the chair.

The following certificates were read for the first time:—W. T. Burgess, E. J. Caley, R. D. Courtney, M. H. Foye, W. F. Grace, Baron Ferdinand von Mueller, H. Rogers, A. J. Watts.

Dr. J. H. GLADSTONE then read a paper—

On Refraction Equivalents of Organic Compounds.—In this paper the author gives the results of observations which have been made from time to time since 1870. These results are contained in three tables giving the refractive indices, etc., of over one hundred and forty substances. Table I. contains the refractive indices of the liquid bodies from observations of the lines A, D, and H. Table II. gives a list of the solvents employed and the percentage amount of substance dissolved. Table III. gives the specific refraction, dispersion, and refraction equivalent of all the substances as deduced from observations and the theoretical refraction equivalent calculated from the values of the respective elements given below. The specific refraction is the refractive index for A *minus* 1 divided by the specific gravity or $\frac{\mu A - 1}{d}$. The specific dispersion is $\frac{\mu H - 1}{d} - \frac{\mu A - 1}{d}$ or which is the same thing $\frac{\mu H - \mu A}{d}$. The refraction equivalent is $\frac{\mu A - 1}{d}$ × the atomic weight. The following are the values of the elements:—Carbon saturated, 5·0; carbon in C_nH_n, 5·95; carbon, double linked, 6·1; hydrogen, 1·3; oxygen, joined by single bonds, 2·8; oxygen, joined by a double bond, 3·4; nitrogen, 4·1; nitrogen in bases, NO_2, etc., 5·1; chlorine, 9·9; bromine, 15·3; iodine, 24·5; sulphur, joined by single bonds, 14·1; sulphur, joined by a double bond, 16·0 The author has not included in the tables the refraction equivalent calculated for the theoretical limit of the spectrum because of the increasing uncertainty as to the position of such a limit. The author then gives the data by which the refraction equivalents of the above elements are calculated and in conclusion draws special attention to two points, the phenomena of dispersion and the bearing of these optical phenomena on our views as to the structure of organic compounds.

Dr. Armstrong asked if Dr. Gladstone had used benzene prepared from benzoic acid, as Meyer had shown that all benzenes prepared from coal tar contained thiophene, and thus the refraction equivalent of carbon in benzene might be affected. He ventured to protest against the use of the terms double linked, double bonds, etc., which he trusted would soon become obsolete; it would be better to speak of carbon in the ethylenic condition, etc. He also thought it would be most important, if possible, to determine the specific dispersion as well as the specific refraction.

Professor McLeod suggested that some use might be made of Captain Abney's photographic results and that it would be better to determine the refraction of liquids at a fixed distance from their melting point rather than from their boiling point.

Mr. TURNER then read a paper—

On the Estimation of Silicon in Iron and Steel.—The author has estimated the silicon in samples of iron and steel containing from 0·06 to 22 per cent. of silica by the various methods usually employed, and comes to the conclusion that the method suggested by Watts is most generally applicable, and gives, when slightly modified, accurate results The method (*Journ. Chem. Soc.*, Abstr., xlii., 1134) consists in passing dry chlorine free from air over the iron borings at a low red heat. The chloride of iron volatilizes and is condensed in the colder portion of the combustion tube, whilst the silicon chloride passes on and is decomposed by passing it through water, which on evaporation yields the silica. Any slag and the silicon contained in it remain behind in the porcelain boat unattacked. The improvement suggested by the author is the use of a Will and Varrentrapp's bulb to contain the water by which the silicon chloride is decomposed; the loss of the silica which used to adhere to the delivery tube and the beaker is thus avoided, as the bulb can be dried and weighed after the experiment. A table accompanies the paper, giving the results obtained by six different methods and six samples of iron and steel.

Dr. TILDEN then read a—

Note on the Melting Points and their Relation to the Solubility of Hydrated Salts.—In a paper read before the Royal Society in June, the author, in conjunction with Mr. Shenstone, proved that a relation existed between the melting points of anhydrous salts and their solubility in water above 100°. In the present paper the author shows that a similar relation holds between the points of fusion of hydrated salts and their solubility below these temperatures. He has determined the melting points of many salts and gives the method by which the determinations were made. The temperature at which incipient fusion occurs is in many cases that at which the graphic curve representing the solubility suddenly turns upwards. In isomorphous salts containing the same amount of water of crystallization the solubility and the fusibility stand in the same order at all temperatures below the point of fusion. The most fusible being the most soluble. The author is greatly in want of experimental data as to solubilities and melting points in order to extend the subject further.

A Memoir Detailing some Minor Researches on the Action of Ferrous Sulphate on Plant Life. By Dr. A. B. GRIFFITHS.—The author finds that 0·15 per cent. of ferrous sulphate added to a solution of various salts aids, whilst 0·2 per cent. is fatal to the development of mustard seeds, cabbage plants, and some microscopic water plants.

Note on Ferric Sulphocyanate. By A. J. SHILTON.—The author finds that if a drop of dilute ferric chloride be allowed to fall into a solution of potassium sulphocyanide the red colour at first formed is completely discharged. Also that a liquid containing enough ferric sulphocyanate to render it almost opaque is completely decolorized if boiled with an excess of hydrochloric acid. These effects are readily explained by the fact that the sulphocyanide is a powerful reducing agent.

The Society then adjourned to June 5.

SOCIETY OF ARTS.

Fermentation and Distillation.

In the second Cantor lecture upon "Fermentation and Distillation," on the 19th inst., Professor Hartley mentioned that soluble can be easily distinguished from organized ferments by their solubility and indefinite infusibility in water. He also gave the results of analyses made of papayin by Wurtz, of pancreatin by Law, and of albuminous peptone by Henniger, which showed that all of them contained about 16·5 per cent. of nitrogen, 52·5 per cent. of carbon, and 7·25 per cent. of hydrogen. Though the action of these ferments is impeded by borax, organic substances known as antiseptics produce no effect. They combine energetically with mineral matters, especially phosphates, and though there is no apparent change during the fermenting action, their power is gradually lessened. Diastase may be obtained as a white powder from malt by extraction with water, heating the liquor and filtering, and then precipitating with absolute alcohol; it is found to amount to only about 1 part in 500 parts of malt. One-seventh of the diastase in raw malt, however, is sufficient to convert the starch into sugar, though sometimes one-fourth may be required, owing to a too high temperature, above 112° F., having been reached during the mashing process. If a saccharine solution of it be slightly warmed a turbidity and incipient ebullition ensues, afterwards resulting in a very energetic evolution of carbonic acid gas; a small quantity of yeast added to the solution quickens this action. If a solution of grape sugar be exposed to the air for some time, the same results are obtained. This action is due to the growth of small bodies of an oval shape, known as yeast, which multiply at an enormous rate. These bodies were shown in 1835 by Schwann to be living organisms consisting of a cell, in which is contained an albuminous fluid. In further experiments it was found that yeast and other germs are at all times present in the air, but that these germs must come in actual contact with the saccharine matter to cause decomposition. Various methods for the preservation of saccharine solutions from this decomposing action were described. If a quantity be boiled and the mouth of the vessel be plugged with cotton-wool after the expulsion of all the air, the wool acts as a kind of filter, preventing the ingress of the germs with the air upon cooling; a still more effective mode consists in constructing the mouth of the vessel with a series of sharp bends, in which the germs in the air entering are deposited or else killed by the steam issuing when boiled. The lecturer then showed the difference between badly fed and well-nurtured yeast. The germs of the former have a shrivelled, pitted appearance, and a very distinct outline. If these germs be placed in sweet wort, which contains a quantity of mineral, especially phosphate of potash, and nitrogenous food, they swell out and the outline gradually becomes more indistinct; it is further observed that the germs commence to bud, the buds growing rapidly and soon becoming detached. In the alcoholic ferment two distinct varieties of the yeast plant (*Saccharomyces cerevisiæ*) are found, whilst a third has been claimed to have been distinguished. Bottom yeast, which is found in the lower part of the fermenting vat, develops at a temperature of 43° to 50° F., and never rises to the surface, even if the temperature be raised to 68° F. It buds less rapidly than the higher yeast, and is principally used for lager beer. The yeast found near the surface of the vat consists of larger and fatter cells, forming at a temperature of from 60° to 68° F., though quite inactive at a lower temperature. Professor Hartley then enumerated the principal conditions for a successful fermentation. The saccharine solution must be of a suitable strength and contain sufficient phosphates and nitrogenous food; it is also necessary that the yeast plant should be in a healthy state. Attention must be further paid to the due proportion of yeast to sugar, as an excess of sugar precipitates the albuminous matter, whilst a want of it induces an irregular fermentation, which allows the introduction of other ferments producing other than alcoholic products. The fermentation of cane sugar occupies twice as long a period as that of grape sugar, as the cane sugar has to be inverted into glucose before being split up by yeast. The alcoholic ferment resolves the saccharose into glucose as dextrose or levulose, which is again resolved into alcohol, carbonic acid gas, glycerine and succinic acid; 100 parts of saccharose yield 105·36 parts of glucose, which split up into 51 parts of alcohol, 48·5 parts of carbonic acid gas, 3·16 parts of glycerine, ·67 part of succinic acid, and 1 part of cellulose, etc. Professor Hartley gave as the result of a yeast ash examined by himself, that it consisted nearly entirely of phosphate of potash with a slight trace of soluble silica; it is therefore apparent that without potash the yeast plant will not grow, the substitution of soda being of no use, though sometimes a magnesium salt is found in the ash. Beans and other legumes are sometimes steamed and added to the fermenting liquid, as they are rich in the needful nitrogenous food. The danger of the use of unhealthy yeast is the probable contamination with lactic or other ferments. The bacterium of the lactic ferment is the *B. subtilis*, resolving the glucose into lactic acid. Those of the butyric ferments are the *B. amylobacter* and *B. ethylicus*, resolving the glycerine into ethylic alcohol; *B. butyricus*, resolving the glycerine into butyric alcohol, butyric and lactic acids, and propylglycol; and the *B. Termo*, causing oxidation of organic matters generally. As all these organisms are smaller than the yeast plant it requires a microscopic power of not less than 700 diameters to examine them. Several methods are used for the purification of the yeast. The plant is grown in a 10 per cent. solution of sugar, in consequence of which the lower organisms are starved out from want of nutritious food, after which the yeast is transferred to sweet wort, where it speedily flourishes. In other methods the use of small quantities of tartaric, carbonic or salicylic acids have been advised. Yeast has also been taken from various sources and mixed, thus affording more chance of obtaining a pure yeast; but with all these precautions bacteria are sometimes introduced subsequently with the addition of the finings.

The concluding lecture of this course consisted principally of an explanation of the different modes of distillation, though some interesting remarks were made concerning the natural production of alcohol. The original yeast plant, possibly derived from the grape or hop vine, has been lost in cultivation. But besides this there are many other ferments that produce alcohol, those of rhubarb and dates especially causing a very rapid decomposition when heated. The iodine test for alcohol, producing crystals of iodoform, was described as sufficiently delicate to detect one part of alcohol in one million parts of water; by the use of this test it has been shown that organic decay leads to a continual production of alcohol in the earth, though it is far less in a sandy barren soil than in one containing much organic matter. Traces of alcohol have been found in nearly all water except that collected from some deep springs; rain water indeed has been found to contain 1 gram weight of alcohol in a cubic metre of the water. These results have been confirmed by experiments made by Captain Abney with the spectrum method. Mr. Hartley then explained the principle of the common still, and drew attention to the great loss of heat in the cooling method, which had first been successfully avoided on the manufacturing scale by the arrangement introduced by Laugier. His plan consisted in utilizing the heat abstracted during the cooling of the alcohol for the purpose of raising the temperature of the liquid to be distilled. The parts of the apparatus consisted of two stills, one being used as a rectifier, a dephlegmator, and a condenser. A more modified form of this apparatus, designed by Coffey, is at present in use in English spirit manufactories for the distillation of fermented worts. In both these methods advantage is taken of the low boiling point and diminished latent heat of alcohol as compared with water to separate the alcohol, the strength being regulated by the rapidity of the distillation. It is further found that a comparatively stronger alcohol is obtained by the distillation of a wash containing a low percentage of alcohol. Thus if the wash consist of 90 per cent. alcohol, with a boiling point of 173° F., the distillate will contain 92 per cent. of alcohol; but if the wash only has 60 per cent. alcohol, the boiling point rises to 178° F, whilst the distillate contains 87 per cent. of alcohol or a comparative increase of 27 per cent. With a wash of 20 per cent. alcohol a distillate containing 71 per cent. or an increase of 51 per cent. is obtained. The well-known improvement in flavour consequent upon the keeping of whisky, etc., Mr. Hartley considered due to the conversion of some of the amylic compounds into ethers. In a homologous series of alcohols he mentioned methylic, ethylic, propylic, butylic, amylic, caproic, œnanthic, caprylic, rutic, lauric, cetylic, cerylic and melissic alcohols. He also pointed out the existence of the base C_6 in the composition of the aromatic benzene derivatives, consisting of benzine, cymene, benzoic, cinnamic and salicylic aldehydes, vanillin, anethol, thymol and eugenol. He then referred to the manner in which the barley-malt is dried as imparting a distinctive flavour to the spirit obtained from it, this being especally the case when dried over peat fires; the lecturer considered the flavour due to the formation of certain compounds which remain in the malt. In conclusion he gave the result of an analysis of a sample of Highland malt whisky. About 200 c.c. was taken and divided into eight equal fractions by distillation. The first four, distilled at 78° C., consisted of almost entirely pure ethylic alcohol, though a faint trace of butylic alcohol was noticed in the third fraction; the fifth and sixth fractions, distilled at 78° to 95° C., consisted principally of amylic compounds, whilst the remaining two fractions were chiefly water with a faint trace of amylic alcohol.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, May 15, Mr. H. G. Greenish, Vice-President, in the chair.

The following paper was read on—

The Botany and Materia Medica of Linseed.

BY E. H. EARLE.

The plant, known from the value of its products in manufactures and the arts as *Linum usitatissimum*, is an upright annual having a height of from one to two feet. The stem is smooth and green, and the leaves are linear lanceolate, alternate, and sessile. The calyx consists of five sepals which are ovate and acute, and have membranous margins. The corolla consists of five petals which are of much larger size than the sepals. They are somewhat crenated and are caducous. These petals are of a conspicuous purplish blue colour. Both stamens and styles are five in number. The fruit is a capsule, which dehisces septicidally; the carpels being divided from each other, and these again partially divide down the partition between each pair of seeds.

The native country of the flax plant is unknown, but central Asia has been mentioned as the probable source.

The plant is reared in this country in Lincolnshire, Cambridge, Suffolk, Devon, and Somersetshire. The seeds obtained from the two latter counties are held in highest esteem. In India the flax plant has been under cultivation for centuries for the seeds, whereas in Europe the fibre of the plant was more developed, as linen and not oil was desired.

Experiments have lately been made in India with Dutch and American seed, with a view to cultivating a good flax-yielding plant, but they have not as yet been very successful. This is said to be owing to insufficient moisture in the soil. The seeds are sown in the autumn. India also imports much European grown seed for the extraction of the oil, which possesses more satisfactory drying properties than that obtained from native grown seed. At least such is stated to be the case.

Flax being the more important of the products of this plant, I will allude to it first.

Flax has been known from the earliest ages. It constituted a field crop at the period when the Israelites were in Egypt, and the fibres were used for the manufacture of garments. Herodotus mentions this fabric as constituting articles of clothing amongst the Egyptians, upon whose monuments and tombs the processes which the fibre underwent for economic purposes are depicted with great accuracy. The clothes in which the mummies are wrapped are found to consist of linen, but of a very coarse texture. It was also used for filtering wine through, and a very rough or strong quality formed sails for boats, according to classical writers.

The Romans seemed to prefer wool to linen in the way of clothing. The emperor Alexander Severus is reported to have been the first Roman who had the courage to wear a linen shirt. After the fall of the Roman Empire flax-weaving was lost sight of until the tenth century, when it was started at Ypres in Flanders, and was from that time carried on in various parts of the Continent with varying success. I believe the celebrated Bayeux tapestry is worked on linen.

The seeds from which the flax plant is to be reared should be plump, heavy, and shining; and should be freed from impurities by sifting.

The soil answering best for its cultivation is a dry loam, and in good flax-growing soils silica is found to the amount of 60 per cent., or, in some cases, 80 per cent. Flax has always been notorious for exhausting in a high degree the soil from which it is raised. In the Georgics Virgil speaks of it as "scorching the fields." This was owing in a great measure to the cultivators not understanding the rotation of crops. Thus many districts are barren in Sicily and Asia Minor—once the granary of Rome—Spain, and the Campania, which were historically fruitful.

Irish grown flax is considered the best for the manufacture of linen, and there the crops are rotated so as to allow of an interval of about six years before again using the soil for flax. The first year grass is grown; in the second year oats; in the third year potatoes or turnips; in the fourth year wheat; in the fifth year flax, clover, or beans. In this way the soil suffers no harm.

In order to obtain a superior fibre for linen manufacture the plant is gathered before it reaches maturity, which is indicated by the partial change of the green stem to yellow, and of the green capsule to brown.

The stem consists essentially of a woody interior, and externally of the fibre needed for flax.

The plant is gathered and dragged through a rough comb, which separates the capsules. This is known as "rippling" it. It is next "retted," which operation consists in steeping it in soft water for about a fortnight, in order to dissolve out the gummy and resinous matters holding the woody and fibrous portions together. Ponds have to be dug out for the purpose of steeping the flax, as the plant renders the water so offensive that cattle drinking at a river or stream in which the operation had been conducted would be poisoned. In the reign of King Henry VIII. an Act was passed forbidding the pollution of river water by such means.

In Sweden the plant is boiled in sea water, together with lime and birchwood ashes, and finally washed with soap. This operation ended, it is "grassed" or laid out for sun-bleaching, being turned once or twice in order that all parts may experience the same influence. This occupies about a fortnight. It is then tied in sheaves or bundles and sun dried. It is often broken or "scutched" before being sent into the market. This process consists in beating with mallets or flails until the adhering wooden portion is well broken up. This is now chiefly done by machinery. It undergoes in the mills many processes which are too intricate to be followed out in a paper of this nature, beside involving some technical education. After being "combed" or "heckled" in the mill in order to separate the fibres, flax presents long glistening silver gray or yellowish fibres resembling silk when viewed from a short distance. The fibres broken off short in combing constitute tow.

Flax is also imported from the Baltic ports, Holland and Belgium.

Scraped linen constitutes lint. There has been some discussion from time to time as to the superiority of lint over cotton in bandages. Cotton is more irritating, and this is said to be due to the cells, of which it is composed, being flat and having sharp edges, or by these flat cells twisting when wetted, in both cases proving uncomfortable to the patient. Flax cells, however, are cylindrical, and thus, having no sharp edges, are superior for dressings.

The seeds now come under our notice. They are small, brown and glistening; oval in shape and having sharp edges. They are official, being used for the infusion of linseed. They are used for food in some parts of Russia and Abyssinia.

The seed coats contain a mucilage, according to some writers, which exists in the *growing* plant as *starch*. The nucleus contains much fixed oil (about one-third the weight of the seed). It is when first expressed of a pale colour, but darkens on keeping. It consists chiefly of glycerides, together with fatty acids—notably, linoleic—to which the drying properties are due.

The seeds are obtained from St. Petersburg, Riga, Libau and other Baltic ports both in Russia and Germany, the Black Sea ports, Bombay, Calcutta, Italy, New York and La Plata in South America. The Baltic supplies the greatest amount and the La Plata seeds go chiefly to the Continent.

Linseed meal is officially directed to be obtained by powdering the cake from which the oil has been expressed. It is used as a poultice, which is often stated to have irritating instead of soothing effects. This may be due to the admixture of cruciferous seeds, such as rape and mustard. As the irritation was supposed to arise from the natural oil of the linseed becoming rancid, the meal is directed to be obtained—as stated before—from the *cake* and not from the seeds. Olive oil is directed to be added when a poultice is required, in order to replace the natural oil, which to say the least is an inconvenient arrangement.

Taking now the expression of the oil from the seeds as actually carried on:—The seeds are stored by means of an elevator at the top of the warehouse, and by means of a long wooden tube, a stream of this seed is poured into a large wooden box, which allows a regulated amount to pass in a continual stream between two almost solid steel rollers about 18 inches in diameter, and on emerging from between these the seed falls upon a sloping iron ledge which directs the steam between two more rollers, and so on, until by a course shifting from one side to the other, the seeds emerge finely ground, and constituting a true linseed meal.

The temperature of the room is about 90°, so that a more plentiful supply of oil should be yielded.

Machinery now carries the meal into a large tub-like arrangement known as the "kettle." A workman below waits with iron trays upon which are coarse cloths. These trays are about a yard long and a foot wide.

These trays are placed below the "kettle," from which, by means of a trap, a requisite amount of meal is deposited upon the cloth-covered tray. The meal is pressed just sufficiently to cause it to adhere together and it is then covered at the top by the ends of the cloth before mentioned, and the tray is then placed in a press by another workman, who accumulates a pile of about a dozen in the press in about ten minutes.

At the bottom of this pile of trays is a solid steel slab which now ascends and presses the cakes against the top of the press. The oil flows very freely into tanks below, which have only one small hole for the oil to run out of. This prevents a too rapid current, which would carry mucilage and other matter along with the oil, which runs through a series of tanks, always depositing until it reaches the large storage tanks, from which casks are filled for sale or export.

The press being loosened again, the trays are removed and the cake, now apparently quite dry, is divested of the cloth which was used to allow of the cake being more easily removed from the trays, and the edges neatly bevelled by means of a sharp knife running in a groove, which cuts the cake to the required shape and size.

The portions of cake trimmed off are ground up and worked over again.

These cakes weigh about 12 pounds and contain mucilage, phosphates and nitrogenous matter and about 4 per cent. of oil, which renders them of great service in cattle feeding.

The seeds I saw worked were Calcutta seeds and appeared remarkably free from admixture. Thirty-three per cent. of oil was extracted and 4 per cent. left in the cake, so these seeds yielded very good results.

Linseed oil may be divided into four kinds, raw, refined, boiled and artist's.

Raw oil is obtained in the manner just described.

Refined oil is raw oil allowed to stand for weeks or even months, to allow impurities to settle and then is treated with litharge or acetate of lead either when hot or cold. It is also sometimes heated with sulphate of zinc or alum, which is said to hasten the deposit of impurities. The lead is often separated with oil of vitriol and this bleaches the oil and also converts any lead into sulphate, which might, when mixed with paint as white lead, be converted otherwise into yellow oxide when exposed to air.

Boiled oil. Here the oil is boiled for about five hours, and then dryers are gradually added in the proportion of 5 pounds to a ton of oil. The whole is then boiled for an hour. After this the oil is left by some manufacturers until a pellicle forms, when the oil is then run off or ladled out. Some manufacturers allow it to stand for weeks until all the dryers have settled and the oil is clear and bright. The sediment and scum are used in putty. It is tested by dipping sized paper into the oil and seeing if a varnish is formed, on drying, over the *whole* of the paper. If only the bottom of the paper is varnished whilst the top remains greasy the oil is insufficiently boiled. The drying into a resin or varnish is seen to be due to the absorption from the air by oxygen, by spreading the oil over zinc plates and weighing. When a varnish is formed the weight of the oil is found to have increased by nearly one half.

Boiling oil was almost a traditional arrangement for promoting its drying; but black oxide of manganese and red lead were added with the idea of giving to the oil at a high temperature that amount of oxygen requisite to aid its commencement in absorbing oxygen from the air. The black oxide is said to part with oxygen, which it again absorbs on being stirred to the surface, over which a current of air is passing. Borate of manganese is also used. The pans in which the boiling takes place are of copper or iron, with an iron jacket, and are heated by steam. They have a dome cover, from which two fans or stirrers are arranged to stir up the oil. From the dome the irritating vapours of acrolein are conducted into bottles of water.

Lastly comes artist's oil. There are several kinds, which are made to suit private forms, and consist chiefly of heating the oil with acetate of lead and litharge, and bleaching with ferrous sulphate or by exposure to sunlight.

This paper was followed by one on—

The Chemistry of Linseed.

BY EDWARD CULLINAN, JUN.

The chemistry connected with linseed and its products is not only very interesting, but has received some very important technical applications.

Composition of the Seeds.—The testa contains an abundant secretion of mucilage; the cotyledons, a fixed oil. The average composition of linseed, as analysed by Dr. T. Anderson, shows the following results:—

Albuminous substances	24·24	parts in 100.
Oil	34·00	
Gum, sugar and cellulose	30·73	
Ash	3·33	
Water	7·50	

A more complete analysis of the seeds by Meyer gave the following results:—

Fat oil	11·265	parts in 100.
Wax	·146	
Acrid soft resin	2·488	
Resinous colouring matter	·550	
Yellow extractive and tannin	1·917	
Sweet extractive, malic acid and salts	10·884	
Gum	6·154	
Nitrogenous mucilage, acetic acid and salts	15·120	
Starch	1·480	
Albumen	2·782	
Gluten	2·932	
Husk	44·382	

The seeds are principally cultivated for the oil, but linseed cake, *i.e.*, the marc left after the expression of the oil, is also a valuable substance for feeding cattle. According to Voelcker's analysis* it contains:—

Oil	10·90	parts in 100.
Albuminous substances	24·56	
Mucilage, starch and digestible fibre	31·97	
Woody fibre	11·47	
Ash	6·20	
Moisture	14·90	

The proximate substances contained in the seeds may be conveniently divided into four: (1) mucilage, (2) albumen, (3) sugar, (4) fixed oil. Of these only Nos. 1 and 4 will be considered now.

Mucilage.—This is a universal constituent of plants, although found in some under different modifications. According to Thomé, linseed mucilage is formed by the conversion of the epidermal cells into mucilage by the excessive thickening of the cell wall; the innermost layers under the influence of water swell to an extraordinary extent and burst the outer layers, emerging from them as a transparent mucilage. It may, therefore, be considered as a product of the transformation of the cell-wall. It is contained in the testa of the seeds. It may be obtained from them by boiling with water (by which means it will be obtained in thick threads) or by shaking the seeds with acidulated water, filtering, heating to coagulate albumen, concentrating and precipitating with alcohol. It is less transparent and brittle than ordinary gum, insoluble in cold water or alcohol. In a dry state it contains about 10 per cent. of mineral substances, but if freed from these and dried at 110° C. it yields a formula corresponding to $C_{12}H_{20}O_{10}$ (similar to althæa mucilage. With boiling nitric acid it gives crystals of mucic acid. The mineral constituents contained in it are chiefly phosphates of potassium, magnesium, and calcium. The seeds yield about 15 per cent. of mucilage. It is a most useful material for luting stoppers and other such joints in glass works.

Fixed Oil.—This is obtained from the seeds with or without the aid of heat. Preliminary to pressing the seeds are crushed to a fine meal. For the finest quality of cold drawn oil this meal is enclosed in horse-hair envelopes and pressed either by means of wedges, in a screw press, or in a special form of hydraulic press. The cake left may then be submitted to heat and again pressed. Practically cold drawn oil is seldom prepared, but after the seeds have been ground they are roasted (to destroy mucilage) and the oil expressed. The yield of oil is from 23 to 33 per cent. According to Mr. E. Woolsey, the quantity of oil varies according to the weight, quality, and kind of seed used, and his experiments show that the quantity of oil extracted is from thirteen to twenty gallons per quarter, and that the seed known in commerce as "Best Odessa" yields the most oil. Ladurean states that Russian linseed grown in France becomes valueless after the second generation, and the ash is found to lose more than half its phosphates (*Chem. Soc. Journ.*, 1880). Elaborate descriptions of the machinery employed for extracting the oil may be found in Ure's 'Dictionary of Arts.'

When expressed without heat, linseed oil presents very little colour and no unpleasant taste, but the commercial oils are usually dark yellow with a peculiar taste and odour. According to Sassure's analyses it contains—

Carbon	75·17	parts in 100.
Hydrogen	10·98	
Oxygen	13·85	

corresponding to the formula $C_{15}H_{23}O_2$. Chemically it is a glyceride of linoleic acid. By saponification it yields glycerin and fatty acids, oleic, palmitic (Schuler), myristic and linoleic. If boiled for some time it loses weight, becomes thick, and dries up readily to a sold transparent varnish, called linoxyn ($C_{32}H_{54}O_{11}$). Heated to 323° C. it takes fire and leaves tar and charcoal, but if interrupted by closing the vessel, a brown turpentine body will be left, similar to bird-lime. Bromine and chlorine will combine with the oil at a temperature of 50° to 80° C., yielding dark brown liquids, known as brominated and chlorinated linseed oils, and having the formulæ represented by $C_{15}Br_2H_{26}O_2$ and $C_{15}H_{26}Cl_2O_2$. With H_2SO_4 (specific gravity 1·478) it is turned green; with strong sulphuric acid it is turned yellow-brown, coagulated and at last formed into a tough ropy mass, which, mixed with water or spirit, has been used for precipitating gelatin under the name of "Hatchett's artificial tannin." Exposed to the air it absorbs oxygen and forms a resinous mass called oxylinoleic acid ($C_{16}H_{23}O_5$), and this takes place much more rapidly if the oil be heated. In combining with oxygen it evolves much heat and has been known to cause the inflammation of cotton waste. It is soluble in 5 parts of boiling water, 32 parts of alcohol, and 1·6 parts of ether, and it will dissolve sulphur, selenium, arsenic and phosphorus. Sulphur dissolved in four times its weight of oil forms a brown viscid mass, known as "fatty balsam of sulphur." A solution (6 in 1) is contained in the non-official formulary of the Dutch Society for the Advancement of Pharmacy (*New Remedies*, 1882). Boiled with dilute nitric acid it becomes thick and hardens in the air to a substance possessing the property of softening in warm water and resembling caoutchouc.

The oil obtained from linseed belongs to that class known as "drying," and these are of sufficient importance to warrant our consideration.

Drying Oils.—This is a division of fixed oils which, when exposed to air, absorb oxygen and ultimately become converted into a yellowish supple varnish. They contain a glyceride different from non-drying oils and yield by saponification, linoleic or some similar acid. It is probable that they contain a glyceride of linoleic acid, stearin and palmatin, by the varying proportions of which their differences are determined. They are not solidified by treatment with nitrous acid and mercuric nitrate, and they are distinctly heavier than non-drying oils.

* *Journal Royal Agricultural Society*, 2nd series, vol. xvi., p. 659.

The following is a list of the principal drying oils, together with specific gravities and solidifying points :—

Cress seed oil . .	Lepidum sativum .	·924—15° C.
Deadly nightshade	Atropa Belladonna.	·925 – 27° C
Gourd seed . .	Cucurbita Pepo . .	·9231 – 15° C.
Grape seed . .	Vitis vinifera . .	·9202 – 11° C.
Hemp seed . .	Cannabis sativa . .	·93075 – 27·5° C.
Linseed . . .	Linum usitatissimum	·935 – 20° C.
Poppy seed . .	Papaver somniferum	·927 – 18° C.
Sunflower seed .	Heleanthus annuus.	·925 – 16° C.
Scotch fir . . .	Pinus sylvestris . .	·931 – 30° C.
Tobacco seed . .	Nicotiana tabacum.	·923 – 15° C.
Walnut seed . .	Juglans regia . .	·928 – 18° C.

Those in common use are linseed and nut, hemp, and poppy seed oils.

Linoleic Acid.—This acid belongs to the $C_nH_{2n-4}O_2$ group. Its formula is $C_{16}H_{28}O_2$ or $C_{15}H_{27}COOH$. It occurs in linseed and poppy seed oils, and probably in all drying oils. It may be prepared from linseed oil by saponifying, purifying the soap by salting out, dissolving in excess of water, and then throwing down by excess of calcium chloride. The precipitate, which is linoleate of calcium, is washed, pressed, and digested in ether, which dissolves it. The ethereal solution is decomposed by hydrochloric acid, linoleic acid being formed, which is soluble in the ether. The ether is then distilled at a low temperature in a stream of hydrogen, leaving impure linoleic acid. It may be purified by dissolving in alcohol, precipitating as a barium salt with ammonium chloride and barium chloride, washing, pressing and again dissolving in ether. This is then decomposed with hydrochloric acid, the ethereal layer drawn off, redistilled in a current of hydrogen and finally dried in a vacuum over sulphuric acid.

Mulder estimates it approximately by saponifying, dissolving the mixed fatty acids in alcohol, carefully evaporating, crystallizing out the palmitic and myristic acids and converting into lead salts. The oleate and linoleate of lead may then be extracted with ether, and the linoleate separated by repeated evaporation in air and resolution in ether (*Amer. Journ. Pharm.*, xl., 249).

Linoleic acid is a yellowish limpid liquid, insoluble in water, soluble in ether and alcohol, having a weak acid reaction. On exposure to air it oxidizes to a thick viscid mass. Its salts are very easily oxidized. Nitrous acid and mercuric nitrate do not form elaidic acid with it. The formula attributed to it is doubtful. If correct the acid is isomeric with palmitolic and homologous with sorbic ($C_6H_8O_2$) and stearolic ($C_{18}H_{32}O_2$) acids.

Uses of Linseed Oil.—The principal use of the oil is in the preparation of oil paints and varnishes, but it is also used in the preparation of linoleum, oil cloths, printing inks, and gummed silks. For painting and varnishing it is used either as raw or boiled oil. Boiled oil is prepared by boiling the raw oil for two hours, ladling off scum, and then adding a certain proportion of "dryers." The substances used for this purpose are kept as trade secrets, but they are generally composed of equal parts of minium and litharge, or a mixture of these with other substances, such as manganese dioxide, lead acetate. Messrs. E. Barruel and Jean recommend that the resinification be effected with manganese borate. After the admixture of "dryers" the oil is again boiled for some hours, and after cooling stored in tanks so that the uncombined dryers may settle to the bottom. The theory of boiling has been differently explained and is not understood. Liebig suggested that by the process the mucilage and foreign matters were removed; Chevreul, that the chemicals oxidize the oil and thereby induce a more rapid absorption from the air.

Adulterations of Linseed Oil.—The substances used for this purpose are very numerous. Not alone are the seeds mixed with other kinds before expression, but the oil itself is frequently sophisticated. Nearly all but the very best samples are impure. The principal adulterations are cotton, rape, poppy, and hemp seed oils and rosin, mineral and fish oils. These adulterations are very difficult to detect, although the following tests are useful in determining them:—

(1) *Density.*—The true oil varies from ·932 to ·937; boiled oil from ·940 to ·941. Mineral and seed oils are lighter, rosin oil is heavier. All the samples of commercial oils that I have tested have been lighter, and have varied from ·930 to ·931

(2) *Solidifying Point* of pure oil is – 27° C., but samples containing other seed oils freeze at a higher temperature.

(3) *Elaiden Test.*—This consists in treating the oils with nitric acid and copper, or nitrous acid and mercuric nitrate. The non-drying oils are converted into a more or less solid mass of "elaiden." By this means almond, olive, rape and castor seed oils may be detected. I exhibit a number of different "elaidens" obtained from different oils.

(4) *By passing Chlorine into the Oil.*—If fish oils be present the colour will change from brown to black. Fish oils may also be detected by the action of nitric acid. Ten grams of the oil suspected to contain fish oil may be treated with 3 grams of nitric acid, stirred and left to separate. Pure oil becomes green and then a dirty yellow green, whereas a mixed oil becomes dark brown and even black.

(5) *Flashing Point.*—A mixture of hydrocarbons with linseed oil always diminishes the flashing point. The true flashing point of linseed is 283° C., whereas Mason has found that samples of oil mixed with hydrocarbons present a flashing point as low as 128° C.

(6) *Behaviour with H_2SO_4.*—When 50 c.c. are mixed with 10 of strong sulphuric acid, a rise of temperature from 14° to 134° C. takes place, whereas with sunflower, poppy, olive, and almond, the rise in temperature is between 14° to 90° C. (Dragendoff's 'Plant Analysis,' translated by Greenish).

The principal adulterations of boiled oil are rosin and rosin oil. Allen states that the latter may be detected by titrating with alcohol and alkali, and extracting with ether. By evaporating to dryness the rosin may be extracted and recognized by taste and smell, and even in favourable circumstances presenting the physical characters of rosin.

Adulterations of Linseed Cake.—According to Holderfleiss, Ranuard and Corenwinder (*Journ. Chem. Soc.*, 1882–3) it is largely adulterated with rape cake, hemp and colza seeds, and other seeds belonging to the Cruciferæ. Rape and colza seeds may be detected by Maibho's test. Boil with potassium hydroxide, filter and test with lead acetate paper. A black colour indicates sulphur present in cruciferous seeds. The presence of these seeds, as stated by Greenish and others, is highly injurious in their use in medicine.

Much of my information has been derived from the works of Allen, Gmelin, Watts and others, and also from original papers by various authors, most of which have been acknowledged when referred to. I am also indebted to and desire to thank Mr. Dunstan for laboratory assistance, Mr. Earle for samples, and Mr. Walker for practical details.

The two papers gave rise to a discussion in which the Chairman, Secretary, Messrs. Dymond, Lowe and Short took part.

Votes of thanks were passed to Mr. Earle and Mr. Cullinan.

The Reporter on Analytical Chemistry, Mr. C. Thompson, then read a report on "The Separation of Cobalt and Nickel."

A discussion followed in which the Chairman, Secretary and others took part.

Miscellaneous business having been proceeded to, Mr. Thompson introduced the subject of the estimation of carbolic acid, which had formed the substance of a previous report by him, and stated that the method then described by him (titration with bromine water) had been found to give too high results, probably from the precipitation of cresol and higher homologues by bromine water.

After some remarks on the subject by the Secretary, the meeting adjourned.

Parliamentary and Law Proceedings.

Suspected Death by Poisoning.

Some time ago an inquest was held at Ilfracombe on the death of Mr. James Shipway, a retired tradesman, who died under peculiar circumstances. He lived in the Torres, with two female servants as attendants. He was a cheerful man and of robust health for his age, but in March last he frequently was attacked with sickness. Dr. Foquett was called in, but Mr. Shipway died during one of the attacks. A *post-mortem* was made and the doctors could not account for death. They found the inward parts much inflamed and containing fluid of a dark bloody character, and their suspicion was that death resulted from irritant poison. The inquest was adjourned in order that an analysis might be made.

The inquiry was resumed on Monday, the 12th inst., at the Town Hall, before Mr. J. F. Brougham, Coroner.

The first witness called was Dr. Stevenson, of Guy's Hospital, and analyst to the Home Office. He stated that the dark fluid he found in the stomach was blood, but as the bowels had been cut open he was unable to determine the source of the blood, that was to say, whether it had been effused before or after death. Traces of antimony were found in the liver, too small to permit of accurate estimation; also a quantity of bismuth, an appreciable amount. The groats from which the deceased had been eating gruel were free from poison, but the lozenges stamped "Crowther," which the deceased had been eating, contained preparations of morphia and antimony. The medicines deceased had been taking were harmless; but the bismuth, a sample of which he had received from Dr. Foquett, contained a very minute trace of arsenic. The quantity of this, however, was too small to produce any appreciable effect, otherwise the article was pure. The only articles submitted to him which appeared to have any bearing on the case were the lozenges. The use of those accounted for the presence of the only noxious substance found in the body, namely, antimony, and the minuteness of the quantity of the metal in the viscera pointed to its administration in a small dose or doses, such as contained in the lozenges. The use of an excessive number of those lozenges within a limited period would cause nausea, feebleness of the heart's action, and possibly sickness and slight irritation of the bowels. One ounce of the lozenges per day would certainly be an excessive number. He had read and considered the evidence of Dr. Foquett and Dr. Fox, and having regard to that and to the facts of his analysis, he was of opinion that the death of the deceased was due to natural causes. He had known cases where the symptoms had been similar to those of Mr. Shipway, simulating irritant poisoning, and hemorrhage in the bowels, found after death where the cause was ascertained to be natural. There was nothing in the case to warrant the suspicion that deceased was poisoned by anyone or by himself, but the medical men were quite justified in refusing to give a certificate before an inquest was held and an analysis made.

Dr. Foquett was then called and subjected to an examination. He refused to say his suspicions were removed, contenting himself with remarking that as Dr. Stevenson had not discovered any irritant poison he supposed it was not there. Cases were on record where people had died from poison and yet no traces of poison had been found after death. In answer as to whether he thought the fluid in the stomach was blood, he said he did not think so.

The Coroner briefly summed up, recommending a verdict of death from natural causes.

Mr. Thorne also addressed and jury, and pointed out that as the housekeeper was known to be benefited under the will of deceased she had occupied an acutely painful position for many weeks past, and he asked the jury to express their sympathy with her.

This the Jury did, and said they were unanimous in their opinion that death was the result of natural causes. They were also glad to hear Dr. Stevenson say that the medical men were justified in refusing to give a certificate.

Review.

Elements of Pharmacy, Materia Medica and Therapeutics. Second Edition. By William Whitla, M.D.*

This work, which has reached a second edition, has undergone careful revision, though perfect accuracy has not in all cases been obtained. The sections on non-official remedies and chemical reactions have been re-written and extended. The manual has been arranged chiefly for the benefit of medical students, which may account for the detailed explanation of processes connected with dispensing, which will appear unnecessarily elaborate to those who are practically engaged in pharmacy.

The tabular method of conveying information will be found useful if only as a hint to students of the advantage of preparing similar tables for themselves.

The two most useful portions of the book are the chapters devoted to therapeutics and non-official remedies; the medical recipes which illustrate the former continue to render the treatment of this section clear and definite. No one can afford to neglect the study of the long list of substances which, though not officially recommended, are extensively prescribed.

So great attention is at this moment devoted to practical work, both in medicine and pharmacy, that we have separate treatises issuing from the press on several of the subjects included in this volume; but as a ready and comprehensive reference, Dr. Whitla's pages may be consulted with much economy of time. That probably was one chief object contemplated by the author in the compilation of this volume. Essentially it is an excellent guide to students preparing themselves for an examination, and may lay claim to concise teaching and well classified arrangement.

The author insists on the value to the medical profession of a practical acquaintance with the art of pharmacy, and regrets that a more intimate knowledge of this art is not cultivated by the student of medicine.

We may insist, on our side, on the value to the pharmacist of a more intimate acquaintance with the leading principles of therapeutics and posology.

The practice of pharmacy can never be adopted by the medical profession without unduly interfering with those onerous duties which demand their unremitting care; but a knowledge of the principles on which the art is based would instruct both the surgeon and the physician how to prescribe accurately and intelligently; while a general insight into pharmacy would infinitely widen the choice of remedies.

The practice of medicine can never be adopted by the pharmacist, for he does not possess the requisite qualifications. But to know the leading principles on which the science is based would deduct one chance of error, and would infinitely widen the area of his research.

Both parties would be in a truer relative position, and be better able to render mutual companionship and aid.

* London: H. Renshaw. Fcap. 8vo. Pp. 1-602.

Obituary.

Notice has been received of the death of the following:—

On the 1st of May, Mr. Joseph Malpas Oakey, Pharmaceutical Chemist, Preston. Aged 70 years. Mr. Oakey was a Founder of the Pharmaceutical Society.

On the 5th of May, Mr. Edmund Thornton Butler, Chemist and Druggist, King's Cross Road, London. Aged 52 years.

On the 14th of May, Mr. Frederic South Morris, Chemist and Druggist, Birmingham. Aged 57 years.

On the 18th of May, Mr. Hugh Davies Hughes Chemist and Druggist, Walworth, London. Aged 52 years.

BOOKS RECEIVED.

Grundriss der Pharmakognosie. By F. A. Flückiger. Berlin: R. Gaertner. 1884. From the Publishers.

New York and Brooklyn Formulary of Unofficial Preparations. By a Joint Committee of Delegates. New York. 1884. From the Committee.

The Extra Pharmacopœia of Unofficial Drugs and Chemical and Pharmaceutical Preparations. By W. Martindale and W. W. Westcott. Third Edition. London: H. K. Lewis. 1884. From the Authors.

Correspondence.

Dr. Redwood's Liquid Extract of Cinchona.

Sir,—Immediately after the Evening Meeting of April 2, I commenced some experiments with a bark by Dr. Redwood's process, and had obtained results which seemed of interest, when, in consequence of domestic bereavement, I was obliged for a time to discontinue them.

In the meanwhile Mr. Cownley published results which closely coincided with those I had obtained; he, however, as might be expected, has made a much more complete analysis of the various alkaloids than I have attempted. My apology for publishing this note rests in the fact that in the letter which Professor Redwood published in the Journal for May 10, he states "that the results obtained by Mr. Cownley are explicable only by assuming that the sample of bark he operated on differed very much from any I have employed." The bark that has been used in the following experiments cannot be objected to on these grounds, for by De Vrij's method it gave 4·625 per cent. of alkaloid, of which 0·72 per cent. was quinia and 2·932 cinchonidia.

In the same letter the Professor adds, "I attach much importance to the degree of comminution of the bark in treating it by this process," and he raises a doubt as to whether Mr. Cownley used a sufficiently fine powder. Now in the private proof of the paper which was issued before the meeting was held "Red Cinchona Bark in No. 60 powder" was directed to be used. At the meeting the Professor stated that with a powder of this degree of fineness percolation was sluggish and that he had since substituted bark in No. 40 powder with equally good results. On the day following the meeting I started, therefore, with bark of this degree of fineness. When the Journal appeared, however, the number of the powder was again altered, and the bark was ordered to be used in "No. 50 powder." It would thus appear that uncertainty as to the proper degree of comminution existed in the author's own mind.

1. *Preparation of the Dry Extract.*

With the exception that Dr. Redwood's verbal instructions, as given at the meeting, were followed, so that the bark used was in No. 40 powder, the process, as it afterwards appeared in the Journal, was strictly adhered to. The percolate no longer gave a precipitate with liquor sodæ when 11 pints had been collected. Upon diluting the concentrated liquid with water, the matter thrown out was extremely difficult to separate; it refused to settle after standing for several hours, and blocked the pores of the filter upon attempted filtration. After the lapse of fifty hours the whole had been filtered and washed. Again the process of drying on glass occupied much time, and when dry the extract adhered most tenaciously to the surface; if the glasses were removed for a few minutes from the hot chamber it was almost impossible to remove it with a knife. By scraping the warm glasses in the chamber fair scales were obtained. Considerable loss was entailed by this difficulty and only 3 ounces of dry scaly extract were obtained.

2. *Estimation of Alkaloid in the Dry Extract.*

Twenty grains of the extract dissolved in 1 fluid ounce of water treated with 3 drachms of liquor sodæ gave 0·069 grams or 1·062 grains of alkaloid equivalent to 5·31 per cent.

Ten grams of the extract treated by a modification of De Vrij's process gave 0·926 grams of alkaloid or 9·26 per cent.

3. *Amount of Alkaloid left in the Marc.*

One hundred grams of the dried marc gave by De Vrij's process 2·23 per cent. of alkaloid, showing that a little more than half the alkaloid present had been extracted by the dilute acid.

4. *Hygroscopic Property of the Dry Extract.*

To test the hygroscopic property of the dry extract obtained from this bark 2·492 grams of it was left exexposed in an open dish for forty-eight hours, at the expiration of which the weight was 3·608 grams, showing an increase of 48·3 per cent.

5. *The Fluid Extract.*

Taking 9·26 per cent. as the alkaloidal strength of the dry extract the fluid extract was prepared according to the directions. The result was highly satisfactory, the product being an elegant aromatic extract of full aroma and bitterness, but which precipitated slightly upon dilution with water.

J. O. Braithwaite.

Laboratory, 50, *Southwark Street, S.E.*

J. H. A.—(1) *Paris quadrifolia.* (2) *Equisetum arvense.* (3) *Lastræa dilatata.* (4) *Orchis mascula.* (5) *Luzula campestris.* (6) *Lastræa Filix-mas.* Ferns should be sent in fructification and with the lower part of the stipes showing the scales.

A. B. C.—*Lepidium Smithii.*

F. Moore.—*Ung. Pagenstecheri.*—The following is the formula of this ointment, as used in Vienna:—℞ Hydrarg. Oxyd. Flav., grana quatuor; Cold cream, drachmas duas.

J. W. W.—We are not aware that sulphurous acid is used for the purpose and should doubt its efficacy if it were.

A. C. Talbot.—The evolution of chlorine is due to the action of carbonic acid in the atmosphere in the presence of moisture.

Photographer.—Place the leaves in a boiling saturated alkaline solution and keep them there until your object is attained. Botanical specimens, not exceeding six in number on each occasion, may be addressed to the Editor.

W. Curtis.—If the nitrite of amyl is in the condition in which alone it should be dispensed the mixture will be colourless when prepared; but it will soon become coloured in keeping.

Manager.—In the Draft Pharmacy Bill there is a provision that would meet your wish.

A. P. S.—The L. S. A. degree does not make a person eligible as a member of the Pharmaceutical Society.

M. E. Allen.—Very much would depend upon the manner in which the articles are labelled and advertised. If you are in doubt you are recommended to submit your question to the Inland Revenue Authorities, who alone can answer it authoritatively.

Unique.—(1) A pharmaceutical chemist is entitled to claim exemption from jury service, but if he wishes to do so he must take care that his name is not improperly included in the jury list.

F. J. Foot.—(1) *Orchis Morio.* (2) *Calamintha Acinos.* (3) *Veronica Chamædrys.* (4) *Brassica Napus.* (5) *Cratægus oxyacantha.* (6) *Hieracium pilosella.*

David.—(1) *Anacharis alsinastrum.* (2) *Achillea Millefolium.* (3) *Veronica nederifolia.*

Communications, Letters, etc., have been received from Messrs. Samuel, Liverseege, Shapley, Gandulph, T. C. H., C. J. B.

THE ESSENTIAL OILS OF BLUMEA LACERA, DC., AND SPHÆRANTHUS INDICUS, LINN.

BY W. DYMOCK.

These two plants attract attention in India during the cold weather by their abundance on waste ground and in fields after the harvesting of the rice crop. The *Blumea* has a powerful camphoraceous odour, and *Sphæranthus indicus* a rose-like perfume.

B. lacera is a perennial plant, with obovate, deeply serrated leaves and yellow groundsel-like flowers, the whole plant being thickly clothed with long silky hairs. The natives of the Concan, near Bombay, call it *Nimúrdi*, and make use of it to drive away fleas and other insects. One hundred and fifty lbs. of the fresh herb in flower was submitted to distillation in the usual manner with water, and yielded about 2 ounces of a light yellow essential oil, having a specific gravity of 0·9144 at 80° F., and an extraordinary rotating power, 100 mm. turning the ray 66° to the left. Mr. D. S. Kemp, who made the observation, checked it by examining a 10 per cent. solution in alcohol, which gave 6·6.

This *Blumea* is of interest as the possible source of an insect powder. I am forwarding a supply of the plant and a specimen of the oil to Mr. Holmes for experiment and also for identification, as the genus is a difficult one.

Sphæranthus indicus is an annual with sessile, decurrent, obovate, bristly serrate, downy, glutinous leaves, and globular heads of purple flowers. It is a well-known Indian medicine, under the names of *Múndi*, *Gorakhmúndi*, *Munditika*, *Murmuria* and *Kottak-karandai*, and is reputed to be a general tonic, deobstruent, alterative and aphrodisiac. The distilled water is recommended for use and also the root. One hundred and fifty lbs. of the fresh herb was distilled with water in the usual manner and yielded a very deep sherry coloured, viscid essential oil, very soluble in water, and clinging to the side of the vessel, so that only half an ounce could be collected. The oil does not appear to have any rotatory power, but it is difficult to examine on account of its opacity.*

Bombay, May, 1, 1884.

THE CHEMICAL PHARMACY OF THE NEW PHARMACOPÉE FRANÇAISE.

(*Continued from page* 919.)

Sulphur and the mode in which its preparations are described form a good illustration that the new Codex may lay claim to being more than an amended edition of a preceding work. It will be interesting to see the manner in which precipitated sulphur, (soufre précipité) is directed to be made.

Slaked lime has been rejected, and ordinary water (eau commune) gives place even here to aqua destillata. This absolute choice of eau distillée has raised the ire of French commentators.

Sulphur Præcipitatum. Magistère de Soufre.

Monosulphuret of sodium, in crystals	240
Sublimed sulphur	128
Distilled water	200
Hydrochloric acid, pure	230

* Specimens of the plant and oil are being forwarded for the Museum.

Put the sodium sulphide, sulphur and water, into a glass vessel of about the capacity of a litre, and raise nearly to ebullition over a sand-bath. As soon as the sulphur has quite dissolved, dilute with water and filter into a precipitating vessel of a capacity of from 5 to 6 litres. Bring up the volume to about 4 litres. Pour into this hydrochloric acid previously diluted with 4 parts of water. Pour the acid into the liquid, not the liquid into the acid. The mixture must be well agitated so that the acid should nowhere be in excess as regards the polysulphuret. Continue to add the acid, stirring always until a distinctly acid reaction is produced. Conduct the operation in the open air so as to avoid the fumes of sulphuretted hydrogen.

The whole of the sulphur is thus precipitated. Pour off the supernatant liquor; wash with boiling water until solution of silver nitrate gives no reaction. Dry and keep. Precipitated sulphur thus made is in a state of fine division, but not entirely free from the odour of sulphuretted hydrogen in spite of repeated washing.

Soufre Doré d'Antimoine (golden sulphuret of antimony) is retained, though described anew.

Kermès Minéral (oxysulfure d'antimoine hydraté) is not yet to pass away from continental pharmacy. It is prepared by precipitation, called Cluzel's method, the only one to be employed in medicine. Kermes made by fusing sulphuret of antimony, sulphur and potassium carbonate is reserved for veterinary practice.

Numerous sulphates and sulphurets are in the list, some which should be relegated to a manual of chemistry; in England we trust more to individual skill and less to official definition. Consequently many chemical substances have been omitted in this review; not because they are deemed unimportant, but, with our independent habits, their authorized formulæ are of minor interest.

The cinchona series has been the subject of a completely new investigation, and even when the old titles have been retained, the descriptive portion and methods of testing purity are of modern date.

This branch of pharmaceutical chemistry would be unfairly treated in brief abstract, and it must only be remarked that two novelties are, the sulfate de cinchonidine basique (needle-like crystals containing 6 equivalents of water) and sulfate de quinidine basique, not unlike in appearance the ordinary quiniæ sulphas.

Charbon animal purifié (carbo ossium acido depuratum), ordered in certain of the cinchona preparations, must invariably be used purified, owing to the calcium salts always found in the animal charcoal of commerce.

Charbon végétal (carbo ligni) is stated to have the greater absorbent power in proportion to the hardness of the wood from which it has been prepared.

Sulfovinate de Soude (ethyl sulphate of soda) has now a recognized position; the sulphovinates enjoyed a passing fashion in English prescribing.

The chlorhydrates will be noticed subsequently; the chlorures (chlorides) have been much extended.

Of these latter, the Chlorure Ferreux Cristallisé (ferrous chloride), not a very convenient preparation in itself, is a simple solution of iron filings, Tournure de fer, or Pointes de Paris, in hydrochloric acid, the iron being in excess. Filter, evaporate and crystallize. It is probably inserted for the preparation of the Chlorure Ferrique Dissous (liquor ferri perchloridi) made by dissolving the above crystals in water to a density of 1·10. Through the solution is passed a current of washed chlorine, till there is no blue precipitate by potassium ferricyanide. Concentrated solution of ferrous chloride is then added until no trace of chlorine is observed, care being taken not to add excess. The solution of ferric chloride is reduced to the density of 1·26 by addition of distilled water. Various lower strengths may be obtained on further dilution.

Fer Réduit (*Ferrum reductum*) has long been a favourite continental remedy. This is one of the few substances which remains described in almost the same words as in the Codex of 1866.

It is essential that the hydrogen employed should be absolutely free from sulphuric or sulphurous acids, else the contained sulphur, acting on the iron would give black sulphuret.

Moreover, the temperature must be nicely regulated. If reduction takes place below a dull red heat, the product is black and pyrophorous. If at a bright red heat, the iron particles cohere, and the requisite fineness is not obtained.

Ferrocyanhydrate de Quinine is a new introduction. The salt is described, but no process given.

Chlorure de Mercure (calomel) by volatilization; *Chlorure Mercureux Précipité* (white precipitate), and *Chlorure Mercurique* (corrosive sublimate) are all three supposed to be prepared by the pharmacien, full details of manufacturing process being given. A distinction in synonym used to be drawn between mercure doux (calomel obtained by sublimation); and calomel à la vapeur; both synonyms now apply to the one formula of the Codex.

Chloral Hydraté belongs to comparatively modern chemistry, and is now official. *Chloroform* is not a new introduction, but its mode of preparation and chemical characters have been written afresh, with indications of processes of purification to obtain it for anæsthetic purposes, and for medical use generally.

Acide Chrômique Cristallisé, replaces the old solution, and the Chrômate (bi) d'Ammoniaque has been added.

Citrate de Magnésie is what its name implies, and must not be confused with other preparations of a somewhat similar title belonging to galenical pharmacy.

Ethers are five in number:—Éther acétique, process and characters given. Éther amyl-nitreux (amyl-nitrite). Éther brômhydrique (ethylic bromide), process and characters given. Éther iodhydrique (ethylic iodide), process and characters, and éther officinal or pure, elaborate details of process and arrangement of apparatus being described.

Éther Rectifié du Commerce, commonly called sulphuric ether, is of two kinds, the first having a density of 0·724, and a second whose density is 0·735, but it is not sufficiently rectified, and contains water; about 8 per cent. of alcohol, and often other impurities. It should be reserved exclusively for veterinary use.

Glycerine has been removed from the list of materia medica, and placed in the chemical section; its applications belong to galenical preparations. When officinal or purified for medicinal use it should be free from colour and smell, with a sweet taste, and with no after bitterness. Density 1·242. On combustion it should leave no residue. Soluble in all proportions in water and alcohol, but insoluble in ether and chloroform. Its adulterations are, water in excess, dextrine, glucose, syrup and honey. In veterinary pharmacy there is an iodized glycerine (Glycérine Iodée, Trasbot.), made of equal parts of tincture of iodide and glycerine.

A new preparation is presented under the name of:—

Glycyrrhizine Ammoniacale.
Glyzine, Glyzina.

Rad. Glycyrrh. (Smyrn.)	200
Aq. destillat.	800
Acid. sulph. pur.	4
Liq. ammon. pur.	3

Bruise the liquorice root so as to reduce it to a sort of stringy tow, and macerate for four hours with twice its weight of cold distilled water. Press and strain and treat the residue in the same manner. Allow both macerations to deposit, decant, raise them to the boiling point, and filter them in order to separate the coagulated albumen. Unite the liquors, and when quite cold pour in by degrees sulphuric acid previously diluted with four times its weight of water till no further precipitate is produced.

This precipitate, at first gelatinous and flocculent, soon coheres strongly and forms a semi-soft mass at the bottom of the vessel. Pour off the supernatant liquor; wash repeatedly, and well knead the mass until completely free from acid.

Dissolve over the water-bath in the smallest possible quantity of liquor ammoniæ, diluted with an equal weight of water.

Thinly spread the solution on plates or glass, dry at 40° C. (104° F.) and scale. Colour, reddish brown, and translucent if the scales are not too thick.

Glyzine is completely soluble in distilled water, communicating to it an amber tint; sugary taste, much like that of rad. glycyrrhizæ, and it froths on agitation. It is insoluble in strong alcohol and in acid liquids.

Good Smyrna root should give from 6 to 7 per cent. of glyzine.

Iodhydrate d'Ammoniaque is our ammonium iodide, the remaining iodides being the mercurous, which is ordered to be prepared only in small quantity to avoid the danger of over-heating, and mercuric iodide, and the iodides of lead, potassium and sodium. Ferrous iodide now belongs to pharmacy proper, and iodide of sulphur has dropped out of existence.

Lactic acid is distinctly intended to be prepared at home, as not only a process is given for its manufacture, but the mode of its purification is indicated so that it should be in a fit condition to make the lactates which are specified further on. It must be confessed that in this respect we admire the French system of pharmacy, and believe that to a considerable extent the practice might be copied with advantage by ourselves.

The lactates are five in number: Lactate de chaux (lactate of lime) is purified for use. Lactate ferreux (lactate of iron) and lactate de zinc are the old preparations of 1866, but lactate of quinine is new. It is made by mixing powdered quinine hydrate in sufficient water; heating to the boiling point and adding enough lactic acid to dissolve the quinine, and to give a feebly acid reaction. Filter boiling and crystallize.

In appearance the salt much resembles the official sulphate. It is soluble in 3 parts of cold water, and in less than its own weight of boiling water. Very soluble in alcohol at 90°, and almost insoluble in ether.

Lactophosphate de Chaux en Solution (Liquor calcis lactophosphatis).

Phosphate of lime (neutral) . . .	17 grams.
Lactic acid, pur.	about 19 grams.
Aq. destillat.	964 grams.

Carefully suspend the phosphate in the water; add the lactic acid and allow a few minutes for solution to take place. Filter. Twenty-five centigrams of neutral phosphate of lime are contained in 15 grams of the solution.

Mercury, as obtained in commerce, should be reserved exclusively for mercurial preparations intended for external use. For other purposes it must be purified by nitric acid, diluted with twice its volume of water. Keep it in contact for four and twenty hours with frequent shaking. Decant the supernatant liquor; wash and dry.

Oxygen gas comes once more into the domain of pharmacy, and is ordered to be prepared from potassium chlorate and manganese dioxide.

The oxides, which we generally term such, are about ten in number, and are familiar to English pharmacy.

Oxyde (Sesqui) de Fer Bi-Hydraté, or ferric hyhydrate, is to be prepared by the addition of liquor ammoniæ to solution of perchloride of iron, both previously diluted. A reddish-brown precipitate is formed with alkaline reaction. Collect and wash till the water used, acidulated by nitric acid, has no effect on silver nitrate. Hydrated peroxide of iron is to be kept as an antidote to arsenious acid; and the more freshly prepared the better. Experience would suggest the advisableness of extemporaneous manufacture: its keeping properties are small.

With regard to Oxyde Mercurique Rouge, or red precipitate, when heat is too long employed the oxide is decomposed into oxygen and mercury. On the other hand when not heated sufficiently to decompose all the nitric acid used, an oxide is obtained mixed with subnitrate of mercury. This second inconvenience is to be more carefully avoided than the first. Oxyde de Zinc is prepared both by calcining hydrocarbonate of zinc obtained by precipitation; and by the direct calcination of metallic zinc. The first process is called par voie humide; and the second, par voie sèche, the result being Fleurs de Zinc.

Acting probably on the theory that pepsine is now well known and that the literature of the subject is abundant, the short essay contained in the former Codex has been abandoned; no process for its extraction is supplied, and only a test of purity is appended.

Pepsine médicinale is described as a greyish-white powder which is a mixture of extractive pepsine and starch.

Extractive pepsine is made from the stomachs of pigs, or from the rennets of sheep or calves. It should dissolve in water without sensible residue.

A variation of the old test is given in which hydrochloric acid replaces lactic acid; and 50 centigrammes, instead of 25 centigrammes, of pepsine should dissolve 10 grams of fibrine.

Test for Medicinal Preparation.

Put into a small wide-mouthed bottle—

Medicinal pepsine	50 centigrammes.
Aq. destillat.	60 grams.
Acid. hydrochloric. pur. . .	60 centigrammes.
Fibrine (pig) washed and freshly dried	10 grams.

Place the bottle in a hot water drying closet, temperature up to 50° (122° F.) and digest for six hours with frequent agitation till the fibrine is quite dissolved. Ten c.c. of the cold filtered solution should not be affected by the addition of from 20 to 30 drops of nitric acid.

Extractive pepsine (that is the unmixed article) should require only 20 centigrammes to produce the same result.

(*To be continued.*)

QUINOVIN AND QUINOVIC ACID.*

BY C. LIEBERMANN AND F. GIESEL.

Notwithstanding the occurrence of quinovin and quinovic acid in most if not all species of china and cinchona barks and their varieties in considerable quantities (up to 1·6 per cent.), both compounds have only been imperfectly investigated. The older work of Pelletier and Caventou, Winckler, Petersen and Schnedermann, did not go much beyond the preparation and analysis of quinovin, and it is to the investigation of Hlasiwetz that some further conclusions as to the glucosidal nature of quinovin and respecting its decomposition product, quinovic acid, are due. The object which the authors sought to attain was to throw some light upon the chemical nature and formulæ of these compounds, and the present paper contains a preliminary statement as to the results.

The quinovin used in the experiment was a waste byeproduct in the manufacture of quinine, obtained when the cinchona alkaloids are extracted with alcohol. The bases and their salts, together with quinovin and numerous other compounds, pass into alcoholic solution. Upon distilling off the alcohol from the filtrate, and treating with a dilute mineral acid, only the bases in the state of salts are dissolved from the residue by water, leaving a brown resinous mass, insoluble in water, which was the raw material used.

This insoluble substance was digested with milk of lime at a moderate temperature and the filtrate precipitated with hydrochloric acid. The pale yellow precipitate was dried and digested with alcohol, when a small quantity of quinovic acid remained undissolved as a white powder whilst the greater part of the mixture went into solution with a brown colour. Upon diluting this solution with water until a precipitate commenced to form and allowing it to stand for some time a separation took place of small, slightly coloured crystals of quinovin. A single recrystallization from dilute alcohol was usually sufficient to obtain it free from quinovic acid, in the form of small glittering white scales. The yield of the pure product is not very favourable (about 26 per cent. of the crude material), as a considerable proportion of the crystallizable quinovin is kept in solution by the amorphous products. This can be proved by the fact that boiling hydrochloric acid will still split off from it a considerable quantity of quinovic acid, for which the mother-liquor may, therefore, be worked.

A resinous raw material obtained from other barks in a precisely similar manner yielded, however, no quinovin. This was the case when cuprea bark, derived from the nearly allied species *Remijia*, was used. The alcoholic solution of the resin, diluted with water, could not be

* Abstract of a paper read before the German Chemical Society (*Berichte*, xvi., 926).

brought to yield crystals, notwithstanding that the formation of a considerable quantity of quinovic acid upon heating it with hydrochloric acid implied the presence of a large quantity of quinovin. Eventually the separation of the body yielding the acid was effected by converting it into an ammonia compound. The alcoholic solution was treated with the requisite quantity of strong ammonia and heated, when after a short time the whole mass formed a crystalline paste of the ammonia compound in fine needles. This was freed from mother-liquor by pressure, decomposed with acetic acid to take up the ammonia, dissolved in alcohol and the ammonia compound again formed and decomposed. Upon then diluting the alcoholic solution with water to the point of turbidity, a crystallization of fine white needles resulted. A further investigation showed that this substance obtained from cuprea bark agreed with the quinovin previously studied in composition and in splitting off quinovic acid, but that it was not identical with it, though probably an isomer. It was therefore named β-quinovin

The authors, having been able to prepare a considerable quantity of these two compounds in a crystalline condition (quinovin having been represented by most previous writers as an amorphous substance), were able to study them and their derivatives advantageously.

a-Quinovin is described as a white, very light crystalline powder, readily reduced to a dust. It is quite insoluble in cold water and almost insoluble in hot, but is soluble in cold aqueous solutions of the alkalies and ammonia, in milk of lime and baryta water. In benzol, chloroform and absolute ether it is very difficultly soluble; but it dissolves more readily in dilute alcohol, and is separated from it, upon a suitable addition of water, in glittering white scales. From stronger alcohol it separates in rosettes of clear very small needles. It is very freely soluble in 98 per cent. alcohol, especially when warmed gently, 100 parts of alcohol dissolving at 15° C. more than 43 parts of α-chinovin, without any separation taking place upon standing. Upon evaporation of the alcohol over sulphuric acid the whole dries finally to a gummy mass, without any separation of crystals. α-Quinovin in solution has a dextro-rotatory action: $\alpha = +56{\cdot}6$. It does not reduce Fehling's solution, and does not undergo fermentation with yeast. It is a very stable compound, some raw material having been found unaltered, after having been kept six years. Powdered quinovin has a very bitter taste. In concentrated sulphuric acid it dissolves, under evolution of carbonic oxide, with an orange-yellow colour. In fuming nitric acid it dissolves without any specially energetic reaction; but with glacial acetic acid the solution is faintly blue, which colour is also shown by the precipitate thrown down by water. Analyses of five samples purified in different ways and dried at 120° C. gave—

	I.	II.	III.	IV.	V.
C. . . .	65·15	65·26	65·29	65·75	65·92
H . . .	8·75	8·97	8·85	8·88	8·98

Samples IV. and V. were the most carefully prepared. The figures for carbon are about 1 per cent. lower than those found by Schnedermann.* Drying at 160° to 190° C., as recommended by Hlasiwetz,† is thought by the authors not to be advisable, as some of the water removed from a glucoside at this temperature would possibly be water of constitution.

β-Quinovin is in most respects very similar to α-quinovin, so that the characters already referred to the latter also apply to β-quinovin. Nevertheless, sharp distinctions between the two compounds are not wanting. The β-compound, unlike the other, is not soluble in absolute ether or acetic ether. From dilute alcohol it crystallizes readily in handsome scales. But its most characteristic difference from the α-compound is its behaviour towards absolute (98 per cent.) alcohol, in which β-quinovin is also freely soluble, with the liberation of heat, generally small in quantity, but easily recognizable with a thermometer. After some time, even if evaporation of the alcohol be prevented, a separation of crystals commences spontaneously. This phenomenon was most remarkable in a case where 100 grams of quinovin were dissolved in 420 grams of absolute alcohol. By the following day 118 grams of glassy crystals had separated, which exposed to air effloresced and lost weight until it reached 93 grams. In the 400 grams of alcoholic mother-liquor only 7 grams of quinovin remained dissolved. It appears therefore that the β-quinovin is reprecipitated from absolute alcohol, in which it is so soluble, almost completely in the form of an alcohol compound. The finest crystals are obtained when a solution of β-quinovin in twenty-five times its weight of absolute alcohol is allowed to evaporate slowly from a deep glass over sulphuric acid; but when removed from the liquid the crystals effloresce and become opaque with extraordinary rapidity. When heated in a melting-point tube these crystals melt in their crystallization alcohol between 70° and 80° C.; at 120 C., when the alcohol is all driven off, the substance again becomes solid, and it fuses like quinovin, under decomposition, at 250° C. Triturated with concentrated sulphuric acid on a watch glass β-quinovin forms a yellow solution, which exposed to air becomes a beautiful cherry-red; α-quinovin shows this reaction, but far more faintly. In rotatory power β-quinovin is the least active by one-half: $\alpha = +27{\cdot}9$.

Decomposition of the Quinovins.—The decomposition into quinovic acid and sugar, first observed by Hlasiwetz, is shown by both α- and β-quinovin. It is effected by sulphuric acid as well as hydrochloric acid in alcoholic solution; but a solution containing 5 per cent. of sulphuric acid is not completely decomposed even after several hours' heating at 100° C. In the splitting up of small quantities (10 to 50 grams) for determining the yield of quinovic acid, it was found most advantageous to dissolve the quinovin in the smallest possible quantity of alcohol and allow the solution saturated with gas to stand in a closed vessel thirty hours. The decomposition was complete; all the quinovic acid had so completely separated as a heavy white crystalline powder that the small quantity of coloured supernatant liquid gave no precipitate with water. Quinovic acid may, however, be prepared direct from the brown resinous raw material, by dissolving it in alcohol and then heating it several hours upon a water-bath with much concentrated hydrochloric acid. The gelatinous quinovic acid which separates is white, notwithstanding the strongly coloured mother-liquor. It is washed with alcohol, in which it is insoluble, and then dissolved in it by the aid of ammonia. If the ammonia be boiled off, or hydrochloric acid be added with heat, the quinovic acid falls as a pure white sandy powder that can be easily filtered. The yield by this treatment equals about 60 per cent. of the raw material.

It was ascertained that both the quinovins yielded identical decomposition products and in almost the same proportions, the average yield of quinovic acid obtained from α-quinovin being 74·8 per cent., and from β-quinovin 77·2 per cent. The identity of the quinovic acid from the two compounds was determined not only by their general properties, but by the behaviour of their derivatives.

Quinovic Acid has been already pretty thoroughly described by Hlasiwetz. It forms a snow-white powder consisting of small needles, quite insoluble in water and soluble with great difficulty even in boiling alcohol or glacial acetic acid. It is best brought into solution by adding ammonia to the alcohol; after filtration it may be set free again by the addition of acetic acid.

Quinovic acid is soluble in ammonia, the alkalies and alkaline earths, though far less acid dissolves than would suffice for their saturation. The ammonia and lime salts

* *Annalen*, xlv., 277.
† *Annalen*, lxxix., 148.

crystallize from alcohol in needles, the former losing its ammonia in the air or by boiling its alcoholic solution. The alkaline carbonates are decomposed by quinovic acid. The alkaline solutions froth like a solution of soap.

If an alkaline solution of quinovic acid be precipitated by acids it separates in a gelatinous form, the entire contents of the vessel solidifying. In this condition, which probably represents a special hydrate of quinovic acid, the acid is remarkably soluble in ether and even in alcohol. The reaction can, therefore, be utilized in the recrystallization of the acid, which separates from ether in needles. Upon boiling or allowing the liquid to stand for some time, the acid passes from the soluble modification into the insoluble form. The authors did not find that quinovic acid possessed a regular melting point; it softens at 295° C., giving off at the same time carbonic acid. Analyses of the substance dried at 120° C. gave the following results, I., II. and III. representing quinovic acid from α-quinovin and IV. and V. from β-quinovin:—

	I.	II.	III.	IV.	V.
C . . .	72·55	72·32	72·47	72·37	72·29
H . . .	9·26	9·24	9·47	9·86	9·34

These results vary slightly but constantly from those obtained by Hlasiwetz, who with a substance dried at 160° C. obtained in seven analyses an average of 73·60 per cent. of carbon and 9·85 per cent. of hydrogen, from which he calculated the formula $C_{24}H_{38}O_4$.

The authors failed to obtain salts of quinovic acid of sufficient purity to allow of their being used in estimating the equivalent of acid.

Quinovin Sugar.—In preparing the other decomposition product of quinovin, the quinovin sugar of Hlasiwetz, the alcoholic hydrochloric acid solution of quinovin is kept sheltered from air and light until nearly all the quinovic acid has separated (about twenty-four hours), then filtered, and the filtrate exactly neutralized with strong soda solution, and evaporated rapidly to dryness. The saline mass is boiled with absolute alcohol, the solution evaporated to dryness and the residue again taken up with a little absolute alcohol. The sugar is present then in the alcohol free from ash, but contaminated with a little quinovic acid, which may be precipitated from the concentrated alcoholic solution in flocks by boiling it with some water. The quinovin sugar is then filtered out and taken up once in absolute ether, in which it is remarkably soluble, and in this way it may be obtained containing only a little colour, which can be removed by animal charcoal. Quinovin sugar has a sweet taste with a bitter after-taste. Dried in a vacuum it resembles a colourless glass; it is highly hygroscopic, and could not be obtained in a crystalline form. At 105° C. it liquefied and gave off an odour of caramel. The following results were obtained upon analysis:—

	Found		Calculated for $C_6H_{12}O_4$	Calculated for $C_{12}H_{22}O_8$
C . .	48·98	48·90	48·65	48·98
H . .	8·12	8·18	8·10	7·49

The sugar from α- and β- quinovin was identical. It reduced Fehling's solution; but did not ferment with yeast, even after boiling with acid. It is dextro-rotatory; the β- sugar giving $\alpha = 78·1$

Decomposition Products of Quinovic Acid.—The authors report that they have succeeded in splitting up quinovic acid in two directions. When heated to about 300° C. under ordinary atmospheric pressure, or preferably to a lower temperature in a partial vacuum, carbonic acid is evolved leaving about 80 per cent. of a new acid (*pyroquinovic acid*), mixed with some resin, from which it can be freed by dissolving it in ether and shaking the ethereal solution with strong solution of potash, when the potash salt separates at once in white flocks of crystalline needles. Pyroquinovic acid melts, with previous softening at about 216° C., and distils unaltered at a temperature above 360° C. It is insoluble in acids, very difficultly soluble in petroleum spirit, but readily soluble in cold alcohol, ether, benzol, and glacial acetic acid, though an acetic compound separates, after a time from the last mentioned solution in clear crystalline plates. The alkaline solutions froth. *Novic acid*, the other decomposition product, is obtained when finely divided quinovic acid is dissolved in concentrated sulphuric acid. An active evolution of carbonic oxide takes place and when the reaction has ended the mass is thrown into water, the precipitate dried on porcelain and then dissolved in ether and the solution shaken with strong alkali solution. On standing the liquor separates into three layers, the middle one containing the potash salt of the new acid. The free acid crystallizes from benzol in colourless transparent needles, melting at 257° C. The top ethereal layer yields upon evaporation a yellow resinous mass, which can be crystallized from boiling alcohol in beautiful yellow needles. This substance, which gives several interesting colour reactions, has been named "chinochromin."

From the general results of the analyses the authors are inclined to represent these compounds by the following formulæ:—

Quinovin	$C_{38}H_{62}O_{11}$
Quinovin Alcohol Compound . .	$C_{38}H_{62}O_{11} + 5C_2H_6O$
Quinovic Acid	$C_{32}H_{48}O_6$
Pyroquinovic Acid	$C_{32}H_{48}O_4$

But some of the analytical results agree nearly as well with formulæ containing another atom of carbon, and at present the authors prefer to leave the question open.

THE SEPARATION OF MERCURIC FROM MERCUROUS IODIDE.*

BY H. MACLAGAN.

According to most authorities, the separation of these two salts is a very easy and simple matter, the process being to treat the powder with certain solvents, such as alcohol, ether, etc., which are supposed to dissolve out the red without action on the other.

I have lately had to perform some analytical work in this line, and was at first considerably puzzled at the singular results obtained. A sample of mercurous iodide, which was believed to be pure or nearly so, was washed with ether, sp. gr. 0·725, and the liquid, on evaporation, left a yellowish residue, which became red when rubbed. After several washings, the result was weighed, and amounted to about 1 per cent. The washings were then continued, using the same quantity of ether for each, and weighing after each evaporation, with the result of a *steady* and *uniform* increase until 6 per cent. was reached, when the washings were discontinued. The salt had become quite dark coloured, and metallic mercury was easily seen with the microscope. A quantitative analysis had shown that, making the usual allowance for loss, the iodide was pure, and this, added to the fact of the singular uniformity in the ratio of increase in weight of the deposit, and the fact that the total amount of red iodide obtained should have been soluble in one-tenth of the solvent used, pointed out clearly that it was being derived from the yellow iodide through some action of the ether. I have made a series of experiments to prove this, using different solvents of red iodide, and, as far as I have been able to ascertain, there is not a single one which does not more or less decompose mercurous iodide. Those experimented with were ether, sp. gr. 0·718; ether, sp. gr. 0·725 (Squibb's); ether, 0·725, and alcohol, 0·820, equal parts; alcohol, 0·820, and chloroform. In each case 1 gram of iodide was treated with six successive washings of 25 c.c. each of liquid, shaken occasionally at intervals of half an hour, and as much as could be poured off, filtered into a watch-glass and evaporated on the top of a drying oven, where the tem-

* From the *American Druggist*, May, 1884.

perature was about 120° F., the weight being noted after each evaporation. The results were as follows, the figures representing the weight in grams of the dry residue after evaporation of the solvent: —

	No. 1. Ether, 0·718.	No. 2. Ether, 0·725.	No. 3. Ether and alcohol.	No. 4. Alcohol, 0·820.	No. 5. Chloroform.
1st.	0·0029	0·0044	0·014	0·0046	0·0007
2nd	0·0029	0·0044	0·0118	0·0045	0·0007
3rd	0·0026	0·0043	0 011	0·0044	0·0007
4th	0·0034	0·005	0·0129	0·0031	0·0009
5th	0·0028	0·0046	0·0105	0·0934	0·0009
6th	0·0029	0·0049	0·0135	0·0042	0·0007
Total	0·0175	0·0276	0·0737	0·0242	0·0046

The residues from Nos. 1, 2, and 5 were yellowish, but became red when rubbed, those from the rest were red. The iodide in Nos. 2 and 3 perceptibly darkened on the addition of the first 25 c.c., and at the end they were of a dirty greenish colour; the other three were only slightly discoloured. The residues on the glasses were then treated each with its original solvent to ascertain about the quantity necessary for solution.

No. 1 dissolved in 13 c.c., No. 2 in 10 c.c., No. 3 in 10 c.c., No. 4 in 6 c.c., No. 5 in 10 c.c. Thus showing that had the red existed primarily in the salt it should almost all have been obtained in the first washing. For additional proof of this 2 per cent. of red iodide was added to the same salt previously used, and one gram of the mixture treated with 25 c.c. of chloroform; the result was 0·0185, and a second 25 c.c. yielded 0·003. Next, 1 gram of iodide was shaken as before with 30 c.c. of ether, sp. gr. 0·725, the ether filtered into a second bottle containing 1 gram of iodide, and shaken from this into a third, then into a fourth, and, finally, into a watch-glass and evaporated (30 c.c. was used here, so as to have about 25 c.c. for the last gram). The deposit weighed 0·0049, the same as obtained previously from only 1 gram, and the salt in the first bottle darkened, while the other three were unchanged. One *decigram only* of iodide yielded by treatment with the same ether 0·0047, and the residual salt in the bottle was treated with a large quantity of ether, the dark coloured sediment collected on a filter and dried, a globule of mercury resulting.

The iodide used in these experiments was made by double decomposition of mercurous nitrate and potassium iodide, and fulfilled all the requirements of the U.S.P. An analysis of it showed

$$\left\{\begin{array}{ll} Hg & 607 \\ I & 386 \end{array}\right\} \text{ theory requiring } \left\{\begin{array}{ll} Hg & 611 \\ I & 389 \end{array}\right\}$$

Iodide made in the officinal way gave precisely similar results.

It seems clear from these facts that there is some principle in these solvents (probably the same in all, as they are closely related) which decomposes mercurous iodide, and, therefore, while sufficient for ordinary purposes in separating the two iodides, they cannot be used for analytical work without making proper allowance, and this allowance must probably be determined in each case. As indicated, chloroform is to be preferred, and of that, 25 c.c. will dissolve about 20 milligrams of mercuric iodide.

GINSENG CULTIVATION IN JAPAN.

The following particulars are taken from a United States official report on the method of cultivating ginseng, written by Yamaguchi Sheiguro, and forwarded by Minister Bingham, and translated by Mr. Whitney, interpreter, U. S. Legation:—

The seed of ginseng may be sown twice a year, namely, during the vernal and autumnal equinoxes; but in this district (village of Meiyama, county of Aidzu, province of Iwashiro, about 37° N. latitude, 140° E. longitude from Greenwich) the seed is usually sown during the autumnal equinox. The land on which the seed is to be sown is permitted to lie fallow for one year, and during the year following the grass is cut and buried in the soil for the purpose of fertilizing it.

In April of the same year the land is ploughed. Before the period called Taisho (commencing about the 22nd day of July) begins, horse manure and straw used in the stables are spread over the surface and the clods of earth are broken up, and the land is divided into mounds each about 3 feet broad for sowing purposes. By means of the *meita*—a board about 2 feet in length, 11-3 feet in breadth, in which is inserted a stick about ½ foot long, sharpened at one end—the surface of the mounds is smoothed and the seed is sown in drills made with the *meita*. After sowing the surface of the mounds is lightly swept with a broom, and, in order to protect the surface from the sun, straw about 1 foot thick is spread over it. Before the period called Ko Kun (commencing about the 20th day of April of the ensuing year) begins the straw is removed, and on both sides of the mounds sticks about .5 feet long are erected about 6 feet apart, on which cross-bars are placed, over which straw mats are laid to protect the surface of the mounds from the sun, the sticks on the north side of the mounds being higher than those on the south. Until the period of Taisho (about the 22nd day of July) returns, the ground must be kept carefully weeded, and, during the first two years, the soil between the shoots of the ginseng must be hoed about seven or eight times, after which no weeding is required on account of the shoots being considerably grown.

When the period called So Ko (commencing about the 23rd day of October) begins the colour of the leaves becomes yellow, and the straw mats should then be removed. Twenty days after the period called Doyo, which begins about the 18th day of January and continues seventeen or eighteen days, the field should be manured. The quantity of manure for every tan (about ¼ acre) should be one *kan* and two hundred *me* (=7½ catties=10 pounds) of oil cake, 6 sho (1 sho=109·752 cubic inches, 'Hepburn's Dictionary') of rice bran, and a quantity of night soil diluted with water. The quantity of manure for every *tan* must be doubled in the second year and trebled in the third year. In July of the fourth year the roots are dug up and dried. Ginseng is, during its growth, attacked by the mole, the rat, and a worm about 2 inches long, called *hari-gane-mushi* (wire-worm), from its resemblance to a piece of wire. Of these the mole burrows in the field and overturns the roots of the ginseng, so that the plants finally die; the rat follows the holes made by the mole and eats the roots, consequently the latter is more injurious than the former. The following means are used to protect the plants against these pests:—

In order to prevent the mole from burrowing, boards about 1 foot square are inserted in the ground on all sides of the mounds so as to stop up the holes, or jars are buried here and there between the mounds, or pit-falls are made in the holes. In order to keep off the rat a bamboo tube filled with gunpowder is placed in the mole hole and the powder ignited, and the smoke remaining in the hole prevents the rat from approaching. In order to protect the roots from injury by the *hari-gane-mushi* (wire-worm), onions, leeks, or dai kon (a kind of large radish) are planted between the mounds about 1 foot from one another; and when the worms attack these vegetables, the vegetables are pulled up and the worms killed. These vegetables are planted for the purpose of attracting the worms.

The roots of ginseng having been dug up a portion of the stem about 3 inches long is cut off and the roots are washed in water with a brush.

Then the fibrous portion of the root about 1 inch long is removed—these fibres, called *moniku* (literally hair flesh), are used as a medicine, and the remaining parts are scraped with a bamboo knife for the purpose of removing the particles of soil.

After these steps have been taken all the roots are classified into five species or grades, according to their qualities. Those roots which are large but injured are called Omare (literally large and rare), and those which are small and injured Sho mare (literally small and rare). The *moniku* or fibres are sometimes classified as the sixth and seventh species. All the roots are then put upside down into baskets made of bamboo, each containing about one *kammi* (8·33 pounds) in weight of the roots. The baskets are then placed for five minutes in a liquid specially prepared, and which is boiling.

In preparing the liquid the following steps are prescribed: 5 *momme* (=1-24 pound=2-3 ounce) of ginseng, manufactured in the preceding year. 25 *momme* of liquorice root, and 25 *momme* (3 1-3 ounces) of *shai-shin* (a drug) are thrown into (2) *to* and 5 sho, or 25 sho (about 10 gallons) of water, and when the colour of the water becomes brownish the residue of these substances is removed and 7 1-5 *go* (1 *go*=53·475 cubic inches) of alcohol is added to the liquid. The roots of the lowest quality of ginseng are first boiled in the mixture and then all the other species are successively boiled therein, from the lower to the higher qualities.

They are immediately dipped into cold water, and when entirely cooled they are dried.

After ten baskets of ginseng have been boiled the liquid should be changed. A place open to the sunlight is to be selected for drying the ginseng.

The process consists in setting up a shelf with a shade made of split bamboos. On the shelf the roots are dried. During the daytime the roots must be turned over six or seven times; at night they are kiln-dried.

After about three days the skin becomes tolerably dry, and the roots become pliable. The stems and fibres are then entirely removed and the crooked roots are straightened.

After this they are again dried for four or five days; if the weather be rainy they are kiln-dried. The whole process of preparation now being completed it remains only to put them in cases, first wrapping them in thick paper.

There are two or three other methods of cultivation, but they are mainly the same as the method described in this paper.

The quantity of seed required for planting one acre is about half a bushel.

THE USE OF NAPHTHALINE AS AN INSECTICIDE.*

Naphthaline, in one form or another, has for some time been used by entomologists as a means of preventing injury to their collections from acari, psoci, dermestes, anthreni, and other museum pests. My own experience is that it destroys the acari and psoci, but not the other pests, though it tends to repel them. Recent investigations would seem to indicate that it may be used to advantage in the field as an underground insecticide. It appears that as early as 1842 a French physician, Rossignon, pointed out the possible use of naphthaline not only as a remedial agency in medical practice, but also as a substitute for camphor for the destruction of museum pests. But up to the appearance of the grape phylloxera in France no serious experiments were made with it in the field. Among the substances tried against this pest naphthaline played its part. The efficient ingredient in the "poudre insectivore" of Peyrat, was, according to Maurice Girard, naphthaline; but the experiments with it did not yield encouraging results.

Baudet recommended it to the French Academy in 1872, while in 1874 E. Fallieres proposed gypsum saturated with naphthaline, the mixture to be distributed over the soil. It was also among the numerous substances experimented with by Messrs. Maxime Cornu and P. Mouillefert, the results of which were published in the well-known memoir presented by these gentlemen to the French Academy in 1877. Naphthaline, up to this time, proved to be of little value in killing the insect, and of no value as a repellant. Nevertheless, Dr. Ernst Fischer, of the Strassburg University, encouraged and induced by the most favourable results obtained with naphthaline as an antiseptic and as a destroyer of micro-organisms (moulds, schizomycetes, bacteria, etc.), has, since 1881, again experimented with it as a direct remedy for the phylloxera; and he has given us the results of his experience in an interesting *brochure* lately received. The first part of Dr. Fischer's work treats of, and strongly recommends, the use of naphthaline for surgical purposes as an antiseptic superior, in most respects, to all other antiseptics now in use. His conclusions are based on extensive experiments showing the effect of the material on the lower organisms, and prove that, properly used, it not only arrests the growth of these micro-organisms but eventually destroys them. This part of the work will be of especial interest to those who are experimenting with a view of destroying disease-germs. It is to the second part that I would here call attention. Preliminary to a statement of the results of this part of Dr. Fischer's work, a few facts in regard to the nature of the substance may not be out of place.

Naphthaline, a carbohydrate of the formula $C_{10}H_8$, was first made in 1820, by Garden, from coal tar. It is volatile at any temperature, melts at 79·2° C., boils at about 214° C., and has a specific gravity of about 1·1. Essentially insoluble in water, alkalies and diluted acids, it is easily soluble in ether, hot alcohol, hot concentrated sulphuric acid and in many volatile and rich oils. It is readily carried off with aqueous vapours, so that in order to quickly disinfect a room, it is only necessary to heat a vessel with water in which naphthaline has been put. The naphthaline gas mixes very readily with atmospheric air, and is also readily taken up by water. It is not poisonous to man or to the higher animals, and for surgical purposes should be used chemically pure. The crude material is by far cheaper, and upon inquiry Dr. Fischer found that in London it can be obtained, without barrels, at 25 marks (6 dollars) per 1000 kilograms (about 2200 pounds), in Paris at 100 francs, and] in Cologne at about 45 marks (barrels included). The crude naphthaline contains more or less phenol and creasote, and is a stronger insecticide than the purified article, but also more injurious to plants. Dr. Fischer used the purified naphthaline in his experiments on phylloxera, but thinks that with some precaution the crude material might safely be used, especially if it is not brought in direct contact with the plant, or if used in the dormant season.

The experiments with phylloxerized grape vines were carried on under direction of Dr. Fischer at La Grave d'Ambares, near Bordeaux. Fifteen badly infested stocks,* partly growing on light, partly on heavy soil, were treated in April, 1883.

It was placed in a hole dug in the ground near the main root, and subsequently covered up; and the quantity used was on some plants one, and on others one-half kilogram. On September 18, the plants were examined with the following result:—All plants experimented with, but especially those treated with the largest quantity of naphthaline, showed a new and healthy growth of numerous long, fine rootlets, which were perfectly free from phylloxera; in fact, the phylloxera had entirely disappeared from the roots of all plants experimented with, whereas several plants not treated with naphtha-

* 'Das Naphtalin in der Heilkunde und in der Landwirthschaft.' Von Dr. Med. Ernst Fischer. Strassburg: Trubner, 1883. Reprinted from the *Oil, Paint, and Drug Reporter*, May 14, 1884.

* It is not stated whether the roots of these stocks were examined at the time, to ascertain whether or not the phylloxera was still at work.

line showed no young growth of rootlets, and an abundance of phylloxera. The growth above ground of the plants treated showed no difference as compared with plants not treated—a fact explained by insufficient time for the treated plants to recuperate. Some of the most vigorous new rootlets were found to have penetrated the layer of naphthaline, thus showing that the latter has no injurious influence upon them. A considerable quantity of the naphthaline was found unchanged at the date of examination, which shows that the evaporation is very slow, and that its effects will be correspondingly lasting.

The results are certified to by official affidavits, and were more marked on plants growing in heavier and moister ground than on those in light and gravelly soil.

As the most convenient mode of application, Dr. Fischer recommends that about 1 kilogram of the naphthaline be put in a trench dug around the plant a few inches from the stock; the trench to be not less than from 15 to 20 centimetres deep, and to be at once filled up again. He attributes the failure of former experiments: 1. To the small quantity of the material employed. 2. To its being employed too near the surface of ground, so as to permit evaporation in the air. He also thinks that results were expected after too short a lapse of time.

OLEUM GAULTHERIÆ.*

BY ISAAC EDWARD LEONARD, PH.G.

Oil of wintergreen was first made in Luzerne county, Pa., in 1863, from which time it has been distilled in great quantities, with the exception of last year, when the yield was not so plentiful, owing to the destruction of the shrubberies by the fire which passed over our mountains.

In distilling, the entire overground portion of the plant is employed, which has its greatest yield during the months of July and August.

The still is generally a wooden box, about eight feet long, four feet wide, four feet high, with a copper bottom and staid with bolts. The head of the still is copper, and connecting with this is a square or circular worm of the same material or of tin, placed in a barrel. The still being filled with wintergreen to within about twelve inches of the top, a sufficient quantity of water is added, and this is allowed to macerate from ten to twelve hours. The fire being started, the distillation commences and continues for about eight hours; but during the first two or three hours, 90 per cent. of the oil has passed over. For collecting the distillate, most of the distillers use a wide mouth bottle or fruit jar, fitted with a large cork having two holes. A small tin or glass funnel is put into one of the holes, so that the beak of the funnel is below the shoulder of the receiving vessel, and connected with the other hole is a suitable pipe forming an egress. The distillate passes into the receiving vessel through the funnel. It is here that the oil and the water separate, the oil going to the bottom, and the water being lighter and in excess passes through the egress pipe into a larger receptacle, where it is reserved for a subsequent operation (cohobation).

Occasionally the oil is very highly coloured. I have found several samples to contain traces of iron, which is due to the oxidation of the tin worm or can with which the oil comes in contact. Tin worms are used on account of their cheapness, but will only last about two weeks, before they undergo oxidation.

The wholesale dealers that handle the oil in large quantities have three ways of "cleaning" it, re-distillation, filtration and decolorization. The first two processes are easily understood, while the decolorization seems a difficult one, but is much easier than either of the others. The oil to be decolorized is put into a bottle and crystals of citric acid are added, the whole allowed to stand, agitating occasionally, until the oil is colourless, or nearly so.

On experimenting with nine quarts of wintergreen fruit, I found it contained one and a half drachms of oil. The chief uses of the oil are for flavouring and in printing fine calicoes.

In experimental distillation, I found that the lower specific gravity is due to the separating of the oil from the water too quickly, and that the higher specific gravity is obtained by letting the distillate stand from twenty-four to forty-eight hours before separating the oil from the water.

A case of poisoning occurred in 1883, at one of the grocery stores in White Haven, Pa. A man mistaking the oil for the milky water, drank about two ounces; he was taken to his home in Easton, Pa., and died in about five hours.

Parties have tried to export the oil, but did not succeed.

* From the *American Journal of Pharmacy*, May, 1884.

WEST INDIAN EPIPHYTES.

A. F. W. Schimper describes, in great detail, in the *Botanisches Centralblatt*, the various epiphytes natives of the West Indies. They belong to a great variety of families. Of species the largest number belong to the Orchideæ, but in the mass of individuals, to the Bromeliacæ and Aroideæ; next follow the Filices, Rubiaceæ, Gesneraceæ, Ericaceæ, Cactaceæ, Myrsineæ, Melastomaceæ, Bignoniaceæ, Clusiaceæ, Piperaceæ, Urticaceæ, and Cyclantheæ. They are usually herbaceous, but very often of considerable dimensions, less often woody.

The subject is treated under three heads, viz.:—(1.) General remarks on the epiphytic flora of the West Indies. (2.) The structure of the different species. (3.) The influence of their mode of life on their geographical distribution.

As far as regards their mode of life, they may be classified into four groups, viz.:—(1.) Those in which the adaptations are very simple; deriving their nourishment entirely from the *detritus* of the bark to which they are fixed. (2.) Those that derive their nourishment through aerial roots which reach the ground. (3.) Those in which the roots form a conspicuous spongy mass, in which great quantities of moisture and humus are collected; and (4.) Those in which the leaves perform the ordinary functions of roots in absorbing water and nutrient salts.

The special contrivances in particular cases are described in detail.

KOUSSINATE OF SODA.*

One of the most efficient combinations of koussin is that with soda, which is effected as follows:—Any desirable quantity of koussin is dissolved in hot water, to which enough bicarbonate of soda is added to dissolve the koussin entirely; boil this solution with a little animal charcoal for a few seconds and then filter. The solution thus obtained, and which though slightly coloured is clear, is now slowly evaporated in a porcelain dish until dry. The koussinate of soda is an amorphous, powder-like mass, of intensely bitter taste and a whitish colour, slightly bordering on yellow, somewhat hygroscopic, soluble in cold water, but more so in warm. It is equally soluble in alcohol, excepting the slight superabundance of carbonate of soda. On account of this great solubility it can be dispensed in all forms, and it is said to have done splendid service in the treatment of tenia and pin worms.

* From the *St. Louis Druggist*. Reprinted from the *Pharmaceutical Record* May 15, 1884.

The Pharmaceutical Journal.

SATURDAY, JUNE 7, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

DR. J. BURDON SANDERSON ON INFECTION AND DISINFECTION.

NOTWITHSTANDING the multitudinous treatises that have been devoted to the subject of disinfection, each successive investigation seems to widen the field of research rather than to deal exhaustively and finally with any particular portion of it. Still some advance has been made, and a tendency is now evident to go beyond what Mr. SIMON calls "vague chemical libations and powderings" and to deal definitely with the specific organisms which are associated with different forms of contagious disease. Hitherto, attention has been mainly directed to the rendering of solid and liquid excreta innocuous, but in a memorandum appended to the Report of the Medical Officer to the Local Government Board that has been just issued, Dr. J. BURDON SANDERSON urges that this is not by any means all that can be accomplished by the application of chemical agents for the prevention of infective diseases. He points out that the innate no less than the extraneous contagia have a life history which is made up of two states of existence, alternating with or succeeding each other,—one in which they vegetate with more or less activity in the external environment, the other in which they have their abode in living blood or tissue, exerting there their hurtful function,—and that the problem of disinfection relates to the latter as well as to the former of these states. In the application of disinfectants, the attainment of one or both of two practical purposes may be kept in view: the direct action of the disinfectant on contagia so as to render them innocuous, or the arrest and inhibition of their morbific action within the body. Dr. SANDERSON considers that the most important lesson that has been learnt in recent researches respecting the nature of contagia is best expressed in the word "specificity," by which he means that each individual kind of contagium has a power peculiar to itself of producing a particular modification of the chemical processes which constitute the life of the organism it attacks. Very little is yet known respecting the effect of chemical agents upon the progress of such modifications within the organism, and before much extension of this knowledge can be hoped for not only will a more intimate acquaintance with the contagia be indispensable, but the nature of the modification produced by each will require to be worked out. Holding these views, therefore, Dr. SANDERSON indicates four lines of research which should be followed with a view of acquiring a better and more practical knowledge of the art of disinfection: (1) the disinfection of liquid and solid excreta and of clothing; (2) the disinfection of air; (3) the detection of contagia in food, air, or water; and (4) the use of colytic agents with a view to the inhibition of infective action within the living body. Postponing for the present a discussion of the first two divisions, he deals in the memorandum with the last two in some detail.

In attempting to determine the presence or absence of morbific germs in water or air the method of cultivation is the best available; but here we are met by a difficulty due to the universal presence of microphytes. Some assistance may be rendered by the analyst, but his results, as ordinarily obtained, do not help to discriminate between the living and non-living, much less between active and inert, between hurtful and innocuous. Dr. SANDERSON, therefore, argues that in the examination of water for the purposes of public health it is desirable to add to the approved methods of qualitative analysis a much more complete and systematic examination of its biological properties, which should have a point of departure in the qualitative sorting of the microphytes of contagium and aim at acquiring knowledge as to the morphological development of each species, as well as its external chemical relations with its environment.

In discussing the possibility of inhibiting the action of contagia after they have entered the human or animal organism, Dr. SANDERSON remarks that the knowledge we at present possess to assist us in attacking this part of the problem amounts to little more than that all contagia owe their power to their continued chemical action on the living substance of the organism they attack. In this and other points specific contagia resemble the common septic ferments, but they present marked points of difference. For instance, the symptoms of septic infection follow immediately on invasion of the septic poison and as rapidly subside, whilst the specific poison has a definite period of incubation and retains its hold upon the organism for a period equally definite, whilst both these periods, as well the pathological disturbance produced, are in general characteristic of the particular species. Agents antagonistic to septic infection before, as well as after, its entry into the organism are known, though little is understood as to the way in which they act, and the question arises whether similar agencies may not be discovered in relation to specific contagia. Dr. SANDERSON believes, for reasons given, that "all "contagious microphytes are related by descent to "the common microphyte of sepsis, and consequently "that whatever properties belong to the parent are "likely to be represented, more or less modified, n "those of the successors." Assuming, therefore, that the agent by which the septic microphyte produces its toxic effect is a ferment in the chemical sense, it might follow that the morbific action of the microphyte of small-pox is of the same nature; so that if it can be shown that septic fermentation is brought to a standstill by the development of an antagonistic chemical action, it seems possible that the mechanism by which the variolous fermentation is terminated is similar and within the reach of investigation. Recent researches have indeed shown that the development of microphytes in an albuminous fluid undergoing sepsis at a favourable temperature is a terminable process and that the period of the most active vegetation is coincident with the greatest toxical activity of the liquid. After this culmination the organisms cease to multiply, and eventually die, long before the nutritive material has been exhausted. This is regarded as the result of the interference of compounds resulting from the breaking up of the proteid molecules, which have been ascertained to belong to the aromatic group, and to be represented at an early stage in the septic process by acids of the acetic series, in which an atom of hydrogen is replaced by an aromatic molecule. One of these compounds so developed, phenyl-propionic acid, has been found by experiment to be more than twenty times as destructive of the vitality of microphytes as carbolic acid, and, therefore, one of the most powerful antiseptics known. Physiologists have long been familiar with the fact that chemical bodies of the aromatic group take part in the normal exchange of the material of the living body. It would seem, therefore, that no unimportant portion of the sanitary problem will be how best to maintain their presence in such relation to the body as to furnish it with the means of struggling against hostile agencies.

APOTHECARIES AND THE MEDICAL BILL.

In a recent editorial article in the *Medical Times, à propos* of the attitude taken by the Society of Apothecaries towards the Medical Bill now before Parliament, some views are put forward that recall a suggestion made a few years since by the first President of the Medical Defence Association, as to a method for settling satisfactorily what he termed "the counter practice controversy." Our contemporary is strongly adverse to the amendment of the Bill so as to maintain the Society of Apothecaries in the anomalous position it has so long held; but it professes to see a great future for that body if the rulers of it will only accommodate their course to the necessities of the time. It is of opinion that should the Medical Bill pass without any tangible modification, there would be a great likelihood that before the law has been in operation many years an irresistible demand would arise for a lower grade of medical practitioners, who would not think it beneath their dignity to accept the only fees that the labouring classes can afford to pay. Medical men, it says, are even now above the position which many of them have to take, so that there is a danger that when the law demands a still more prolonged and costly education, the poorer sick "will be entirely deserted by the doctors and left to the tender and ignorant mercies of the herbalist and prescribing chemist." When this crisis arrives, it is predicted, the public will demand that chemists shall receive some smattering of medical education, and be allowed to visit patients and treat them, or else that a lower grade of medical practitioners shall be created for the service of the poor. Already it is pointed out the State has recognized this principle of a lower grade of practitioners in the institution of the Dentists' Register.

In this emergency, according to our contemporary, the Government will naturally turn to the Society of Apothecaries, or the Pharmaceutical Society, as the proper authority for controlling the new departure. Or, adopting a suggestion made recently by a writer in *Blackwood's Magazine*, the two societies might form an alliance for the examination and authorization of low priced practitioners, in which case, it is thought, the Society of Apothecaries would have a fair claim to control the examinations. That Society is, therefore, recommended to give up its hopeless attempt at rivalry with the Colleges of Surgeons and Physicians and be content to take a lower place, the recompense suggested being the opening up of a useful and lucrative *rôle* for it in the not far distant future.

We have thus briefly paraphrased the principal points in the article in the *Medical Times*, rather because it may interest our readers to become acquainted with the views advocated seriously by so respected a contemporary than because we think they are likely at present to be included within the range of practical politics. It is not, indeed, for us to say whether the Society of Apothecaries will be tempted by the prospect of a "useful and lucrative *rôle*" to ignore its ambitious past, "get over the old idea . . . that a doctor must of necessity be a gentleman," and busy itself in opening up a "very useful and excellent career . . . for many of the picked pupils of the Board Schools." Nevertheless, we think such a course very unlikely to be adopted. But we believe our contemporary evinces profound ignorance of the sentiments of the chemists and druggists in this country as a body to suppose that they would voluntarily enter into any alliance which would place their examinations or any part of their proceedings to any extent under the control of a medical corporation. Such a proposition requires only to be mentioned to be stigmatized at once as likely to be fertile in misunderstanding and mischief. Moreover, we are convinced that such an alliance would be inimical to the best interests of pharmacy, if not of medicine. The scientific practice of pharmacy has a future of its own in this country and will be bes able to serve medicine whilst carried on independently of it. We have the past history of the Society of Apothecaries to show the effect of attempting to combine in one person the compounder of drugs and a low grade of medical practitioners. Naturally, this hybridism resulted in an undue predominence of what was assumed to be the higher—and probably was the most remunerative—strain in it, and the word "apothecary" acquired a new and non-natural meaning in the English language. We do not fear, therefore, that the Pharmaceutical Society of Great Britain will risk a repetition of this experience, and by taking a similar course promote a return to the dark ages of pharmacy in Great Britain, or be tempted under any such pretext to endanger the advance in pharmaceutical science which it has done so much during the last forty years to promote.

The Medical Acts Amendment Bill was the third order of the day in the evening sitting of the House of Commons on Friday, but at the time of going to press this stage had not been reached.

* * *

After six years' agitation the New York State Pharmaceutical Association has secured fresh legislation regulating the practice of pharmacy in all the counties of the State, except New York, Erie and Kings. The new Act practically places the duty of carrying out the examination, registration and supervision in the hands of a Board of Pharmacy, consisting of five members, who are to be selected by the Governor of the State from ten pharmacists nominated by the State Pharmaceutical Association. The Board will hold office for five years, the Governor selecting from nominees once a year the number of pharmacists requisite to fill up any vacancies that may occur.

* * *

The pharmacists of New York City, however, appear to have been less successful in an attempt to carry through the Legislature a Bill to confine the sale of drugs and patent medicines in the city to pharmacists. The Bill is said to have been defeated mainly through the influence of the patent medicine manufacturers, who through their counsel urged upon the Committee which had it under consideration that there is no responsibility attending the sale of patent medicines, and that many of them "possess no merit whatever" and could do no injury to the public!

* * *

At a recent meeting of the Paris Société de Pharmacie the subject of an International Pharmacopœia was broached by M. Petit, who suggested the advisability of having the draft already drawn up by the Society printed, and of remitting the consideration of the subject to a new Commission, the powers of the former one having expired. M. Ferrand objected that the impression produced upon him respecting this question whilst attending the International Pharmaceutical Congress in London was unfavourable to the initiative being taken by France, and M. Desnoix expressed an opinion that it would be better to await the decisions at the coming International Congress in Brussels before taking any further steps. After some further discussion it was decided that the manuscript should be communicated to the Brussels Congress.

* * *

Some of the friends and admirers of Dr. A. W. Hofmann in the United States, wishing to testify their appreciation of the services he has rendered to the world by his labours in chemical science and of commemorating his recent visit to that country, have subscribed to have a gold medal struck at the United States Mint in Philadelphia, and this has been forwarded with a complimentary letter to the learned Professor in Berlin. In acknowledging the receipt of the present, Dr. Hofmann, whilst modestly protesting that he has rendered no service which deserves such commemoration, and confessing that he is "somewhat perplexed by the monumental form" which the good feeling of his American friends has taken, expresses himself as deeply touched and feeling highly honoured by the solid and permanent token of their sympathy.

* * *

The Royal Society of New South Wales, with a view of encouraging original research, has published an offer to present a medal and a money prize of £25 for the best communication upon each of eight subjects which are arranged in three series. Among these subjects may be mentioned the "Influence of the Australian Climate in producing Modifications of Disease," to be sent in to the Honorary Secretaries, Sydney, not later than September 30, 1884; "The Chemical Composition of the Products from the so-called Kerosene Shale of New South Wales," to be sent in not later than May 1, 1885; and "The Chemistry of the Australian Gums and Resins," to be sent in not later than May 1, 1886. The competition is to be an open one and will not be confined to residents in the colony. A communication to be successful must be either wholly or in part the result of original observation or research on the part of the contributor, as no award will be made for a mere compilation, however meritorious.

* * *

We have received from Mr. J. E. Ryder, of Great Portland Street, a letter of warning that the "chloroform dipsomaniac" who a few years ago caused a considerable amount of annoyance and anxiety to several West-end pharmacists, by obtaining, under the pretence that he was a medical man a supply of chloroform and drinking it in the shop, has recommenced his mischievous operations. The man may be easily recognized by the fact that, apparently in consequence of some defect, he carries one arm folded across the chest.

* * *

A meeting of the London Section of the Society of Chemical Industry will be held in the Chemical Society's Rooms, Burlington House, on Monday next, at 8 p.m., when Mr. W. S. Squire will read a paper on "The Processes concerned in the Conversion of Starch into Alcohol, and their relation to Brewing and Distilling."

* * *

A meeting of the School of Pharmacy Students Association will be held on Thursday, June 12, at 8 p.m., when a paper will be read by the Honorary Secretary (Mr. Wyndham Dunstan), on "The Separation of Chlorides, Bromides and Iodides," and a Report on Practical Pharmacy will be made by Mr. R. A. Cripps.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, June 4, 1884.

Present—Messrs. Andrews, Atkins, Borland, Bottle, Butt, Carteighe, Churchill, Gostling, Greenish, Hills, Radley, Richardson, Robbins, Savage, Squire, Symes, Williams and Young.

The chair having been taken by Mr. Michael Carteighe, the minutes of the meetings of May 7 and 21 were read and confirmed.

The late Mr. Squire.

Mr. Carteighe read a letter from Mrs. Squire thanking the Council for the resolution passed at the last meeting.

Election of President.

A ballot having been taken in the usual way—

MR.. MICHAEL CARTEIGHE

was unanimously re-elected President for the ensuing year.

The President said he was extremely grateful to his fellow Councillors for this mark of their confidence. It was a source of satisfaction to find that his efforts in behalf of the Society had received their cordial sympathy and support. He could only say that whatever he had been able to do for the Society and the Council was largely due to the loyal support he received from every one of his colleagues.

Election of Vice-President.

On a ballot being taken—

MR. SAMUEL RALPH ATKINS

was re-elected Vice-President for the ensuing year.

The Vice-President expressed his acknowledgments for the honour conferred on him, and thanked his colleagues for the courtesy and sympathy which had been shown him during his previous terms of office. He said he would endeavour to devote the same amount of attention to the Society as he had done in the past.

Election of the Treasurer.

On a ballot being taken—

MR. JOHN ROBBINS

was also re-elected Treasurer for the ensuing year.

The Treasurer, in thanking the Council for the honour again conferred upon him, said that by the wise decision of the Council to re-invest its funds and securities with more advantage, the Treasurer during the past year had had to draw larger sums of money than any of his predecessors, and in the forthcoming year he would probably have to draw larger sums than would fall to the lot of any of his successors. As he had always taken an interest in the line of policy adopted he felt great satisfaction that it was being carried out during his term of office.

Standing Orders.

The Standing Orders of the Council were unanimously adopted for the ensuing year.

Letter of Resignation from Mr. Hampson.

The President read the following letter which he had received from Mr. Hampson:—

"205, St. John Street Road, E.C.,
"*June 2nd*, 1884.

"Dear Mr. President,—With feelings of regret I beg to resign my seat at the Council of the Pharmaceutical Society.

"In consequence of the continued illness of my wife and my own imperfect health, it is necessary that I should relieve myself of all unimperative duties, so that I may be able to obtain more leisure.

"My interest in pharmaceutical progress and in the welfare of the Pharmaceutical Society is unabated, and, perhaps, I may at some future time have opportunities of giving effect to this feeling.

"Kindly convey to the Members of the Council the assurance of my most friendly regard.

"I am, dear Mr. President,
"Yours sincerely,
"Robt. Hampson."

The Council went into committee to consider the letter, and the following resolution was passed unanimously on the motion of the President:—

"That Mr. Hampson's letter be received and entered on the minutes; that the Council, having in view the able services so long rendered to the Society, hesitates to accept his resignation, and instructs the Secretary to write to him requesting him to reconsider his determination."

Election of Secretary.

The President read the following letter from Mr. Elias Bremridge:—

"New Malden, Surrey,
"*May 31st*, 1884.

"My dear Mr. President,—In preparing the Agenda for the June Council Meeting, when the appointment of officers for the ensuing year will be considered, I have been reminded of the pleasure it has always afforded me on similar occasions to find that I continued to possess the confidence of the Council, as shown by my being unanimously re-elected. This has occurred year after year for a period of nearly twenty-eight years, and during the whole of that time it has been my privilege and my happiness to enjoy, I believe, the personal friendship of every member of the Council.

"I feel, however, that the time has at length arrived when it is desirable, and perhaps opportune, that I should request the Council to release me from my official duties as soon as may be found convenient.

"The growing necessity for this step has been on my mind for some time past, but it has required no small effort to screw myself up to make this communication and to ask you, my dear Sir, to make this announcement of my views to the Council at its next meeting.

"The reason that has had the most weight with me in coming to this conclusion is that my sense of hearing has become imperfect, and I find it is getting increasingly defective, so that, although the Council and the Committees have generously borne with this infirmity, the knowledge that I could only imperfectly perform my duties has, at times, been a source of depression and grief to me; moreover, I have recently had strong indications that I no longer possess my former elasticity and endurance.

"Under all these circumstances I could not conscientiously desire to retain my official position. But I shall continue to watch the proceedings of the Council with unabated interest, and I shall ever remember, with grateful feelings, the many happy years during which I have had the distinguished honour of carrying out its instructions and the important duties ordinarily devolving on the Secretary and Registrar.

"I beg to remain,
"My dear Mr. President,
"Ever faithfully yours,
"Elias Bremridge."

The President said this letter would be received with a general feeling of regret, but coupled with that the members of Council must entertain considerable respect for the courage which an old and valued officer showed by sending in his resignation when he felt he could no longer do the work as efficiently as he did in days gone by. He thought this was not the proper time to refer to Mr. Bremridge's great services and devotion to the Society. He should ask the Council to formally refer the letter to the Library Committee for consideration and report as to the best mode of dealing with it and filling up the vacant office, and the members of Council would have an opportunity of expressing their sentiments when the report came up.

The VICE-PRESIDENT seconded the motion, which was carried unanimously.

Mr. ELIAS BREMRIDGE was then unanimously appointed Secretary and Registrar until further notice.

ASSISTANT SECRETARY AND DEPUTY REGISTRAR.

Mr. RICHARD BREMRIDGE was also unanimously appointed Assistant Secretary and Deputy Registrar until further notice.

APPOINTMENT OF AN EXAMINER.

The PRESIDENT said the next business was to appoint an Examiner for England and Wales, in place of Mr. H. B. Brady, F.R.S., who had resigned.

The Council went into committee to discuss the merits of several gentlemen whose names were mentioned.

On resuming—

MR. W. H. SYMONS, of 2, Queen's Terrace, St. John's Wood,

was appointed, subject to the approval of the Privy Council.

APPOINTMENT OF EDITOR AND SUB-EDITOR OF THE JOURNAL.

Dr. B. H. PAUL was appointed Editor, and Mr. F. PASSMORE Sub-Editor of the Society's Journal for the ensuing year.

APPOINTMENT OF CURATOR.

Mr. E. M. HOLMES was appointed Curator for the ensuing year.

TREASURER TO THE SOCIETY IN SCOTLAND.

Mr. JOHN B. STEPHENSON was unanimously re-elected Treasurer to the Society in Scotland.

SECRETARY TO THE SOCIETY IN SCOTLAND.

Mr. PETER MACEWAN was re-appointed Secretary to the Society in Scotland.

RESTORATIONS TO THE REGISTER.

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

Benjamin Henley Eastes, Loughton, Essex.
William Pierpoint Lawrence, 194, Great College Street, Camden Town, N.W.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemist.

William Pierpoint Lawrence, of London, a Pharmaceutical Chemist, having tendered his subscription for the current year, was elected a "Member" of the Society.

Chemist and Druggist.

Adam McGregor, of Ayr, who was registered as having been in business on his own account before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society.

ASSOCIATES IN BUSINESS.

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

Bartle, William Frederick ......Greenwich.
Burchell, Robert Henry ....Kettering.
Oldershaw, George ....Liverpool.

ASSOCIATES.

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

John, Benjamin ....Narberth.
Moss, Thomas Abbot ....Carlisle.

APPRENTICES OR STUDENTS.

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

Acton, Frederick George ......Worcester.
Allin, Charles James ....St. Albans.
Barclay, John ....Birmingham.
Evans, John Richard ....Dowlais.
Farquharson, Alexr. McDonald.Aberdeen.
Flower, Walter.....................Barton-on-Humber.
Hitchman, Walter ....Kettering.
Jaques, George.....................Leeds.
Jarvis, James Henry ....Hastings.
Jones, Ebenezer Owen ....Swansea.
Lewis, Daniel ....Tredegar.
Menhinick, Chas. Hy. Foott ...Stonehouse.
Mould, Arthur H. .. ..London.
Owen, Alfred Ernest ....Newcastle.
Pearson, Ernest ....Cromford.
Puckey, William ....Bishops Stortford.
Smith, Henry ....Durham.
Tomkins, William Kingston ...Oxford.
Wisker, Robert Hardy ....York.
Withers, Herbert Percival......Penwortham.

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

LOCAL SECRETARIES.

The nomination of Local Secretaries for the ensuing year was deferred to next month, in order that the list might be considered by the Library, Museum and Laboratory Committee. The following return was laid on the table by the Secretary:—

No. of towns eligible, 1883-4	305
No. of towns from which votes have been received	195
No. of towns from which no votes have been received	111
No. of towns added to the list as eligible (Accrington, Helensburgh, Maidenhead, Ruthin)	4
No. of towns removed from the list as not eligible (Exmouth, Redditch, Slough) .	3
No. of towns eligible, 1884-85	306

ADDITIONS TO THE REGISTER.

The Registrar reported that—

Francois Hippolyte Rebaute, of 26, Rue St. Gilles Paris; and

Richard Richardson, of Williamstown, near Melbourne, Australia,

having made statutory declarations that they were in business before the passing of the Pharmacy Act, 1868, and these declarations having been duly supported by qualified persons, their names had been placed on the Register.

An appeal against the Registrar's decision which had been made by a person who claimed to be registered was submitted to the Council and referred to the General Purposes Committee.

APPOINTMENT OF COMMITTEES.

The following gentlemen were appointed on the various committees for the ensuing year:—

General Purposes.—The whole Council. To meet at six o'clock on the evening previous to the Council meeting.

Finance.—Messrs. Gostling, Hills, Radley, Savage

Schacht, Symes and Woolley. To meet at four o'clock on the day previous to the Council meeting.

Library, Museum, Laboratory and House. — Messrs. Andrews, Bottle, Butt, Greenish, Hills, Robbins, Schacht and Squire. To meet on the second Wednesday in the month at eleven o'clock, except in August and September.

Benevolent Fund.—Messrs. Andrews, Borland, Bottle, Butt, Churchill, Greenish, Richardson, Robbins, Squire, Williams and Young. To meet at half-past three on the day preceding the Council meeting.

Law and Parliamentary. — Messrs. Bottle, Butt, Greenish, Hills, Richardson, Robbins, Squire, Symes, Woolley and Young. To meet as occasion may require.

Evening Meetings.—The Professors, the Editor and the Curator. To meet when required.

Freehold Investments.—The President, the Vice-President, the Treasurer, and Mr. Butt. To meet as occasion may require.

Revision of Bye-laws Committee.—Messrs. Bottle, Butt, Hills, Robbins, Schacht, Symes, Woolley and Young.

Spurious and Worthless Drugs. — Messrs. Greenish, Richardson, Symes, Williams, Woolley and Young; with Mr. Fred Barron, Mr. Richard B. Barron, Professor Bentley, Mr. Thomas Farries, Mr. G. Bult Francis, Mr. J. B. Herring, Mr. A. B. Hill, Mr. W. Hodgkinson, Mr. Holmes, Mr. E. Horner, Dr. Paul, Mr. Umney, and Mr. F. Yates, with power to add to their number. To meet when required.

The President and Vice-President are *ex officio* members of all committees.

Some conversation took place with reference to the appointment of the Committee on Spurious and Worthless Drugs.

Mr. WILLIAMS remarked on the fact of a large quantity of spurious cubebs having been recently offered for sale.

Mr. GREENISH referred to another case which had been mentioned in which nux vomica seeds had been mixed with ginger.

Mr. WILLIAMS said he understood the Committee had held no meetings during the past year.

The PRESIDENT said the object with which the Committee was originally appointed was to have a body representing both the Society and the wholesale houses, who would take notice of these matters. If anyone brought any special case under his notice he would call the Committee together at once. Part of the object no doubt was to consider any proposed legislation on the subject. It would not be wise to meddle too much with commercial affairs in the city.

Mr. GREENISH suggested that it would be a very good thing if a record were kept of cases of adulteration which were discovered, and tabulated. Such information would be very valuable in case any legislation were contemplated.

The PRESIDENT said this suggestion was worthy of consideration, and he would bear it in mind.

FINANCE.

Messrs. Carteighe, Atkins, Gostling, Hills and Savage, acting as an interim Finance Committee, had examined the accounts, and recommended certain accounts for payment. Their report and recommendations were received and adopted. These included the expenses of the Conversazione.

LIBRARY, MUSEUM, LABORATORY, AND HOUSE.

Library.

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

Attendance.		Total.	Highest.	Lowest.	Average.
April	Day	458	29	9	20
	Evening	128	10	3	6

Circulation of books.	Town.	Country.	Total.
	No. of Entries.		
April	168	117	285

Carriage paid, £2 4*s*. 3*d*.

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

Report on the Progress and Condition of the Royal Gardens at Kew, during the year 1882. From the DIRECTOR.

Statements of W. T. G. Morton on his claim to the discovery of the anæsthetic properties of ether; Report vindicating the right of C. T. Jackson to the discovery, etc., 1853.

City of Boston, Annual report of the Inspector of Vinegar, 1884. From Dr. B. F. DAVENPORT.

Flückiger (F. A.), Grundriss der Pharmakognosie, 1884.

— Indische Pharmakognosie, 1884. From the AUTHOR.

Bentley (R.), Student's Guide to Systematic Botany, 1884. From the AUTHOR.

The Committee recommended the purchase of the undermentioned works:—

Keith Johnston's Atlas of Physical Geography,

Wanklyn and Chapman, Water-analysis, 6th ed., 1884.

Ramsay (W.), Experimental Proofs of Chemical Theory for Beginners, 1884.

Bentley (R.), Student's Guide to Systematic Botany, 1884.

Henfrey (A.), Elementary Course of Botany, 4th ed.

The Librarian having announced the need of more shelf room, it had been arranged that the President should consider how increased accommodation could be provided, and report to the Committee.

The Committee had ordered that the Library and Museum should be closed in the evening of Wednesday, May 21, and on Whit Monday, June 2.

The Committee recommended that sundry numbers of the *Pharmaceutical Journal* required by the Chemical Society to complete a set should be supplied.

Curator's Report.

The Curator had reported the attendance in the Museum during April to have been:—

	Total.	Highest.	Lowest.	Average.
Morning	500	38	15	20
Evening	134	11	3	7

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

A series of herbarium specimens of Natal plants. From Mr. J. MEDLEY WOOD, Curator of the Botanical Gardens, Durban, Natal.

Specimens of perfect crystals of Arragonite and Quartz. From Professor LEON SOUBEIRAN

A series of herbarium specimens of rare medicinal plants. From Mr. THOS. HANBURY.

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

The late Mr. Peter Squire.

The report also referred to some correspondence with Dr. Balmanno Squire relative to his desire to found a prize in connection with the Society to perpetuate the memory of his father, Mr. Peter Squire.

Certain books had been ordered to be sent to the Library in Scotland.

The report and recommendations were received and adopted.

BENEVOLENT FUND.

The report of several members of Council, who had acted as an interim committee, and examined the applications for relief sent in to the Benevolent Fund Committee, was read. The report included a recommendation of the following grants:—

£5 to a life member, since 1864, aged 47. Many years in business, but now out of employment, having eight children, seven of whom are dependent on him. Surrey.

£10 10*s*. towards securing the election of an orphan girl, to the British Orphan Asylum, to be expended at the discretion of the Secretary. Sussex.

£5 to the widow of an associate, aged 54, suffering from ill health, and with an invalid daughter. Applicant has had six previous grants. Middlesex.

£15 to the widow, aged 56, of a registered chemist and druggist, and member of the Society for fourteen years. Applicant has had three previous grants. Northampton.

Some cases had been deferred for further inquiries, and some the Committee had declined to entertain.

The following letter had been received by the Secretary from Mr. W. H. Baigent, of Shefford, Bedfordshire, who last month presented a hundred guineas to the Fund:—

"*May* 14, 1884.

"My dear Sir,—After seeing you on Monday it occurred to me that perhaps the Council might be disposed to entertain the subject of augmentation of the pensions, in the first place taking the higher grade and gradually increasing the pensions to £50 per annum, with this proviso, that the annuitants be founders, pharmaceutical chemists, or subscribers to the Benevolent Fund for more than six years, and also that their income from all sources shall not exceed £40 per annum.

"I have lately had under my notice several who in former years have held higher positions but are now reduced to seek help from our pension fund.

"I think if this plan could be entertained it would cause many more to subscribe to the Benevolent Fund, and establish a social feeling in the Society which might bear some good fruit.

"Yours truly,

"Elias Bremridge, Esq. "W. H. Baigent."

The Vice-President, in moving the adoption of this report, said Mr. Baigent's proposal had received the earnest attention of the Committee, but, on the suggestion of Mr. Bottle, it had been decided to ask the office to furnish information as to what number of persons would be affected by the proposal. The impression of the Committee was that the number would be very small, so that even if the suggestion were adopted it would not make much difference financially; but if the figures should show, on the contrary, that a large number would be eligible for receiving the increased grants, he should personally feel bound to oppose it. His feeling was that it was a much greater gain every way to give a smaller sum to a greater number of people than to advance the comfort of a restricted number. When he thought of the large number of applicants who were kept back for want of funds, and the value which even £30 year was in saving persons from absolute destitution, he thought the Council should go in for extension of the area of relief, rather than increase of the amount. One other point had been mentioned to which he should like to call attention. The desire of the Committee was that the influence of the local secretaries should be more largely made use of in aid of the Benevolent Fund, and one suggestion made was that all the action of the office with regard to particular cases should go through the local secretary; that instead of sending out forms of application to the applicant, they should be sent through the local secretary who would thus form the medium of communication with the office. It seemed to him that that would be imposing an unnecessary burden on the local secretaries, and he feared it would rather interfere with instead of facilitating applications. The Committee did not very favourably receive the suggestion, but were quite unanimous in recommending that whenever the information supplied was in any way defective the local secretary should be at once communicated with and asked to furnish additional information.

Mr. Robbins said the question raised by Mr. Baigent's letter was most important, but he did not know that his suggestion was the best which could be made. He rather thought that a plan which he himself suggested some time ago would be preferable, and which he still believed would prove of great advantage to the Fund, viz., that every annuitant who had formerly subscribed twenty guineas to the Fund should be entitled to £50 a year, and those who had subscribed ten guineas to £40 a year. After giving a great deal of consideration to this question he had come to the conclusion that such a plan would be of great service to those who had formerly moved in a good position in society, and had been unfortunate, but to whom £30 a year was a miserable pittance, and was just the same amount as was given to those who had never contributed anything to the Society, and had never moved in the same position of life. From another point of view he thought it would be advantageous, for if it were known that by subscribing a certain amount persons would receive a larger income if reverses came, there would be a much greater number of subscribers than at present, and thus a large addition would be made to the Fund, whilst at the same time very few of the subscribers to the amounts named might ever be expected to become applicants for relief. Very few, comparatively, who had subscribed to the Fund had ever applied for its benefits, and he believed only one who had subscribed ten guineas.

The President said these remarks would be more appropriate at the next meeting, when the Committee would have probably made a report after having considered the statistics which the office would furnish.

Mr. Symes observed that on Mr. Robbins' own showing those who subscribed were never likely to want assistance from the Fund, and, therefore, he could not see that the motive held out would have much operation. This proposition was something in the nature of a mutual insurance fund, but as a benevolent fund scheme he thought it was altogether impracticable.

Mr. Robbins said several cases had come under his notice in which he was very sorry that the Council had not the power of giving more.

Mr. Bottle said he did not propose to follow up the discussion on this letter, because it would be premature to do so at the present time; but he wished to correct a little misapprehension which the Vice-President had evidently fallen into as to the suggestion he had made to the Committee. His idea was that without waiting for the Committee to meet and consider the applications, the office should, immediately on receipt of an application, communicate with the local secretary and obtain all information possible with regard to the case, so that it might all come before the Committee at the same moment.

The President, in corroboration of what had been said by Mr. Symes, thought Mr. Robbins rather mistook the object of the Fund when he made the proposal to which he had now referred, and which he had brought forward from time to time. The Fund was a benevolent fund, and he could recognize no difference between the case of a man who had been in receipt of £5000 a year, and one who had only had £100 a year all his life, when he came to ask for assistance. It was contrary to the true spirit of benevolence and to the catholicity of charity to make any artificial distinction between one man and another. If Mr. Robbins were very enthusiastic about this scheme it was open to him to suggest the foundation of a Mutual Insurance Fund, such as was actually in contemplation among the medical profession at the present moment; but on the lines on which the Benevolent Fund was constituted the Council could not touch that question, or graft a mutual insurance scheme upon a benevolent fund. Moreover, it would spoil one of the greatest gifts the Society had ever conferred upon the trade, which was effected when, by the Act of 1868, the benefits of the Benevolent Fund were thrown open to all persons upon the Register, whether connected with the Society or not.

Mr. Robbins said he did not recommend a mutual insurance scheme.

The President said it came to very much the same thing. The Fund was essentially one for the relief of distress, and if it were desirable to give £50 a year to anyone of a certain age, it was desirable to give it to everyone who presented proper credentials.

The report and recommendations were then received and adopted, and an additional grant of £10 for the support of two of the Isherwood orphans was also made, the application for the usual quarterly payment having been received that morning.

The Inaugural Address in October.

It was resolved that the Library, Museum and Laboratory Committee be authorized to make arrangements for the delivery of this address.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The thirteenth general meeting was held at the Royal Institution, on Thursday, April 24. The President, Mr. E. Davies in the chair. The minutes of the previous meeting were read and confirmed, and the following donations to the library were announced:—The *Pharmaceutical Journal*, from the Society; the *Canadian Pharmaceutical Journal*, from the Editor; the *Science Monthly*, from the Editor.

In the absence of the Secretary, Mr. A. C. Abraham read the following paper, entitled—

Suggestions upon the Preparation of Lard.

BY F. A. BROWN.

In the short paper which I have written, I shall endeavour to show that lard can be prepared on a small scale, easily, cheaply and reliably.

No doubt from its being so largely used by pharmacists, its preparation has not received that amount of attention it requires. I believe (in fact, I am certain) there are a great many retail chemists who buy their lard from pork butchers or provision merchants by the bladder, or else what they term "home rendered."

A few years ago, I was persuaded by a tradesman to try some of his "home rendered," which I was assured was beautiful, as it had been specially rendered. To all appearances it seemed a good sample. With this I prepared some zinc ointment as an experiment; in less than a week I had to throw it away as the smell from it was abominable.

No doubt the bladder lard is the most reliable that can be bought from the class of tradespeople I have mentioned. My advice is, do not buy lard; prepare your own, but not according to the B.P. process.

The first thing to be done is to procure some good flare from a reliable source; choose the thickest you can get, and when you can, from a pig that has been fed with good food. Having obtained what you consider a good piece, hang it up freely exposed to light and air for a week or ten days, then proceed as follows:—Cut away as much of the membrane as possible, then beat it well in a mortar (which will cause the fat to melt at a lower temperature), melt over a water-bath, taking special care that the temperature does not exceed 130° F., strain through flannel; then you will have a beautiful white preparation of good consistency and free from smell.

The two chief points are having good flare and the temperature at which it is melted. If it has been well mashed, the fat can be melted at 110° F. By the experiments I made the amount of lard produced from the flare was 86 per cent.; the thicker the flare the greater the percentage. The directions in the B.P., "break up the masses of fat with the hands, exposing every part to the water," I think is a mistake, as it causes the lard to turn rancid. None of us would think of putting cod liver oil in wet bottles, therefore we should not let water come in contact with the broken-up fat.

Lard prepared by the process I have described will keep good in colour and free from smell for over twelve months, as will zinc ointment prepared with it. I have used it in making red and white precipitate ointments, using one ounce of white wax to each pound of lard in the summer months and rather less in the winter. I have found these to keep good in colour and free from rancidity for over three months. I think that is as long as they are required to keep good in most pharmacies.

A vote of thanks to Mr. Brown having been passed Mr. Davies delivered the following—

Valedictory Address.

It is my pleasant duty now to close the proceedings of the session with a few words of farewell. We have, I trust, usefully employed some of our winter evenings in imparting and receiving knowledge, and now the approach of summer calls us to the more appropriate study of nature herself, to learn our lessons from the ever open book which she spreads before us, and I hope to receive renewed physical vigour in the fresh air by the seashore. What lessons we may learn I hope we may be ready to impart, and that the summer may ripen a harvest on whose fruits we may feed next session.

It is usual to review the work of the session in the valedictory address, but I think you will scarcely thank me for a dry *résumé* of the papers read and the communications received. Rather would I in general terms express an opinion that we have had success quite equal to our expectation. Papers have come in to supply every evening, they have been varied in character, whilst they have all had a direct reference to the objects of the Association, and they have exhibited no inferiority to those of former sessions. Old members of the Association have shown that they have not forgotten us, though no longer in our ranks, whilst some who are still with us and on whose readiness to come forward we can always rely, have again paid the debt we owe them by increasing our indebtedness. Nor have we been without new recruits, who have broken through the trammels of fear and have made that first step which is to inaugurate a march along with the veterans of our army. Would that there were more like-minded, who would find that they may learn by teaching, and who will find no stern critics, but rather helpers and encouragers in their early endeavours.

Miscellaneous communications have been fairly numerous, and have given opportunities to those who shrink from a paper to impart the results of their investigations.

We have received donations of specimens, books, and journals, by which our Museum and Library have been enriched, and for these our grateful thanks have been tendered.

I am thankful to believe that death has not been busy in our ranks, but departure from Liverpool has removed some. Of these the most conspicuous was Mr. Mason, a personal friend of me and many, whose kindly help as Vice-President was extended to me in the discharge of the duties of the chair, who could always be trusted to for a paper, and whose fearless yet courteous discussion of the topics arising at our meetings tended to prevent us falling into the weakness of being a mutual admiration society. We must hope that our loss may be repaired by more energetic action on the part of those who remain, and by additions to our ranks from without. In this last respect I am sorry that this session has not added many to our ranks, but I trust that by the extended freedom and range of subjects now offered those who have fought shy of pure science will be attracted. I would even hope that the bane of Liverpool societies for the advancement of knowledge, that is, their excessive multiplication, may be attacked by us, and that those who study the same things in pharmaceutical matters may study them together. One of the oldest societies in Liverpool would then set an example to the rest, and so develop strength by concentration of effort.

In looking forward to the employments of the recess, I would strongly urge the study of botany. No science can beat it for dryness if studied from books alone, none for interest if studied from nature. Let every fact be verified by the student for himself; let the plant explain the terms, and it will be found that botany is not a vocabulary of Greek and Latin words, nor even the collection of more or less rare plants in a herbarium, but that it is the study of life in its most varied forms, that it is full of surprises in the adaptation of means to ends, and whilst neatness and skill are taught in the dissection needful, yet there is not that suspicion of cruelty which attaches to studies of animal life. If a student cannot get much into the country, yet in our market a constant supply of many wild flowers can be got, and over the water on Bidston Hill or Oxton Heath some rarities may yet be found in the compass of an evening walk.

I must now come to a conclusion. I have enjoyed my year of Presidentship from the kind assistance which has been extended to me, although it has entailed labour upon me I had at one time hoped to escape. If my efforts have been of any use, I have been amply rewarded, but it is on you that the success of the Association must depend. It is only by the willing co-operation of all that the Association can maintain its position, and I call upon all to lend their aid so that it may still rank among the societies of this city, which have for their object the raising of the minds of its citizens above the considerations of the mere mechanical routine of life, whilst that very routine is assisted and developed into intelligent and wisely directed work.

After the conclusion of this address the election of the President for the ensuing session was proceeded with, when Mr. E. Davies was unanimously re-elected President.

This concluded the business of the meeting.

Proceedings of Scientific Societies.

INTERNATIONAL HEALTH EXHIBITION.

On Wednesday last the first of a series of Conferences, which it is intended to hold in connection with the International Health Exhibition, took place in the arena of the Albert Hall, under the presidency of the Right Honourable the Lord Mayor. As many of the subjects announced to be discussed at these Conferences promise to be of interest to the readers of this Journal, we purpose as far as possible to give a weekly *résumé* of the proceedings.

The first paper read was by Mr. G. B. Longstaff, on "The Population of London and its Migrations." The author first referred shortly to the populations of some of the chief ancient cities as being large compared with most of the capitals of modern Europe. Similar reference was also made to other large cities of the present day, but, said the speaker, "such an agglomeration of human beings as is now living, toiling, suffering, pleasuring, entering the world and quitting it, in modern London is absolutely without precedent in ancient and modern civilization." London proper contains more people than Paris, Berlin, and Brussels together; and the greater London includes within the Metropolitan Police District has little short of five millions. A large and important city it had been since the Roman occupation, and Good Queen Bess thought it large enough, in 1580, when she forbade the erection of new buildings, as the extension of the Metropolis "was likely to increase the plague, to create trouble in governing such multitude, a dearth of victuals, the multiplying of beggars, the assemblage of more artizans than could live together, and, moreover, as likely to impoverish other cities for lack of inhabitants." But London was not yet grown up and was still growing at the rate of 50,000 a year, 1000 a week, or 150 a day! Statistics followed showing the increase of population and the birth and death rate in London as compared with other cities. With regard to immigration into London, it was somewhat surprising that Scotch, Irish, foreigners and colonists together only numbered some 6 per cent., but it must be borne in mind that their children were of course classed among the London born. Of the foreigners Germans were the most numerous, and next came French, Poles (mostly Jews and very poor), Dutch, and Italians. No great manufactures were carried on in London save in connection with furniture and books; and some interesting though voluminous figures were given of the persons following various occupations. The very poor class numbered 100,000, and there was a much larger number but very little removed above them. The speaker confessed himself a disciple of Queen Elizabeth, and wished something could be done, if not to diminish the number of inhabitants, at least to prevent their increase. Emigration was the only practicable remedy, but should not be promoted from London itself, merely, as for every family sent away from it two would rush in from the provinces, and even from Ireland, and country people made far better emigrants than townsmen. In fact, everything possible should be done to discourage immigration into large towns. With regard to the administration of London, the governments in the thirty-nine districts occupying twelve miles from north to south and seventeen from east to west, and supposed by common consent to be utterly incompetent, had, at all events, reduced the average death-rate to 22·5 per 100, which was much exceeded on the continent of Europe, as for instance, in Christiania, a mere village in comparison.

In the discussion that followed, Canon Gregory, referring to the "migrations of the people," said that when he was in Lambeth it was calculated everybody in the parish removed once a year; but they did not go far enough. Decent accommodation could be found for all if they could but be brought to the thousands of unoccupied houses in the suburbs, and the problem was, how was that to be brought about?

The second paper was read by Mr. Toynbee (for Miss Gertrude Toynbee), on the "Treatment of the London Poor." The writer argued that in addition to their material privations and sufferings the poor were almost entirely deprived of such friendship and social intercourse as other classes enjoyed, from the wretched character of their homes. In many houses with thirty or forty occupants scarcely a family had more that one room, the families consisting of father, mother, and sometimes as many as five children. Such places were not *homes*, and yet as much as 6*s*. a week was paid for them. The want of anything homelike in their dwellings was the key to much of the misery in the lives of the poor. Children especially suffered from it, and were thrust into vice, when with other surroundings they would become virtuous men and women. Many sanitary improvements were required in the dwellings of the poor, and at any rate efforts should be made to give the children some pure and bright experiences which would help to obliterate the evil in their minds. Purer recreation should be provided for old and young, men and women, in their leisure hours, week-days and Sundays, to enable them to forget the evils which could not yet be removed.

The Rev. A. Mearns followed with a paper on "Overcrowding." He said, though the urban average in England was six people to an acre, places existed where there were from six hundred to one thousand to one acre. Distressing details of overcrowding in poor neighbourhoods were given, and public improvements, high rents, and the necessity of men living near their work were mentioned as the chief causes. Its physical results were bad enough, being of course a fertile source of disease, but its moral effects were fearful to contemplate The registration and official inspection of all property let out in rooms would do much to remedy the evil, and under the Glasgow Police Act that system was at work with good results. Artizans' dwellings should be erected at rents which could be paid by the very poor, and on the authority of Miss Octavia Hill they would still yield a fair percentage upon the capital expended.

The second Conference on the "Dwellings of the Poor" was held under the auspices of the Mansion House Council, on Thursday, in the Royal Albert Hall. His Grace the Archbishop of Canterbury in the chair.

The first paper read was on "Suburban Dwellings and Cheap Railway Fares," by Mr. James Hole, who stated that the increase of the population of London was about 50,000 per annum, and that all the efforts of benevolence in the past twenty years would not provide the accommodation required by one year's increase. The exigencies of space in London proper only permitted of the block system for the growth of population, and he recommended the single dwelling outside London where the tenant could have a few yards of garden, breathe pure air and cultivate the home feeling such as he could never experience in buildings constructed like barracks. After referring to the labours of the Artizans' Dwellings Company, which had completed estates at Shaftesbury Park of about 1200 houses, and at Queen's Park, Harrow Road, of 2170 houses, and was now erecting 2600 houses at Noel Park, near Hornsey, the rentals of which ranged from 6*s.* to 11*s.* 6*d.* per week, Mr. Hole stated that one great benefit to the poor was that public houses were not permitted on these estates. To ensure the success of these schemes it was necessary that the railways should be induced to afford adequate facilities at reasonable rates, as the so-called workmen's trains did not meet the necessities of the case. He proposed the creation of a paid Government Dwellings Trust, with the necessary powers to carry out working class model towns, the funds of which should be derived by the issue of debentures; secondly, the contributions of the working classes in the repayment of the mortgages; and, thirdly, if the above was not found adequate, by a Government loan.

The second paper, by Miss Lidgett, was upon "The Treatment of the London Poor." After describing the horrible condition of the dwellings of the poor and the almost hopeless task of improving them, reference was made to the labours of Mr. Ruskin and Miss Octavia Hill to improve the dwellings of the poor, to the efforts made to teach the people how to keep them clean and how honestly to pay for them. This was not a matter of mere bricks and mortar, of plaster and whitewash, that could be ordered or inspected by public authority, but was a work that for the most part must be done by ladies.

The third paper was by Mr. H. D. Harrod, on "The Creation of a Building Fund," his opinion being that purely voluntary effort was insufficient to meet the exigencies of the case. There was a commercial and a philanthropic side to the problem which it was desirable to keep apart. A commercial company was hampered by the desire to make a dividend, and a large public trust was therefore in many ways preferable. Taking Mr. Shaw Lefevre's figures as a basis, land purchased by arbitration, without the compensation given under the Lands Clauses Act, would cost 8*s.* per foot, or £17,424 per acre. Dealing with forty-two acres, of which one half would be covered, the other half being left for roads and open spaces, the cost would be about two and a half millions. The rents should be 2*s.* 6*d.* a room or 4*s.* for two rooms; and on this basis the income would be £148,512, out of which, allowing two-fifths for expenses, repairs, etc., there would be a net income of £89,108, which would pay interest at 4 per cent. on nearly the whole capital, leaving but a small outlay to be made from the Trust fund. If half the amount required could be borrowed from the State at 3 or $3\frac{1}{2}$ per cent., there would be no difficulty. Such a scheme would provide for 47,140 persons. The Trust might also assist private enterprise in the same direction with loans of capital at moderate interest. In conclusion, the philanthropic side of the problem might be provided for by adopting Miss Octavia Hill's system of employing ladies as rent collectors, who would make friends of the tenants and help to raise their moral tone in every way.

The Chairman was glad that at last public attention had been called to a matter to which earnest labourers had been trying to call attention for forty years, for now they might expect some good to arise from the agitation. Ages ago the idea of a Greek or Roman city was that it should be compactly built, with very little knowledge indeed of sanitation, but with the proviso that all round about the walls there should be a great area of common land. Still it was almost too much to hope to have great rings of land around the villages and towns of England. It had been well suggested that great things might be done by enabling the working classes to own their own houses; but they knew, as practical people, that such a time would not come to pass, though to a certain extent it might be the case. Everyone would agree that it was not good for human beings to be in the hands of middlemen. Another question which seemed to be in a fair way of settlement springing out of the creation of rural villages was that of intemperance. He did not wish to be chimerical and to see the whole of the land covered by model dwellings, for he thought the artizans did not like living in model blocks; they preferred to live in houses or cottages which could be rendered tenantable. It must not be forgotten that the poor were human beings, and as birds and beasts liked to make their own nests and lairs, and as the most polished specimens of the human race spent perhaps a disproportionate time in beautifying their dwellings, as far as possible every working man should be allowed to have some kind of voice in buying his own house. All honour was due to those who, in the first instance, had attempted to deal with the subject. While many people starved the masses will hear those who associated with them generally took the kindest view abont them, and he fully agreed with what Miss Lidgett said about talking to the poor about religion. All men should remember that the poor were of the same flesh and blood as themselves, and if the rich would associate more with them and learn to love them England would be a much happier land than it had ever been.

Reviews.

A Treatise on Chemistry. By H. E. Roscoe, F.R.S. and C. Schorlemmer, F.R.S. Vol. III.; Organic Chemistry, Part II.*

We are glad to receive a further instalment of this valuable and comprehensive work on 'Chemistry.' In these days of little books and books to match the necessities of particular sets of students, or the demands of specified examinations, though many of them have their value, one welcomes the appearance of volumes which deal with their subject, be it chemistry or any other, with the sole object of producing what shall be at once a history of past successes, and by their clearness and completeness in detail lead on the student to that mastery which alone is the parent of discovery and so help him to future triumphs. For the genuine student who wants to know chemistry and not to "*get it up*" this is one of the best treatises ever written on the subject.

The part of Professors Roscoe and Schorlemmer's book which is now before us begins with an account of the divalent alcohol radicles, and their compounds and de-

* London: Macmillan and Co. 1884. Demy 8vo. Pp. i.-xii., 1-655. 21s.

rivatives, and includes the uric acid derivatives. the trivalent alcohol radicles. the univalent alcohol radicles of the C_nH_{2n-1} series; also the oleic acids, the $C_nH_{2n-1}(CO_2H)_3$ acids and those allied to them, the acetylene or ethine series of alcohol radicles, the drying oils, the alcohols of the quadrivalent and sexvalent radicles, the carbohydrates, the furfuryl group, and the meconic and tetrinic acid groups. In short, it brings us to the aromatic compounds, which we may look for in the next portion of the work.

As in the previous volumes these writings on chemistry are distinguished and their interest is heightened by their valuable historical details and the copious references to original sources of information, whilst we again find much attention given to important industries connected with the subject, such as sugar making and refining, and paper making, though from the nature of the case the space devoted to such matters is somewhat less than in some of the earlier volumes. We cannot, however, speak quite so well of the treatment they receive in this section as we could wish. For example, we are sorry to observe some elaborate illustrations quite unexplained, *e.g.*, figs. 126, 127 are referred to in the slightest manner. They would, no doubt, be clear enough as they stand to those technically acquainted with the subject already, who, however, do not need them; but to students, for whom we may presume they are intended, they will be of little value. Similarly the chapter on saccharimetry, though technically sufficient, perhaps, is, in an essentially scientific book like the present one, disappointing. On the other hand, the purely chemical portions, which comprise the vast majority of the book, are most valuable and will thoroughly maintain its high reputation. The general account of the ethene group, with which the volume opens, is extremely clear and will be found most valuable. There are misprints here and there, but they do not seem to be numerous.

In concluding our remarks, we cannot help expressing our wish that chemists would come to some agreement in the use of terms. In the book before us we find, for example, such expressions as "divalent or diatomic alcohol radicle." At present, no doubt, this is done in the interest of students who may be familiar with expressions on one or the other system only. In the long run, however, the difficulties of utilizing the study of chemistry as a method of training are greatly added to by the needless trouble given by having two or more names for one thing in so many cases. An eminent physiologist lately warned science teachers of the danger they are always in of ceasing to teach science and of teaching its dry bones, its terminology, instead. The difficulties of teachers of chemistry are already very great in this direction on account of the imperfections of its terminology, and we feel that it is to the writers of the leading text books that they must look for help in this matter, for in this they must follow the books.

THE STUDENT'S GUIDE TO SYSTEMATIC BOTANY. By ROBERT BENTLEY, F.L.S., M.R.C.S. Eng.*

This little work is intended to form a supplement to the 'Student's Guide to Structural, Morphological and Physiological Botany,' lately published by the same author. Systematic botany is often taught at a different time of year from structural botany, and the appearance of a small and very portable volume on the former subject, which can easily be carried in the breast-pocket, will be a boon to the class of students who have hitherto had to carry the 'Manual,' which, however valuable as a work of reference, is by no means convenient for out-door study. The author believes that the work now under consideration "will form a most convenient and handy little volume for use abroad and at home by medical, pharmaceutical and other students who are desirous of obtaining a good practical knowledge of some of the more important natural orders and their medicinal plants, and also as a foundation for further study." As a matter of fact, the author has condensed into this book the systematic portion of his Manual by omitting the portions relating to the uses and properties of the plants of the different natural orders, as well as the detailed accounts of economic plants, the description of the natural orders being thus compressed within one hundred and thirty-six pages. The remaining pages are devoted to descriptive botany, which includes two chapters, the first giving directions for examining and describing plants, and an explanation of the abbreviations and symbols used in doing so, and the second containing nineteen descriptions of medicinal plants at full length in illustration of the directions given in the first chapter.

This portion of the work will be found exceedingly useful to the student. The plants used as illustrations are most of them easily obtainable and belong to different natural orders, so that the student will find them to answer a double purpose, since they not only serve as models for describing plants, but as a key to explain many points that might prove puzzling to a beginner.

The systematic portion of the work possesses the advantage that it cannot possibly be used for "cramming" purposes. The only way to use it is to examine, book in hand, the different genera of each family, as far as obtainable, in a botanical garden, and even then probably the student will require the assistance of his professor to explain the value of such descriptions as "leaves alternate or opposite; corolla of 3 to 15 usually 5, distinct petals, regular or irregular, sometimes absent."

The long experience of the author in teaching botany has doubtless shown him that a thoroughly inclusive description is the best form in which the natural orders can be presented to students; but as a foundation for further study, one feels that it would be less puzzling to begin with something simpler, and that the relationship of the natural orders would be more easily remembered if they were accompanied with some hints such as are met with in works like Lindley's 'Natural System of Botany.'

Those, however, who are accustomed to the well-known Manual,—and they certainly form a considerable proportion of botanical students,—will gladly welcome the portable little volume now under review, and those who will take the trouble to thoroughly follow out the directions given under descriptive botany are not likely to fail in describing a plant at their examination, even if the specimen be one unknown to them.

DIE PARFUMERIE FABRICATION. Von Dr. chem. G. W. ASKINSON. With Twenty Illustrations. Second Edition.*

This little volume on the manufacture of perfumery is one of a valuable series of works on chemical industries by the same publisher, all of which are remarkable for the large amount of really valuable information condensed into a small space. The present volume is no exception to the rule. On turning to the list of contents, one is surprised to find that in three hundred and sixty-four pages, no less than thirty-one chapters are comprised, each of which contains thoroughly practical and useful information. The illustrations given are of apparatus, not of plants, and such information as can be readily obtained in works of materia medica, such as the preparation of the oils of lemon, bergamot and otto of rose, will be sought for in vain here; but instructions as to the quality, tests of purity, uses, etc., are found instead. The author, being himself a manufacturer of perfumery, has treated the subject from a business point of view. In the preface he states that the receipts which he has given are those which he has himself found to be valuable and that he prefers to give a few that are reliable rather than a number which he cannot honestly recommend.

The formulæ given seem to bear out his claim, the

* London: J. and A. Churchill. 1884. Fcap. 8vo. Pp. i.-xii., 1-178. 3*s.* 6*d.*

* Vienna: A. Hartleben. Crown 8vo. Pp. i.-iv., 1-383. 4 Mk. 50 Pf.

majority having sufficient of the staying element in them to produce powerful and lasting perfumes.

Besides receipts for perfumes for the handkerchief, the book contains others for smelling salts, toilet vinegars, pot pourri, pastilles, incense, cosmetics, perfumed pastes, powders and jellies, pomades, bandoline, tooth powders, finger nail powders, hair dyes, rouge, etc.; in fact, it embraces the whole range of the perfumer's art. The only drawback to the book is that it is printed in German type and that the whole of the information about any one perfume or oil cannot be found under one head. Those of our readers who understand German will find the book worth purchasing, if only for the recipes it contains, and those who do not will not have great difficulty in making out, with the aid of a dictionary, the names and proportions of the ingredients. If here and there a statement occurs such as that the root of opopanax has a pleasant odour, the trite saying *de gustibus non disputandum* may be called to mind. In this instance, moreover, the author honestly states that the opopanax perfume has a very different source.

BOOKS RECEIVED.

WATER AND WATER SUPPLIES, AND UNFERMENTED BEVERAGES. By JOHN ATTFIELD, Ph.D., F.R.S. (International Health Exhibition Hand-book). London: Clowes and Sons. From the Author.

HOW TO ARREST INFECTIOUS DISEASES. By EDGAR G. BARNES, M.D. London: J. and A. Churchill. From the Publishers.

Correspondence.

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

THE ELECTION OF COUNCIL.

Sir,—It is at once a curious but interesting feature in the history of the contested elections for the Council of the Pharmaceutical Society, that between the years 1870–1881, there was always a vacancy to be filled up when the time for election of the new Council arrived. During the last four years, however, all the old members of Council have stood the contest and been returned, as a body; but it is nevertheless true that the majority is steadily decreasing, since in 1881 it was 448, in 1882, 336, in 1883, 281, and now it has fallen to 254.

One cannot but congratulate the successful candidates upon their re-election to the Board duties; but as one of the 1287 who took sufficient interest in the affairs of the Society to return their voting papers, I trust the remarks in your leading article of last week will direct the attention of the Council to the urgent necessity of adopting some means of eliciting the sympathy and interest of the remaining 2385 to whom voting papers were issued.

Such a vast proportion of apparently disinterested members (the largest, I believe, since 1876) should at least raise the question, Are there sufficient local secretaries? Are they encouraged to interest country members in matters relating to the Society's welfare? or are they only a collecting medium for picking up the annual guinea from defaulting members?

Would it not be wise, would it not be a gracious act for the Council to encourage the furnishing of reports by the local secretaries, whereby the governing body might become better acquainted with the state of trade generally and the requirements arising from different conditions in the smaller towns, where, indeed, the health of pharmacy is just as much to be advised as in the large centres of industry and wealth? Such means would, I believe, be fraught with most beneficial results, since it could not fail to impress upon our minds that the work of our Council for legislative and pharmaceutical reform would then be better guided for the benefit of the whole body of chemists.

11, *Strand, Torquay*. CHAS. SHAPLEY.

NOTICES TO OFFENDERS.

Sir,—The President, in his address at the Annual Meeting, referred to what to him appeared the mistaken view of some members, in thinking that no letter of warning should be sent to offenders against the Pharmacy Act previous to proceedings being taken. As an ordinary member I hardly like to differ from so high an authority, but it is evident I am not alone in my views. It is a most courteous and honourable way of carrying out the Act, and doubtless offenders fully appreciate it, but I very much question its policy. It is, I believe, generally known that trading in poisons by others than chemists is illegal, else why should there be such an expression of surprise that poisons are so readily obtainable at almost every inquest on what may be termed "illegal cases of poisoning?" Besides which ignorance of the law is never admitted in other cases as an excuse for non-compliance with it.

It seems to me that we are treating others in a way that we should not expect to be treated ourselves. If a chemist sells methylated spirit without a licence, I do not think the Revenue Authorities give him notice before proceeding against him, and I doubt very much if the Treasury would entertain any application for a remission of the penalty, and to take a more extreme case, if a chemist poisons a customer it is not very probable that he would receive a letter warning him not to do it again or else proceedings would be taken against him. If traders know that they will be warned they feel perfectly safe until they receive that warning, naturally omitting to use any labels whatever, in order not to attract notice and so postpone the receipt of the warning as long as possible.

To my mind it appears that we are neglecting our duty in not stringently carrying out the provisions of the present Act, and in the present state of the public mind I do not see that we are justified in asking for further powers when we do not use those we possess to their fullest extent. If there is any hardship in enforcing the law, the responsibility rests with those who made it, not with those who have to carry it into effect. For the public good we are entrusted with this duty, and we have no right to condone any offence on the promise of better behaviour in the future. We are taking a responsibility with which we have not been entrusted and neglecting to use fully the powers which have been given us. Surely with a surplus income of £1500 we can afford to do our duty in this respect, and show that we can safely be trusted to sternly enforce the poison regulations of the future.

GANDULPH.

Photographer.—(1) *Lysimachia nemorum*. (2) *Ajuga reptans*. (3) *Linaria cymbalaria*.

A. P. S.—It is open to doubt which preparation is intended; but in the event of not being able to refer to the prescriber, Lin. Bellad. Co. (Squire) would be the safer to dispense.

Tik.—Liq. Cinchonæ, B.P.

T. C. H.—The coloration has been frequently observed, but has not, so far as we are aware, yet been explained. Neither has it been noticed to be particularly associated with alkalinity. The subject appears to be worthy of further investigation.

C. J. B.—The mixture becomes opaque and there is a flocculent separation; but if the quinine, previously to its addition to the infusion, be dissolved in a little nitric acid there will be a little opacity, but no separation.

J. D. Pridgeon.—Tomes' 'Dental Surgery' (Churchill) and Coleman's 'Dental Mechanics.'

G. Horne.—(1) *Polygala vulgaris*. (2) *Valeriana dioica*.

G. S.—*Hypericum Androsæmum*.

S. H.—(1) *Prunus Lauro-Cerasus*. (2) *Fagus sylvatica* (purple variety). (3) *Aucuba Japonica*. (4) *Betula alba*. (5) *Alliaria officinalis*. (6) *Euonymus japonicus*. We cannot undertake to name garden plants. The specimens sent should include stem, leaves, and, when different in character, the root leaves also.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Horne, Morton, Bolton, Saul and Co., Wood, Lyle, Alpha, Neophyte.

NOTES ON RECENT DONATIONS TO THE MUSEUM OF THE PHARMACEUTICAL SOCIETY.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

II.—ESSENCE OF LIMES FROM TRINIDAD.

In March last there was offered for sale in the London market some oil of limes which differed very considerably in flavour from previous consignments. A sample of this oil, presented to the Museum by Messrs. Wright, Layman and Umney, was so exceedingly fragrant and bore so strong a resemblance in colour and odour and taste to the finest or "perfumer's" essence of lemon that it was difficult to believe that it could have been obtained from limes. Under these circumstances, I asked Mr. J. O. Braithwaite to compare it with other commercial samples of the oils of lemons and limes, and he reported as follows:—

At 60° F.	Essential oil of limes, Trinidad.	Essential oil of limes, commercial	Essential oil of lemon, *a*.	Essential oil of lemon. *β*.
Sp. gr. .	0·8741	0·8655	0·8566	0·8622
Boiling points .	177·7° C.	178° C.	175·5° C.	177° C.
		Colour test.		
Nitric acid .	Dark red-brown.	Brown.	Red brown.	Yellowish brown.
Nessler .	Canary-yellow.	Egg yellow.	Canary yellow.	Pale canary-yellow.
Phosphoric acid	Deep umber.	Lightred umber.	Umber.	Red brown.

"The solubility of the Trinidad oil is very different from that of commercial essence of lemon. It is soluble in the proportion of 1 part in 5 of alcohol of sp. gr. 0·838; so is commercial oil of limes.

"Commercial oil of lemon is barely soluble in the same menstruum in the proportion of 1 in 15.

"The taste of the Trinidad oil, while quite different from that of commercial oil of limes, has a slightly peculiar, but not unpleasant after-taste."

Being puzzled to know why an essential oil differing so much in flavour from ordinary oil of limes should be exported under that name, I made inquiries of Mr. H. Prestoe, the Director of the Botanical Gardens at Trinidad, who has sent the following interesting information:—

"Your remark that the odour of the oil is rather that of lemons than of limes is quite correct. It is to be observed that the odour of West Indian limes, as produced here, is rather that of lemons, as produced in Europe, than of limes produced there. The young shoots and all tender parts of the lime here have the odour of *Aloysia citriodora*,* the stronger lime odour being developed in the older parts. In the treatment of the fruit for obtaining the essence, the more rapid the process, the more pronounced is the lemon odour in the result if perfectly fresh fruits are used. The strong flavour of limes, more or less tinged with that of turpentine, seems to be a result of treating stale or decomposed fruit tissue. The plan adopted, on economic grounds, in Dominica and Montserrat, of crushing the limes as received from day to day and then, on the attainment of a large quantity of pulp, proceeding to boil down or distil, seems completely preventive of a fine flavour in the resulting essence when obtained. I might mention also that in some of our samples the essence has been obtained from lemons mixed with the limes, the two being grown on the same field and worked off by hand together. I may add that our limes are the finest in the West Indies, and are produced on trees quite unmatched for size and exuberance in any part known to me in the Western tropics."

The mystery is thus solved. If this product can be placed on the market at a price to compete with the Sicilian article and of quality such as the sample now in the Museum of this Society, there is every probability that it will soon come into demand for purposes of perfumery and culinary flavouring, etc., for which it is peculiarly fitted by its pure fragrance and great solubility in alcohol.

* I had inquired in my letter whether the oil was obtained from lemons or from the lemon-scented verbena (*Aloysia citriodora*).—E. M. H.

THE CHEMICAL PHARMACY OF THE NEW PHARMACOPÉE FRANÇAISE.

(*Continued from page* 987.)

Petroleum marks an entirely new departure in the chemical section of the Codex, and it is introduced under the general name of Pétrole d'Amérique. The different petroleums are a mixture of a great number of homologous hydrocarbons, varying in consistence, density, boiling point, and inflammability. Their products, which are themselves mixtures, are used in certain chemical and galenical preparations.

Essence de Pétrole blanche (light petroleum oil), is a colourless or slightly yellow liquid, non-fluorescent, of a peculiar penetrating odour resembling that of benzine. Density from 0·700 to 0·710. Distilling between 70° C. and 110° C. (158° F. and 230° F.)

This oil is insoluble in water, but completely miscible in absolute alcohol. Vapour ignites spontaneously at an ordinary temperature, with white, powerfully illuminating, sooty flame.

Huile de Pétrole Lampante (Huile minérale, H. pétro-solaire, Pétrole raffiné, Pétrole).—Colourless, often of an amber tint, blue by reflected light, of a less penetrating odour, and not unpleasant. Density not under 0·800, nor above 0·820. Distils at 150° C. (302° F.). This oil is insoluble in water and not miscible in absolute alcohol. Vapour not inflammable below 35° C. (95° F.). Extinguishes a lighted taper. Not coloured by an equal volume of pure concentrated sulphuric acid.

It is adulterated by other light and heavy petroleum oils.

Paraffine.—White crystalline substance, semi-transparent; slightly unctuous; extracted on cooling from heavy petroleum oils. Entirely devoid of smell and taste. Melts between 44° C. and 65° C. Distils between 280° C. and 400° C. Insoluble in water; sparingly soluble in boiling alcohol; freely soluble in ether, chloroform, bisulphuret of carbon, and the fixed and volatile oils. Density 0·875. A completely neutral body, resisting the action of acids and alkalies; heated with bromine a considerable quantity of hydrobromic acid is disengaged.

Pétroléine (Cosmoline, Graisse minérale; Pétroéline; Piméléine).—Petrolatum, better known under the accepted commercial term of vaseline. A mixture of heavy oils and paraffins more or less pure. Semi-solid, yellowish, unctuous. More or less fluorescent, specially when melted; without taste or smell; but with slight odour of petroleum when heated. Density between 0·835 and 0·860. Melts at 40° C. (104° F.). Distils at about 200° C. (392° F.). Insoluble in water and glycerine; sparingly soluble in boiling alcohol; readily so in ether, chloroform, bisulphuret of carbon, and in the fixed and volatile oils. A neutral body on which alkalies and acids have no action, cold; nor is it coloured by pure concentrated sulphuric acid. Entirely dissipated by heat. Vaseline is adulterated by fixed oils, fatty and resinous bodies.

Phénol (Acide Phénique).—Carbolic acid, itself official, is used in the preparation of a solution called

Phénol Sodé Dissous,

or solution of phenate of soda.

Carbolic acid	70.
Liquor sodæ (caustic)	100.
Aq. destillat.	q.s.

Dilute the caustic soda with about half its quantity of water, and the acid, and bring up the volume to 1 litre.

The solution is a novelty; the acid, not.

Phosphorus (white ordinary) and red phosphorus are both official. In preparing the phosphoric acid of pharmacy, the red substance is now employed, while the quantity of nitric acid has been increased. Phosphorus is directed to be kept under water, with the "essential precaution" that it should run no risk of being frozen.

White phosphorus, which is marked as *very poisonous*, is called normal; and red phosphorus, stated to be innocuous, constitutes Phosphore Amorphe. Phosphure de Zinc has been added, though the value of the preparation is not apparent; and a series of well-known alkaline phosphates presents no special interest.

The *Pyrophosphates* have survived the flight of time and certainly deserve a place in elegant pharmacy. They had a temporary reputation amongst ourselves, but have disappeared from medical practice. The Pyrophosphate de Fer Citro-Ammonical; and the Pyrophosphate de Soude (Sodæ Pyrophosphas) are unaltered; while the Pyrophosphate de Fer et de Soude (Pyrophosphas ferrico-sodicus) is new. The scale pyrophosphates make very attractive syrups.

Tannin (Acid Tannique, Acide Gallotannique) may claim to have had its pharmacy re-written. While Tannin Officinal is in the main unaltered, the process formerly given for its manufacture on a large scale has been omitted and two new preparations have been introduced.

Tannate de Quinine.

Quinine hydrate
Acid, acetic (1·060)
Acid, tannic. puv.

Quinia, mixed with water raised to the boiling point, is dissolved in sufficient acetic acid so as to make a feebly acid solution. On cooling, add by degrees to the liquor a filtered cold solution of tannin until the precipitate formed at the first is redissolved and neutralize exactly by sodium bicarbonate. The whole of the tannate of quinine is precipitated; it is collected on a filter, dried and finely powdered; then washed with distilled water, and dried a second time. The tannate is an amorphous, colourless salt, containing 20 to 21 per cent. of quinine.

Tannate de Pelletiérine.

Punica granatum (dried root bark)	1000 grams.
Quick lime	60 grams.
Chloroform (rectified commercial)	375 grams.
Sodium bicarbonate (powder)	q.s.
Dilute sulphuric acid	q.s.
Liquor sodæ (caustic) 1·332	10 grams.
Tannin, pure	q s.

Slake the lime and make it into a thick milk; roughly bruise the bark; damp the powder with the milk of lime and place in a convenient vessel. Percolate with distilled water so as to have 2 litres of liquid. Shake this up with 250 grams of chloroform; let the mixture stand, and separate, by means of a funnel with tap, the chloroform which has dissolved the alkaloids set free by the lime. Shake the chloroform solution with 60 grams of distilled water, adding gradually a 10 per cent. solution of sulphuric acid until a slight acid reaction is produced. The alkaloids are thus converted into sulphates. Add powdered sodium bicarbonate in slight excess; two alkaloids destitute of tænifuge properties are thus set free, and on being agitated will pass again into the chloroform. Separate the latter and replace it by 125 grams of fresh chloroform, then add to the mixture 10 grams of caustic soda lye and well shake. This will isolate from their salts two tænifuge alkaloids, Pelletiérine and Isopelletiérine, which will disolve in the chloroform. Separate the latter and shake with 60 grams of distilled water, and $\frac{1}{10}$ sulphuric acid added gradually until a *very feeble* acid reaction is produced.

The two tænifuge alkaloids will remain as sulphates in the water. Put the solution in a porcelain capsule under a bell glass and expose for some days over concentrated sulphuric acid. The sulphates of pelletiérine and isopelletiérine will form a crystallized residue in the capsule.

The mixture of these two salts is called, for short, sulphate of pelletiérine.

To convert the sulphate into tannate, weigh and dissolve in distilled water, and add a solution of tannin containing 3 grams, 28 c.g. of tannin for each gram of sulphate; neutralize exactly by ammonia. Throw on a filter and wash the precipitate until the washings no longer cause turbidity in a solution of barium nitrate. Dry with gentle heat. When wanted for use, powder the prescribed quantity of tannate; suspend in fifty times its weight of water, and dissolve by a gradual addition of solution of tartaric acid with continual shaking.

The Tartrates do not call for notice. Those of Ammonio-Tartrate and Potassio-Tartrate of Iron have been deemed sufficient to replace the old Teinture de Mars tartarisée, the composition of which was variable and uncertain.

The Valerianates of Ammonia, Atropine, Quinine and Zinc present no novelty.

The adoption of a alphabetical arrangement in the new Codex, with its manifest advantages, has upset the old classification under distinct headings in separate chapters, rendering some amount of reference necessary to gain the full information respecting any particular substance. We have, therefore, no longer Les Alcalis Végétaux included in Chapter XVI. of 1866, or the Sels à Bases Végétales of Chapter XVIII. The general index, consequently, rises into importance, and must be diligently consulted. In this section the Chlorhydrates have been extended, and even Chlorhydrate d'Ammoniaque, the Sal Ammoniac which is common to pharmacy, has been taken out of a mere official list and appears as a newly described chemical preparation.

Apomorphine, by reason of date, is a novelty. It is distinguished from morphine by its solubility in ether and chloroform. It gives a rose colour when treated with very dilute solution of perchloride of iron; readily oxidizable in the air; the product of this oxidation being soluble in water and alcohol. Apomorphine contains no water of crystallization, and should be completely soluble in chloroform without coloration. No process is given either for apomorphine or its chlorhydrate.

Morphine, on the other hand, has full details of manufacturing process added, with short processes for the Chlorhydrate de Morphine and the Sulfate de Morphine Neutre.

Aconitine in a crystalline form but retaining no water of crystallization is prepared by an altered formula. The preference given to the amorphous substance which was formerly stated to be much more active than crystalline aconitine appears to have been abandoned.

Azotate d'Aconitine (Nitrate of Aconitine) is made thus:—Powder crystallized aconitine; mix with about five times its weight of water, and exactly saturate with nitric acid previously diluted with five times its weight of water. Evaporate over the water-bath, and crystallize on cooling.

Two other nitrates are new introductions.

Azotate de Strychnine (Strychniæ nitras), the process for which is given as well as for Strychnine itself, and the extraction of the latter from Nux Vomica. It may be added that the method for the separation of Brucine is also detailed, and if we are to interpret literally the passage which declares that where a process of preparation has been appended, such products can or ought to be obtained by pharmaciens, we must allow that the requirements of French pharmaceutical chemistry are higher than our own.

Produits obtenus mean here clearly products obtained by home manufacture, distinguished from commercial products obtained from ordinary trade sources.

Azotate de Pilocarpine.—An entirely new nitrate, the process for its extraction from the leaves or bark of Jaborandi being given. The salt is purified by repeated crystallization in boiling alcohol. From this nitrate pilocarpine is prepared by the addition of ammonia up to alkaline reaction, and chloroform, which last dissolves the liberated alkaloid. The filtered chloroform solution is evaporated to a colourless syrup, which, to use the curious phrase of the Codex, "n'est autre chose que la pilocarpine." Chlorhydrate de Pilocarpine is the above dissolved in hydrochloric acid diluted with three times its volume of water; evaporate and crystallize.

It would be unfair to criticize French official chemistry by English notions; evidently special importance is attached both to Amorphous Digitalin, and to the Crystalline variety. Full details of process are given with respect to both; Digitalin in crystals has more than three pages devoted to its mode of preparation.

Digitaline Amorphe should always be used in a prescription where no particular kind is indicated. It is a white powder with a tinge of yellow, and possessed of an aromatic odour *sui generis.* Its essential character is stated to be the emerald green colour communicated on addition of hydrochloric acid. It is finally produced by spontaneous evaporation from chloroform, in accordance with the view entertained in 1866, that digitaline so purified was twice as active as that which had not undergone this treatment.

Digitaline Cristallisée is made from digitalis leaves "des Vosges," collected the second year at the flowering period. Chloroform is its best solvent; heated in contact with hydrochloric or phosphoric acid, it dissolves and the liquid assumes a fine emerald green coloration.

Atropine and its salts do not call for notice; and the same remark applies to Codéine, Santonine and Vératrine.

Caféine, Hyoscyamine, Narcéine and Vanilline are official and new introductions. Certain substances and preparations admit of no classification, and a reasonable surprise may be occasionally felt at their insertion. Acide Picrique (Carbazotic acid) is official; and so is Bitume de Judée (Asphalt.)

Cantharidine, with new process of extraction, is retained.

Picrotoxine has been promoted to a place of honour, as also Iodoforme. Dextrine, which we are used to class amongst commercial articles, is recognized in French chemical pharmacy.

The object of these sketches has been to give in convenient space some information concerning the preparations contained in the "Chemical Pharmacy of the New Pharmacopée Française," which are either novel or distinctive; where no real points of difference existed between French and English formulæ, reference has been omitted.

To assist the memory of the reader a few popular names are subjoined, which are sanctioned by common use.

ACIDE AZOTIQUE = Nitric acid.
ACIDE PHÉNIQUE = Carbolic acid.
ALCALI VOLATIL = Liquor ammoniæ.
ALCALI VOLATIL CONCRET = Ammoniæ sesquicarbonas.
BITUME DE JUDÉE = Asphalt.
BLANC { D'ESPAGNE / DE MEUDON / DE PARIS } = Carbonate of lime.
CALOMEL À LA VAPEUR = Mercurous chloride.
CAMÉLÉON VIOLET = Potassium permanganate.
CAMION = Vessel in unglazed earthenware, such as those in which benzoic acid or calcined magnesia is prepared.
CAMPHRE DU JAPON = Camphora officinarum.
CÉRUSE = Lead carbonate.
COLLE DE FLANDRE = Gelatine, or purified, Grénétine.
COSMOLINE = Vaseline.
COUPEROSE { BLANCHE = Zinci sulphas. / BLEUE = Cupri sulphas. / VERTE = Ferrous sulphate.
CRAIE DE BRIANÇON = Talc.
CRISTAL MINÉRAL = Fused nitre.
EXTRAIT DE SATURNE = Liq. plumbi diacetatis.
GOUDRON DE HOUILLE = Coal tar.
KARABÉ = Succin (ambre jaune).
LESSIVE DES SAVONNIERS = Caustic soda lye.
LIQUEUR DES CAILLOUX = Solution of potassium silicate.
LIQUEUR DE LABARRAQUE = Solution of hypochloride of soda.
MAGISTÈRE DE BISMUTH = Bismuthi subnitras.

MAGISTÈRE DE SOUFRE = Precipitated sulphur.
MERCURE DOUX = Calomel.
NOIR D'OS = Animal charcoal.
OFFICINAL. In Codex (Chemical section) = Prepared for pharmaceutical use.
PHOSPHORE AMORPHE = Red phosphorus.
POINTES DE PARIS = Ferri limatura.
SAFRAN DE MARS APERITIF. = Ferri subcarbonas.
SEL DE BERTHOLLET = Potassium chlorate.
SEL DE DUOBUS = Potassium sulphate. (K_2SO_4.)
SEL D'EPSOM DE LORRAINE = Common sulphate of soda. Purified = Glauber salt.
SEL GEMME = Commercial sodium chloride. Sea salt.
SEL DE NITRE = Potassium nitrate.
SEL D'OSEILLE = Binoxalate of potash.
SEL DE PHOSPHORE = Phosphate of soda and ammonia. (Phosphas ammonico-sodicus.)
SEL DE SATURNE = Diacetate of lead.
SEL DE SEDLITZ = Magnesium sulphate.
SEL DE SEIGNETTE = Sodæ potassio-tartras.
SEL DE SOUDE = Soda exsiccata (commercial).
SEL DE SOUDE CRISTALLISÉ = Carbonate of soda, crystals. ($Na_2CO_3 + 10H_2O$.)
SEL DE TARTRE = Carbonate of potash (pure). (K_2CO_3.)
SEL DE VICHY = Bicarbonate of soda.
SUCRE DE SATURNE = Diacetate of lead.

THE BITTER SUBSTANCE OF HOPS.*

BY DR. H. BUNGENER.

Little that is definite is known of the substance or substances to which the hop owes its bitterness. Lermer has succeeded, it is true, in separating from hops a crystallized colourless substance, insoluble in water, an alkaline solution of which has a marked bitter flavour, and which easily changes on exposure to the air, assuming a resinous form. According to Lermer, the formula of this substance is $C_{32}H_{50}O_7$; it possesses the properties of a weak acid and forms a characteristic copper salt, which is soluble in ether. This hop bitter is, however, produced from the hop by a very roundabout process, by treatment of the extract with alkalies; it is not therefore regarded by many as present in this form in the hop. and they hold that it is only produced by the action of the alkalies. On the other hand, however, Etti, by a complicated extracting process, but without using an alkali, succeeded in producing a bitter substance from hops, which is, however, soluble in water.

Several experiments convinced me that there really existed in hops a crystallizable substance, insoluble in water, the alcoholic and alkaline solution of which had a bitter flavour, in short, which possessed all the properties of Lermer's hop-bitter acid. Petroleum ether is the best practical solvent in use for its isolation, as it does not dissolve the majority of the remaining constituents of the hop, especially the hop-resin, which they contain in considerable quantity. Still, the extraction of hop-bitter acid from hops is a troublesome and thankless job, the petroleum ether taking up certain substances which add greatly to the difficulty of purifying the crystals. On the other hand, we can readily and quickly attain our object, if we employ for our original material fresh lupuline from unsulphured hops.

The following process has furnished me the best results:—

The lupuline is first freed from gross impurities (hop-seed, leaves, etc.), and then covered with petroleum ether boiling at a low temperature (40° to 70°) in stoppered flasks. The mixture is shaken up from time to time. After twenty-four hours, by means of a Zullowsky filter immersed in the mass, and with the aid of a suction-pump, the dark brown solution is drawn off; then fresh ether is poured on to the lupuline and it is allowed to stand for another twenty-four hours. After this process has been three times repeated, nearly everything the petroleum will dissolve has probably been extracted. The solutions are put together and the petroleum ether distilled off *in vacuo* at a low temperature, until there remains in the flask a dark brown syrup, which on cooling solidifies into a crystalline mass. This is pulverized and turned on to a filter composed of a large funnel, in which a smaller funnel covered with muslin is inserted. With the aid of a suction-pump, the greater portion of the thick, crude solution can be filtered through. There remains on the filter a highly coloured crystalline "cake," which should be pulverized with a small quantity of petroleum ether and again filtered. After this operation has been repeated three or four times, we obtain an almost colourless mass, consisting of hop-bitter acid, contaminated by small quantities of a fatty substance and a substance which I could not isolate, and which I had at first great trouble in separating from the hop-bitter acid.

If we do not wish to utilize this crude substance at once, it will be necessary to melt it in the water-bath and pour it into a bottle under close seal, where it will at once crystallize and solidify. If it remains exposed to the atmosphere it will soon become sticky and turn partly into resin. Six kilos of lupuline, which included a large proportion of sand, furnished 400 grams of crude hop-bitter acid. The first experiments in crystallization with petroleum ether gave poor results; it is difficult to produce the acid pure in large quantities by this process, as a small quantity of the above substance obstinately clings to it, and it readily assumes a non-crystallizable form. Our object is more readily attained if we crystallize it once from alcohol, for which purpose we dissolve it in a little lukewarm alcohol, then quickly cool the solution; flakes of a fatty substance will be separated, which are removed by filtration with the aid of a suction-pump. Then we throw a few small crystals of the acid into the solution, and after a short time crystallization commences. As soon as it appears to be ended, the mother solution is removed with the aid of a platinum cone, and the crystals washed with a little cold alcohol. The alcoholic mother solution, which still contains the chief part of the bitter acid, must be quickly evaporated, and the residue consigned to a flask. The acid crystallized from the alcohol is then re-crystallized several times from petroleum-ether. In order to quickly dissolve the bitter substance, it should be carefully melted in a flask and double its volume of ether gradually added; on its cooling, we obtain beautiful prismatic crystals, which attain a length of 1 cm., and become perfectly pure after four or five crystallizations. The mother solutions must be speedily evaporated if we still wish to obtain crystals; after a time they will only furnish a resinous residue.

The hop-bitter acid melts at 92° to 93°. It is easily soluble in alcohol, ether, benzol, chloroform, sulphide of carbon, and vinegar; to a lesser extent in cold petroleum-ether, and not at all in water.

In the analysis I obtained figures which correspond best with those calculated from the formula $C_{25}H_{35}O_4$.

	Calculated.	Obtained.					
		2. Crystal.		3. Crystal.	5. Crystal.		6. Crystal.
	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
C	75·19	74·79	74·83	74·9	75·04	75·05	75·07
H	8·77	8·97	8·90	8·85	8·87	8·83	8·80
O	16·04						

If we shake up the ether solution of bitter substance with an aqueous solution of acetate of copper, the ether will assume a green colour and gradually deposits a green crystalline powder, a cupreous combination of the bitter acid. It is difficult to obtain in a pure state, as the solutions are readily subject to slight decomposition, accompanied by a small deposit of copper oxide. This combination is readily soluble in alcohol, to a lesser extent in ether, and is insoluble in water.

* *The Brewers' Guardian, from the Zeit. f. d. gesammte Brauwesen.*

In the course of analysis, I obtained the following figures:—

C	69·4 per cent.	69·3 per cent.
H	7·95 „	7·98 „
Cu	7·20 „	7·18 „

If we suppose that the copper combines with two molecules of hop-bitter acid, by the decomposition of one of its atoms, H, we obtain the formula $C_{50}H_{68}O_8$ Cu. This combination will contain 69·87 per cent. C, 7·91 per cent. H, and 7·33 per cent. Cu. The figures obtained do not perfectly coincide with those calculated; it is nevertheless probable that the formula is correct, and the combined substance analysed was not perfectly true.

I have already referred to the fact that solutions of hop-bitter acid, if left standing too long, assume a yellow colour, and on evaporation leave only a yellow resinous residue. This, as its reaction shows, evinces a complete analogy with the crystallized acid. The dark-coloured mother solution, from which the crystalline cakes of bitter acid are obtained, contains a large proportion of this resinous compound, which can be isolated by treatment with a weak soda-lye; this substance, like the crystallized acid, is soluble in alkalies, and can be precipitated from an alkaline solution by an acid. Old hops furnish far less crystallizable acid than new hops; from some samples I have been able to obtain only a few crystals; the remainder had been transformed into the resinous modification.

If pure hop-bitter acid be pulverized and exposed to the atmosphere it soon turns yellow and the surface assumes a resinous consistency. At the same time, a more pronounced odour of fatty acids and aldehydes is apparent. Still more rapidly will this oxidation occur if a thin layer of an alcoholic solution of the acid is allowed to evaporate in the air. On the other hand, we can allow hop-oil to stand for days without its odour being perceptibly changed; it appears to me more than probable that the peculiar smell of old hops is due far more to the oxidization of the bitter substance than to the oxidation of oil.

Hop-bitter acid appears to possess the character of an aldehyde and of a weak acid; for the present I am not in a position to state its constitution more clearly. Most of the oxidizing processes have an energetic effect on it, forming also considerable quantities of valerianic acid.

The question as to whether the hop owes chiefly to this acid and its resinous modifications the property of imparting a pronounced bitter flavour to a solution, I must for the present leave unanswered. The acid and its isomer are both insoluble in water; they are, on the other hand, very readily dissolved in hop oil; they also furnish a tolerably bitter solution, if boiled for a long time in water, probably on account of their gradual decomposition. I will not for the present go further into the subject, as I hope soon to be in a position to give more definite information.

THE ECONOMIC APPLICATIONS OF SEAWEED.*

BY EDWARD C. C. STANFORD, F.C.S.

In 1862, twenty-two years ago, I had the honour of reading a paper before the Society of Arts, on this subject, in this room. The council marked their appreciation of that paper by awarding me a silver medal, and I cannot forget that the honours of that year were shared by another chemist, my friend, Dr. Crace Calvert, once so well known here, but who has since passed away. When, therefore, I was again invited a little while ago to read a second paper, I felt that some apology was due for not returning to report progress before. I am bound to admit that, like some wanderers through space, the period has been long and the orbit eccentric. For the former I must plead the difficulty of the subject; for the latter I must remind you that any one who follows seaweed must go to the wildest and most inaccessible shores.

It is extremely interesting to me, and I trust it may be made somewhat entertaining to you to look back on that paper, with the light of over twenty years' experience, and see how far the views then put forward were right, and how far they were wrong, premising that even failures are excellent lessons. "Many things have happened since then," and new and better sources have been discovered of many of the products then brought forward for the first time. As, however, it may be advisable to follow the lines of that paper, I shall first briefly allude to the uses of seaweed for food and for manure, and then speak more at length on the important application of these in the manufacture of kelp, and the production of iodine.

Seaweed as Food.—In this country little advance has been made in the use of the algæ as food. The algæ generally contain important nitrogenous constituents, and form nutritious articles of diet, but they have not been popular. We all like a "sniff of the briny," but we do not cultivate a taste for the internal consumption of our marine vegetables. We are equally guilty, however, in rejecting the majority of the fungi, so largely consumed as an important article of food on the Continent. The algæ are closely allied to these, but have the advantage of containing, as far as is known, no poisonous species. The algæ also contain a large proportion of salts which, however, are easily removed, if desirable.

Ulva latissima, or green laver, and *Porphyra laciniata*, or pink laver, are occasionally used in soups. *Rhodomenia palmata*, or dulse, is still sold in the streets of Edinburgh and Glasgow. *Alaria esculenta*, or murlins, is also eaten in Ireland. Some others are occasionally used, but, as a general food, the algæ are almost unknown. The sweetest species is the *Laminaria saccharina*, which is usually covered, when dry, with an efflorescence of mannite; a large quantity of this plant yielded me 7·47 per cent. of mannite. It appears to be a product of fermentation, and does not exist in the fresh plant. This plant is found only on sandy or gravelly shores.

The best known British species of the edible algæ is the *Chondrus crispus*, or Irish moss. This grows far down on the rocks, and is only uncovered at low spring tides. It is obtained mostly from the west coast of Ireland, and after being bleached by exposure to sun and rain, is largely exported to this country and to Germany. It is a gelatinous species, containing a principle known as carragheenin; it yielded me 63·7 per cent. of this substance.

The only other gelatinous British species is the *Gelideum corneum*. This is not very common, but it furnishes the import known as Japanese isinglass, of which it contains 50 per cent. This substance, known also as gelose, was first imported into France from China, in 1856; it has great gelatinizing power, much higher than any other material. It is not nitrogenous, and contains carbon 42·8, hydrogen 5·8, oxygen 51·4.

The following table shows the value of these species in making jelly. The melting point of the jelly is also appended.

1000 parts of water require of—

	Parts.	Proportion.	Melting point.
Gelose	4	1	90° Fahr.
Gelideum corneum	8	2	90° „
Irish moss (*Chondrus crispus*)	30	75	80° „
Isinglass	32	8	70° „
Gelatine	32	8	60° „
Carragheenin	36	9	70° „
Agar-agar (*Euchemia spinosa*)	60	15	90° „

It will be seen that gelose has eight times the gela-

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* Read before the Applied Chemistry and Physics Section of the Society of Arts. Reprinted from the Journal.

tinizing power of isinglass and gelatine; but the melting point of the jelly is too high to allow it to melt quickly in the mouth, hence gelatine is still the favourite.

The carragheenin has evidently become altered by evaporation. Gelose jelly keeps well, the others soon get mouldy. Although not fit for jelly, gelose may be valuable in the arts as a substitute for gelatine, which it so much exceeds in gelatinizing power. I would specially suggest its use as a substitute for gelatine in the production of instantaneous photographs.

The *Euchemia spinosa*, or agar-agar, is an Australian alga, and another important gelatinous species. The algæ form a large article of food consumption in China and Japan. Some years ago I procured some of these samples, one was a dark green frond, and the other two were cut up from it, about the size of vermicelli. I append the analyses of these and of a sample of our own laminaria from Loch Eport in North Uist.

Edible Seaweeds.—Japan.

	I.	II.	III.	IV.
Water	19·20	19·20	21·50	41·00
Volatile matter	59·50	48·20	49·70	32·29
Ash	21·30	32·60	28·80	26·71
Analysis of Ash.				
Soluble salts	74·18	74·85	61·81	72·50
Insoluble	9·84	5·21	33·68	18·69
Carbon	6·58	6·44	1·04	3·60
Silica	9·40	13·50	3·47	5·21
	100·00	100·00	100·00	100·00
Analysis of Salts.				
Potash	31·90	16·20	40·95	28·26
Carbonate soda	14·61	14·41	5·35	5·00
Sulphuric acid	9·58	8·99	12·33	13·34
Chlorine	39·28	27·52	44·74	51·74
Iodine	0·3171	—	—	0·2946

No. I.—"This is a good average sample, worth to-day, in this market, 11 taels, which, at 6*s.* 6*d.*, the average value of the tael, is 71*s.* 6*d.* per picul of 133 lbs.; therefore, one ton (16·75 piculs) would cost, in Shanghai, £57 4*s.* It can be cut finer, and then the price, if it is of the deep green which this is when it leaves me, would be about 14 taels per picul, or £72 10*s.* per ton."—*Extract from letters.*

The sample is green, and evenly cut about as fine as vermicelli.

No. II.—"This is the worst sample I can find, worth 2 taels, which is £11 8*s.* per ton. The uncut leaf would be more valuable than this if of the colour of No. I. It would fetch £16 per ton."—*Extract from same letters.*

This sample looks like the former deteriorated.

No. III.—This was apparently the uncut weed. It much resembles in colour and appearance No. IV.

No. IV.—Laminaria, cut in Loch Eport, North Uist; colour, dark green. Quotations by Mr. Frazer, Yokohama, September 18, 1868:—Fine cut, £17 9*s.* 8*d.*; fine brown, £15 10*s.* 9*d.*; large green, £9 14*s.* 2*d.*—per ton. Specimens of No. IV. were sent out to Yokohama, but they did not take the market. It is remarkable that so high a price as 72*s.* 6*d.* per cwt. (or nearly 8*d.* per lb.) should be realized there for this seaweed for dietetic purposes.

The taste for marine vegetables must be acquired, but those who have eaten them often are said to become very fond of them; and I have known some gentlemen in the Highlands, no mean judges of diet, who consider a dish of dulse, boiled in milk, the best of all vegetables. There is no doubt that a valuable food is lost in entirely neglecting the algæ; but I shall show, presently, how much of this may be recovered in an available form.

Seaweed as Manure.

This appears to me to be one of the worst applications of seaweed, and I do not think it has increased; farmers are beginning to find out that it seldom contains less than 80 per cent. of water, often more; and that for the actual manurial value in it, it may be very expensive if a long cartage is required. Four tons of water, at least, must be carted for every ton of dry manure, and when dried there is much additional expense, and it is very bulky. The dry weed contains an average of 2 per cent. of nitrogen, so that, as it is used, it contains less than ½ per cent. The chemical value is very little, except from the potash contained; but the mechanical value may be greater, as in covering root crops as a protection from frost, or where the soil is simply sand, and it binds it together. However, the cartage of water and the manufacture of soil are expensive amusements, and seaweed is not much used where there is high farming. It appears also, where continually used alone, to impoverish the soil; it is like feeding a dog on butter. The residue of seaweed ash, or kelp waste, one ton of which is equal to forty tons of wet seaweed, and contains all the phosphates, is quite unsaleable for manure in this country. It may be remarked, too, that in the wet climates of the west of Ireland, and of Scotland, where it is mostly used, the application of water is quite a superfluous operation for the farmer.

Another application of seaweed, which I mentioned before, was the manufacture of paper. As far as I know, this has only been carried out in France, on one plant, the *Zostera marina*, or grass wrack, a material largely used in this country for stuffing mattresses, and for packing light furniture. Some curious specimens of this plant, rolled up in little balls of fibre, were shown here at that meeting, as thrown up by the sea at Majorca and Minorca; and soon after it created a good deal of attention, having been proposed as a substitute for cotton; it contains little fibre, however. It grows in enormous fields, on sand-banks, and is widely distributed, and is to be found in almost every ocean; it is a pure marine plant, with flowers, having nothing in common with the algæ except the habitat. It is often found on the shore perfectly bleached. All the algæ are cellular, and contain no fibre, but properly treated they make a tough transparent paper, to which I shall have to allude presently.

The Manufacture of Kelp.

This crude substance which, for many years, made the Highland estates so very valuable, was at first made as the principal source of carbonate of soda. At the beginning of this century it realized £20 to £22 per ton, and the Hebrides alone produced 20,000 tons per annum. The importation of barilla then began, and for the twenty-two years ending 1822, the average price was £10 10*s.* The duty was then taken off barilla, and the price of kelp fell to £8 10*s.*; and in 1823, on the removal of the salt duty, it fell to £3; and in 1831, to £2. It was used up to 1845 in the soap and glass factories of Glasgow, for the soda. Large chemical works were then existing in the island of Barra, built by General McNeill, for the manufacture of soap from kelp, and a very large sum of money was lost there. Two tall octagonal chimneys were still standing not long ago, but have now succumbed to the gales. In the meantime, soda was being largely made by the Le Blanc process, and superseded kelp, which was always a most expensive source, yielding only about 4 per cent., often less than 1 per cent.; it must have cost the soap-makers what would be equal to £100 per ton for soda ash, the present price of which is £6.

The manufacture of iodine and potash salts then began to assume some importance, but the kelp required was not the same; that which contained the most soda containing the least iodine and potash. Chloride of potassium, the principal salt, was at one time worth £25 per ton. The discovery of the Stassfurt mineral speedily reduced this price to about a third, and the further discovery of bromine in this mineral also reduced the price of that element from 38*s*. per lb. to 1*s*. 3*d*., its present price. The amount of bromine in kelp is small, about a tenth of the iodine, and not now worth extracting. Large quantities are now produced in Germany and America. More recently, the manufacture of iodine from the caliche in Peru has attained large proportions, and has so far reduced the price of that article, as to make its manufacture from kelp unremunerative. In a paper, compiled for the British Association, published in 1877, I estimated the then total production of iodine in Great Britain and France at 2000 kegs of 1 cwt. each; and the future production of Peru at 6000 kegs; an estimate which is now being rapidly realized.

In 1882, the amount of iodine exported from Peru was 205,800 kilos, or 4116 kegs, divided as follows:—

To London	120,900 kilos
„ Hamburg	62,100 „
„ New York	22,800 „
	205,800 „

The present annual output is estimated at 300,000 kilos, or 6000 kegs.

On the other hand, the present manufacture of Great Britain and France is less than 1000 kegs, the production of France being now reduced to almost nothing, and the kelp sold as manure.

I append an abstract of a table in that paper, showing the imports of kelp into Glasgow, to which city or its districts the manufacture of British iodine has always been confined.

The prices given are the average prices for the year; higher than the maximum, but not lower than the minimum, have been reached. It is remarkable that we are now coming back to exactly the price of 1841, forty-three years ago, and also exactly to the price of twenty-two years ago, when my first paper was written. Potash salts, however, were then three times the present price.

Imports of Kelp into Clyde.

Five years, 1841 to 1845.

Tons of kelp, 1887 in 1844 to 6086 in 1845; average 3133. Price of iodine per lb., 4*s*. 8*d*. in 1842 to 31*s*. 1*d*. in 1845; average 11*s*. 9*d*.

Ten years, 1846 to 1855.

Tons of kelp, 3627 in 1846 to 11,421 in 1850; average 3627. Price of iodine per lb., 8*s*. 8*d*. in 1851 to 21*s*. 3*d*. in 1846; average 12*s*. 11*d*.

Ten years, 1856 to 1865.

Tons of kelp, 6349 in 1856 to 14,028 in 1863; average 9730. Price of iodine per lb., 5*s*. in 1863 to 13*s*. 8*d*. in 1856; average 8*s*. 10*d*.

Ten years, 1866 to 1875.

Tons of kelp, 8116 in 1868 to 10,923 in 1874; average 9187. Price of iodine per lb., 10*s*. in 1866 to 34*s*, in 1872; average 15*s*. 11*d*.

Seven years, 1876 to 1883.

Tons of kelp, about 6000 to 8000; average about 7000. Price of iodine, 5*s*. in 1883 to 15*s*. 6*d*. in 1879; average about 10*s*. 2*d*.

Total average kelp import, 1841 to 1883 (42 years) 6750 tons. Average price of iodine per lb., 12*s*.

So that the present price is only about 40 per cent. of the average value. The great fluctuation in the price, and the small bulk of the article in proportion to its value, and the limited production, have led to great speculation, and I have no doubt a few kegs might still be found here and there in London which were bought some years ago at a pretty high price, and are still waiting the improbability of a turn in the market.

The amount of iodine in sea water is so minute, that it is extremely difficult to detect by ordinary tests. By evaporating down two portions of sea water filtered and unfiltered, each over 14 gallons, and by employing a delicate colour test, I have succeeded in estimating it. The sea water was collected carefully in the Atlantic, west of the island of Tyree. I found in 1,000,000 grs. measure (14·2857 gallons) of unfiltered sea water, ·003572 or 1 in 280,000,000; in 1,000,000 grs. measure of filtered sea water ·003442 or 1 in 291,000,000. The unfiltered water might be expected to contain more iodine from minute algæ in suspension, although it appeared clear. Kortstoffer, who estimated it in the Mediterranean, puts it at 1 part in 50,000,000. Bromine is easily detected; sea water generally contains about 6 parts in 100,000, and of chlorine about 2 per cent. Professor Dittmar, who has been working out the sea water samples of the *Challenger* expedition, has discovered a remarkable relation between this element and that of the chlorine which he has kindly communicated to me. He finds the relation in the great number of samples examined (77) to be constant in the proportion of ·340 bromine to 100 chlorine. He finds the average amount of chlorine to be 1·9 per cent., or 19,000 parts in 1,000,000, and of bromine ·00646 per cent., or 64·6 parts in 1,000,000, or 18,422 times as much as my mean result for the iodine. The Woodal Spa has been long known to be very rich in iodine and bromine; a recent analysis by Wright giving of chlorine 11113·73 parts per million, bromine 49·7 parts per million, iodine 5·21 parts per million. Here the relation of bromine to chlorine is ·44 to 100, and the iodine about a tenth of the bromine; in sea water the proportion of iodine is a very minute fraction of this. Examination of the brine and the mother liquor from the salt mines of Cheshire failed to detect iodine. The algæ possess the power of assimilating the iodine to about ten times the extent of the bromine. I append estimates of iodine in a number of algæ, those of the Laminaria and Fuci are the average of a great number of specimens collected at different times of the year, and all round Great Britain and Ireland, the Channel Islands, and the Isle of Man, and including Orkney and Shetland, Iceland, Denmark, and Norway. I append also estimates of the iodine in several of the giant algæ in the Falkland Islands, for which I am indebted to Governor Kerr, and Mr. F. G. Cobb, of the Falkland Islands Company.

These gigantic species are seen in this country for the first time in the fresh state, and little is known about them. The macrocystis is said to grow to a length of 1500 feet, or over a quarter of a mile in length. It grows in 10 fathoms water in Stanley Harbour.

The *d'Urvillea* forms stems branched like trees, 12 feet or 14 feet long, and a foot in diameter. All these weeds are thrown up in enormous quantities on the shores of the Falkland Islands, and along the Straits of Magellan, making it difficult for a boat to approach them.

Dry Weeds.

	Per cent.	Lbs. per ton.
Laminaria digitata, tangle stem . .	0·4535	10·158
„ „ Bardarrig frond .	0·2946	6·599
„ stenophylla stem . . .	0·4028	9·021
„ „ fond . . .	0·4777	10·702
„ saccharina, sugar wrack .	9·2794	6·258
„ bulbosa	0·1966	4·403
Fucus serratus, black wrack . . .	0·0856	1·807
„ nodosus, knobbed wrack . .	0·0572	1·281
„ vesiculosus, bladder wrack .	0·0297	·665
Halidrys siliquosa, sea oak	0·2131	4·773
Hymanthalia lorea, sea laces . . .	0·0892	1·998
Rhodomenia palmata, dulse	0·7120	1·594
Japanese edible seaweed	0·3171	7·102
Zostera marina, nat. order Zosteraceæ	0·0457	1·023
Rhodomela pinnastriodes	0·0378	·463
Chordaria flagelliformis	0·2810	6·294
Chorda filum, sea twine	0·1200	2·688
Chondrus crispus, Irish moss . . .	Trace	—
Enteromorpha compressa, sea grass .	Nil	—
Gelideum corneum, Japan	Trace	—
„ „ Cornwall . . .	„	—
Euchemia inosa (agar-agar) . .	Nil	—

Falkland Islands Giant Algæ.

		Per cent.	Lbs. per ton.
D'Urvillea utilis,	No. 1	0·0075	·179
,, ,,	No. 2	Trace	—
Lessonia	No. 1	0·0284	·636
,,	No. 2	0·0181	·405
Macrocystis pyrifera		0·0308	·690

In the foregoing table the Laminariæ and the Fuci are the kelp-producing species.

It is remarkable that the three gelatinous species, *Chondrus*, *Gelideum* and *Euchemia*, contain little or no iodine.

It is noticeable, too, that the *Enteromorpha*, or sea grass, a plant which retains, when dry, a very strong odour of the sea, contains no iodine.

It is also remarkable that the giant algæ contain so little iodine, growing outside the influence of the Gulf Stream, which, rightly or wrongly, has been supposed to be the iodine carrier. It is a curious fact that there are certain seeds, supposed by the natives to grow on the tangle, and called "tangle nuts." A specimen here from Tyree is evidently the seed of a leguminous American tree, brought over by the Gulf Stream.

It is probable that all animal substances from the sea contain iodine; its presence has been long known in cod-liver oil, a substance supposed to be rich in it, and to owe most of its valuable medicinal property to it, but I found, after investigating a good many various specimens of this oil, that the amount is infinitesimal. The liver itself contains double as much. Oysters, especially the Portuguese variety, have also been said to contain a good deal. The following are my results:—

		Per cent.
Cod liver oil, average of six specimens		·000322
Cod liver, fresh		·000817
Salt cod fish	48·5 per cent. water	·000255
Salt ling fish	50·25 ,, ,,	·000150
Fresh cod fish	80·7 ,, ,,	·000160
Scotch herring, salt		·000650
Scotch herring, brine		·000120
Oysters, Portuguese		·000040
Whale oil		·000100
Seal oil		·000050

(*To be continued.*)

VESICATING AND PURGATIVE PRINCIPLES OF CROTON OIL.*

BY R. H. SMILEY.

This is the subject of a paper by Mr. Harold Senier (*Pharmaceutical Journal and Transactions*, December, in which he gives results of his investigations.

To verify his results, I have made numerous experiments, both as to the separation and the action of the parts when separated.

Mr. Senier states that croton oil is soluble in alcohol, by taking equal volumes of each, or less proportion of alcohol; but when more alcohol was added a separation occurred, one part of which was entirely non-soluble, and was found to contain the purgative principle of the oil, whilst the part which was soluble contained the vesicating part. With a sample of croton oil I first made experiments as to its solubility, and found that by taking 10 minims of oil and 5 minims of alcohol a perfect solution occurred after slightly heating; but taking 10 minims of alcohol and 5 minims of oil a separation into two parts remained unchanged by the same amount and even more heat than made a solution of the other proportion. I next put a quantity into a test tube, and added more than equal volumes of alcohol, and after shaking and allowing to stand for a while the soluble part, which, being the lighter, at once rises to the top, was decanted into another vessel. This washing with alcohol was continued until all the soluble part was removed, which was shown by the alcohol, after shaking, rising to the top colourless.

The liquid part removed from the non-soluble was applied to the skin in several places, and in due time a pustular eruption showed, as might be expected, by the external application of croton oil. I then tried some of the insoluble part in the same way, and no sign of any eruption whatever appeared. I made pills of the non-soluble part, and let each one represent ¼ of a minim, and began by taking the half of one pill, which produced no effect other than slight nausea. The dose was increased gradually, and resulted about the same as experiments made by Dr. John W. Meek, of London, who used some of the non-soluble part of the oil prepared by Senier. I found that ½ minim of the isolated part acted as a pretty strong purgative, and the first action generally occurred in from twenty minutes to one hour from time of taking. The action of the vesicant and purgative parts was further verified by experiments on others, and the general result was about the same as given above. There was no griping in any case, and the most unpleasant symptom of the action was slight nausea, which was no more than one would expect from any purgative dose of medicine.

Croton oil will, in the future, be more useful as a remedy than it has been in the past, especially as to internal administration, which has heretofore been accompanied with very unpleasant effects on account of the vesicant principle, but this evil being now removed the good results of the purgative principle are ready for investigation.

* From the *Weekly Medical Review*. Reprinted from the *St. Louis Druggist*, April 26, 1884.

BARBADOES ALOES IN ST. HELENA.

In a recent report on the Island of St. Helena, Mr. Morris, of the Royal Botanic Gardens, Jamaica, says:—

"Another member of the aloe family, which is very abundant in the island, and capable of being largely utilized, is the Barbadoes aloe (*Aloe vulgaris*). It grows freely in Jamestown Valley in volcanic ash, and on barren rocks. It is fast spreading also in Rupert's Valley; and I noticed it was there used, and seemed to flourish, as a coping for a stone wall.

"This plant, so hardy and prolific, produces the aloes of medicine, and it is cultivated, especially at Barbadoes in the West Indies, solely for this purpose. It reproduces itself by means of suckers around the stem; these being removed when about six inches high are planted out on waste pieces of land, about two feet apart. When fully grown, and just before flowering, the outer and older leaves are first removed; they contain an abundance of a thick yellowish juice, which is allowed to drain into troughs leading into a large iron pot or caldron. When the pot is nearly filled it is placed over a fire, and the juice boiled until it has attained the consistency of thick glue; this when cool is the aloes of commerce, and it is usually exported to England in bottles or gourds.

"Barbadoes aloes, prepared in the manner above indicated, is valued in the London market at £4 to £8 per cwt. It is usually retailed by druggists at 4*s*. 6*d*. per pound. This industry, which necessarily must be very small, might commend itself to the notice of many people, especially fishermen and others, living in the lower valleys. The plant is abundant; its cultivation, if merely putting a few suckers in the ground can be so called, is of the simplest description; and the preparation of the juice requires only a few troughs, made by nailing a couple of pieces of board at right angles to each other, and an iron pot. If some local tradesmen were to give attention to the subject, and undertake to purchase the manufactured aloes from the cultivators in small quantities, the industry would soon be placed upon a satisfactory footing."

The Pharmaceutical Journal.

SATURDAY, JUNE 14, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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THE ROYAL COMMISSION ON TECHNICAL INSTRUCTION.

THE preliminary volumes of the Second Report of the Royal Commissioners who were appointed, about two years since, to inquire into the instruction of the industrial classes of certain foreign countries in technical subjects, and the influence of such instruction upon manufacturing and other industries, have just been issued. They contain a large amount of valuable information respecting technical education on the Continent and in the United States, as well as observations made during visits to various industrial establishments, together with the conclusions to which the Commissioners have come after careful consideration of what they have seen abroad and comparison with the conditions that prevail in Great Britain. The Report is one that is worth careful pondering in this country, for whilst there is enough in it to confirm our national egotism, there are also plenty of facts which should act as monitions that if Great Britain intends to continue at the head of industrial nations she must bestir herself and equip her sons in the best possible manner for the struggle. Indeed the Commissioners confess that although the display of continental manufactures at the Paris Exhibition had led them to expect great progress, they were not prepared to find so remarkable a development of natural resources and such perfection in industrial establishments as were actually met with in France, Germany, Belgium and Switzerland. Indeed, in some branches of industry, more especially in those requiring an intimate acquaintance with organic chemistry, Germany has already taken the lead. Two years ago, Professor ROSCOE publicly expressed his regret that the rough products of coal tar were exported from this country to Germany and re-imported in the form of products of greatly enhanced value. In Belgium, the introduction by SOLVAY of the ammonia process for the manufacture of soda has struck a heavy blow at our previous pre-eminence in the alkali manufacture. Moreover, in the economical production of coke, and the recovery of the tar and ammonia formed in this process, we are only now slowly following in the footsteps of our continental neighbours. On the other hand, the Commissioners point out that most of the principal new industrial departures of modern times have been due to the inventive power and practical skill of our countrymen. For instance, it is to the invention of BESSEMER, either alone or in conjunction with the modifications introduced by THOMAS and GILCHRIST, that the present enormous production of steel at one-tenth of its former cost is due; the processes of WELDON, HARGREAVES and DEACON have revolutionized the alkali trade; and the manufacture of aniline dyes owes much to the initiative of PERKIN.

Of course it would be impracticable in these columns even to glance at a tithe of the numerous topics referred to in the Report; we must content ourselves with indicating briefly the explanation that appears to be favoured by the Commissioners of the wonderful advance that has been made by our neighbours, especially in those industries that may be supposed to present special points of interest to the readers of this Journal. Contrary to what might be expected, the Commissioners do not find this explanation in the resources of continental countries for the technical education of workmen outside of the workshop, which are said to be very much more limited than has hitherto been supposed in this country to be the case. It is true that in many important centres there are societies, supported mainly by the manufacturers of the district, having for their object the promotion of education among workmen by means of lectures and the establishment of schools and museums of technology. But although these societies are numerous their sphere of action is limited, and the Commissioners consider that the facilities they offer for evening instruction in science and technology are inferior to those which are at the disposal of our own workmen. There are also technical schools for boys aspiring to become foremen; but it was found that, although, a few of the foreign foreman met with had received theoretical technical instruction, this was not generally the case, and the majority of them were, as in this country, men who by superior steadiness, intelligence and capability for management had raised themselves from the position of ordinary workmen. Nevertheless the Commissioners do not ignore the value of such instruction to the rank and file of mechanics, as is shown by their recommendations framed to secure a more sound and thorough teaching of science, drawing, and the use of tools, even in our primary schools. They forcibly argue that as it is from the great mass of the working population, who have to begin earning a livelihood at an early age, that most foremen will probably continue to be selected, it is even more essential for them than for the community in general that instruction in the rudiments of the sciences bearing upon the industrial arts should form a part of the curriculum of elementary schools. But it is to the technical high schools —such as the Ecole Centrale of Paris and the Polytechnic Schools of Germany and Switzerland—that the Commissioners are disposed to attribute the success that has attended the foundation of various large manufacturing industries on the Continent, and they are of opinion that the success would not have been achieved to its full extent had it not been for the system of high technical instruction in these schools, and for the facilities they afford for carrying on the thorough study of those sciences which bear upon industrial art.. These schools are the recognized channel for the instruction of persons who are intending to become the technical directors of industrial establishments, but the German universities also share largely in the training of technical chemists.

The consequence is that the Commissioners have been much impressed with the general intelligence and technical knowledge of the masters and managers of industrial establishments on the Continent. They state that they have found them, as a rule, possessed of a sound knowledge of the sciences upon which their industries depend, familiar with every new scientific discovery of importance and able to appreciate any possible application of it to their special purposes. Thanks also to their knowledge of foreign languages and of the conditions of manufacture prevalent elsewhere they are ready to adopt not only the inventions and improvements made in their own country, but also those of the world at large. Hence the working of their establishments presents a marked contrast to the "rule of thumb" which too often obtains, for instance, in chemical works in this country. Even in respect to the alkali industry, whilst the Commissioners admit that some English makers are as good alkali makers and just as well acquainted with the scientific bearings and relations of their own manufacture as their continental rivals, they consider that the continental alkali makers are men of wider knowledge and of more extended scientific attainments. Thus it is thought that whilst probably none of our English alkali makers could discuss the chemistry of the latest organic colouring matter, nearly all the continental masters are competent to do so. The extent to which the scientific spirit pervades large industrial undertakings on the Continent is illustrated by what the Commissioners saw in their visit to a coal-tar colour works at Basle, which is by no means the largest of its kind. At the head there was a "scientific director," who was a thoroughly educated chemist, and under him, in charge of the main departments, there were three "head chemists," each of whom had been trained in the Zurich Polytechnique, and below them were a number of "assistant chemists," similarly educated. These chemists carried on their investigations respecting the productions of new colouring matters, or the more economical manufacture of old ones, in ten well-equipped experimental laboratories, which were supplemented by a large scientific library. We may refer more in detail on a future occasion to the progress that has been made under these conditions; but it will be apparent that the unfortunate departure of the coal-tar colour industry from this land would require little further explanation. The principal lesson to be drawn from the Report—and one not without its bearing upon the subject of the proper training of the pharmacist—appears to be that a thorough and sound scientific and technical training will be an essential preliminary in the future to the successful carrying on of any great industry. The Commissioners fear that the belief in the efficacy of training of this highest character is at present small in England, although, as they point out, there is no country in which so many abstract investigations have been undertaken that have been afterwards turned to practical account. Still even in England some advance is being made; in many large factories the skilled chemist is already a part of the regular staff, and it may be hoped that the work of the present Commission, the appointment of which was really the expression of a healthier state of public opinion on the subject, may help to add to those qualities which have enabled our countrymen hitherto to keep in the front ranks that amount of scientific knowledge which is indispensable to the intelligent carrying on of their industries.

CINCHONA CULTIVATION IN CEYLON.

In the Annual Report by Dr. Trimen on the Royal Botanic Gardens in Ceylon for the year 1883, he quite confirms a statement that we quoted a few months since as to the unsatisfactory outlook for the once promising and extensive experiment in the cultivation of cinchona by private persons in that island. The interests involved may be estimated from the fact that the export from Ceylon during the last commercial year amounted to nearly seven million pounds of bark. But there has been a large decrease in the number of cinchona plants and Dr. Trimen at the time of writing his report anticipated that the large export would not be maintained, whilst a fear is expressed that a large proportion that had been exported "was very poor stuff," which at the prices then prevailing could hardly have been worth sending home. It is estimated that at the end of the year there were probably 128,000,000 of cinchona plants in Ceylon, of which not more than 22,000,000 were over two years old, and it is thought that the proportion of the other 122,000,000 which would grow up to maturity would prove to be very small. The heavy mortality of seedlings and young trees now experienced in the island has caused much disappointment, and is said by planters to exceed that which obtained formerly. The cause of this mortality has been assumed to lie in a "degeneration" of the cinchonas since their cultivation in Ceylon, each generation being supposed to be inferior in vitality to the one that preceded it. But Dr. Trimen does not see any clear evidence of this, as, under similar conditions, the tendency to die at an early age is as marked in plants grown from seed fresh from South America or the West Indies as in those from Ceylon-grown seed. He considers the cause is to be sought rather in the climate and soil of Ceylon. Much of the shallow soil and cold subsoil and many of the wet, windy and exposed hill sides have proved very unsuitable for cinchona as a permanent cultivation; but in well-protected localities, with a deep soil and good drainage, it is thought probable the plant grows as well now as it ever did in Ceylon. But even under the favourable conditions that might be supposed to be present in the experimental plantations in the Government gardens, the experience cannot be said to be promising, for the manager at Hakgala reports that the plants were dying there at such a rate as to necessitate special replanting, and that although there had since been some improvement, hardly a plant had made satisfactory growth, whilst those of the calisaya class had nearly all died.

The second reading of the Medical Acts Amendment Bill in the House of Commons is set down as the fourteenth order of the day for Thursday. As, however, the Bill is "blocked" by Messrs. Warton and Biggar, there is little doubt that it will again have to be postponed.

* * *

We are requested by the Curator to state that he is desirous of making the Herbarium of British plants belonging to the Museum of the Pharmaceutical Society as complete as possible. He will, therefore, be glad to receive one or two well-dried characteristic specimens of local species or of any of the varieties or forms of critical species. The Curator hopes thus to make the Herbarium valuable for reference to those who will compete for the prizes of the Society, and for those members of the Society who are interested in compiling local floras.

* * *

The *Bulletin Commercial* reports a serious explosion at Constaninople during the preparation of oxygen, which furnishes a fresh demonstration of the necessity that exists for verifying the chemicals used in this operation. It appears that the operator, M. Aliprandi, a pharmacist, having run out of binoxide of manganese, sent for a supply to another pharmacist, M. Alekian, and placed about 125 grams of this material together with an equal quantity of potassium chlorate in a Limousin apparatus made of steel. Having observed that after heat had been applied for two minutes not a bubble of gas had passed through the wash bottle, M. Aliprandi became apprehensive and had barely escaped from the room before an explosion took place, which did a considerable amount of damage. Upon examining the remaining portion of the black powder that had been received as binoxide of manganese it was found to consist entirely of sulphide of antimony. Some question appears to have arisen as to the person upon whom the responsibility for the consequences of supplying one article for another lies, and it is suggested that M. Aliprandi has a remedy against M. Alekian, who also can recover from the French house by whom he was supplied. But it does not appear to us that the question can be settled quite so simply, for if M. Alekian incurred a responsibility by receiving an article into stock without examination, a similar responsibility would lie upon M. Aliprandi himself, who was equally negligent.

* * *

At the meeting of the British Medical Association in Belfast, which is to commence on the 29th inst., there is to be a debate on Indian Drugs in the section devoted to Pharmacology and Therapeutics, which promises to be one of the features of the gathering. On the other hand in the International Medical Congress to commence in Copenhagen on the 10th of August, there is to be no special section for Materia Medica, as it will be remembered there was in the similar Congress in London, and this is described by a medical contemporary as "a most wise decision."

* * *

The Third Annual Meeting of the British Association of Inspectors of Weights and Measures is to be held in Glasgow, in the Christian Institute, on Tuesday and Wednesday, the 24th and 25th of June. Amongst the business that will come before the Association, it is announced that at 1.30, on Tuesday, a paper, by Mr. Shaw, of Edinburgh, will be read, entitled, "Observations on the Weights and Measures of Apothecaries and the Necessity existing for Exactness in Comparing and Verifying the Same." On Wednesday morning, at 10 o'clock, Mr. Gillman, of Leeds, is to read a paper entitled, "A Consideration of the Scientific Laws relating to the Operation of Weighing and to Weighing Apparatus."

* * *

We have received from the Postmaster-General a copy of a notice calling attention to the desirability that bottles containing liquids, intended for transmission by the Parcels Post, should always be firmly packed in tin or wooden boxes, well stuffed with a soft material, special attention being given to the packing round the shoulders of the bottles. Some of the prepared papers specially introduced for the purpose are spoken of as very suitable. When more than one bottle is sent in a parcel, each bottle should be separately wrapped and a wooden division placed between the bottles.

* * *

The luxuriant manner in which many garden plants flourish in the island of St. Helena has suggested the possibility of cultivating flowers there for the sake of extracting the perfume. One difficulty has hitherto been the want of a simple and inexpensive apparatus for the purpose of the extraction, but there now seems to be some probability that it will be overcome. The island was formerly quite a lemon garden, so that many localities bear names associated with the plant, and the lime was also plentiful; but the neglect to provide a fresh set of plants as the older ones died out was so complete that during the last ten years the trees yielding these fruits in the island have become local curiosities.

* * *

At the meeting of the Chemical Society to be held on Thursday evening next, papers will be read "On the Magnetic Rotation of Chemical Bodies in relation to their Composition and Constitution," by Dr. Perkin, F.R.S.; "On the Effect of High Temperatures on Petroleum Hydrocarbons," by Drs. Armstrong and Miller; and "On Nitrification" (Part III), by Mr. R. Warington.

Provincial Transactions.

LEEDS CHEMISTS' ASSOCIATION.

A meeting of this society was held in the Council Chamber, Church Institute, May 29. The President, Mr. S. Taylor, in the chair.

After the election of five new members, Mr. E. Yewdall read a paper on "The Advantages and Responsibilities of the Retail Chemist and Druggist under Existing Laws."

Mr. Yewdall reviewed the position of the retail chemist for the past thirty years, and gave a historical account of the work done in obtaining the Pharmacy Act, pointing out the similarity of the principal clauses in each of the Bills originally presented to Parliament, with the object of showing that it was not because a more stringent Act had not been sought for, but in consequence of the free trade principles so predominant in the House of Commons, that an Act better suited to the wants of the body of chemists and druggists had not been obtained. He thought the penal clauses of the Bill sufficiently strong to protect the titles of pharmaceutical chemist or chemist and druggist, and maintained that the protection was quite as much as the College of Surgeons was able to offer and such as the public would eventually recognize more fully than is done at the present time. The dealing in scheduled poisons and similar preparations by unregistered persons was considered as demoralizing to the trader, rendering him liable to a conviction with penalties, which, once obtained, would carry its own condemnation; the practice is, moreover, unfair towards pharmacists and fraught with danger to the public. Chemists and druggists should endeavour to improve their position, not by battling with unprincipled men, but in the manner indicated in the eloquent address given by Professor Attfield to the members of the Pharmaceutical Conference last year. Although inconvenience and annoyance have arisen from the practical working of the Weights and Measures Act, yet the advantages consequent upon accuracy in minim measures must be great, as a drop, more or less, of an essential oil in the preparation of a perfume materially alters the product, and in the preparation of medicines containing hydrocyanic acid or the solutions of the alkaloids, accurate uniformity is of great importance. In the graduation of covered pots for ointments, it was thought they would be better adapted for the purpose if olive oil at 60° F. was used instead of water at the same temperature. The practice of a more frequent examinations of the powders received from wholesale houses to avoid being charged with sophistication under the Sale of Food and Drugs Act, would be advantageous to the chemist and druggist in rendering him more familiar with the processes of detection and thus enable him to bring before the Association subjects for discussion. In referring to the depression which has lately affected pharmacy, the author thought the medical profession did not consider the position of the retail chemist as it ought to do; in too many instances a prescription is written for some proprietary article, respecting the composition of which there was either a doubt or the ingredients are so well known that in the interests of the members of the medical profession it was important that a properly written prescription should be given, by which the chemists could prepare the medicine. If this course was not adopted the patient who had found benefit from the proprietary article had no compunction in recommending it to his friend, and thus the medical man lost his fee and the retail chemist his legitimate profit.

The President, in opening the discussion, stated his concurrence with the views held by Mr. Yewdall, and expressed the hope that the Association was about to enter on a more active phase of its existence.

Mr. R. Reynolds desired to express the obligation of the Association to Mr. Yewdall for his historical review of several matters which had much interest for pharmacists during the past few years. He did not expect that any great comfort would be found by those who had no great reason to complain of the condition of pharmacy in England, but it was worth pointing out that this state of things had arrested the opening of new business establishments. Respecting the action of the Pharmaceutical Society, through its Council, in maintaining the existing law against offenders, he could state that it was by no means so inactive as had been often supposed and sometimes publicly asserted. The Society had taken active measures during the past year with regard to several infringements of the Pharmacy Act in Leeds, and it was still ready to investigate complaints as to illicit trading. Mr. Yewdall, as he knew, had always done the Society justice in recognizing what it did, and was himself equally active, as a member of the Executive Committee of the Trade Association, in endeavouring to make the law respected. He (Mr. Reynolds) regarded Mr. Yewdall's paper as peculiarly opportune and a fitting prelude to that call to practical action which might come at any moment, when the promised Bill for the further Regulation of the Sale of Poisons was introduced by the Government. It was to be feared that a Bill to which they could give an unqualified assent would not be presented; it was, therefore, well to be prepared for prompt action.

Mr. Reynolds moved a vote of thanks to Mr. Yewdall for his paper.

Mr. Jas. Abbott seconded the proposition, and alluded to the necessity for accurate measurement by patients of concentrated medicines; he referred also to the considerable variation in the internal capacity of dispensing bottles.

Several other trade topics mentioned by Mr. Yewdall were discussed by the Secretary, Mr. Shillito, and others.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The annual meeting was held at the George Hotel on Tuesday evening. Mr. Councillor Fitzhugh, F.C.S., presiding.

The members present expressed their congratulations to the President upon the honour which had recently been conferred upon him in having been elected by the Lord Chancellor as one of the Justices of the Peace for the Borough.

The Secretary presented the Council's Annual Report, which showed that advance and progress had been made in the work of the society during the past year. Suitable rooms had been obtained for the use of the members and associates. Cases to contain the library and specimens of materia medica had been placed in them, and a number of standard works had been purchased and added to the library, thereby much increasing its usefulness. Twenty-five associates have joined the Society during the past session. Meetings have been held monthly; the associates' meetings having been opened with a conference and *soirée*, both of which were a great success. Lectures have been delivered by Mr. F. H. Spencer, on "The Ear," illustrated by models; by Professor Clowes, D.Sc., F.I.C., on "Spectrum Analysis," of a most able and interesting character and admirably illustrated by Mr. A. H. Simpson with the oxyhydrogen lantern; by Mr. H. Major, B.A., of Leicester, on "Epidemics." During the winter a most successful pharmaceutical chemistry class had been conducted by Professor Clowes at the University College. It continued over two college terms, the attendance of the students the first term being 88 per cent., the second term 77 per cent. At the close the Professor conducted an examination extending over two evenings, at which 50 per cent. of the students passed. There has also been a meeting of the young men every Friday evening at the

Institute rooms. In all, sixteen meetings have been held, with a good and encouraging attendance at each. Members of the Council have been present each evening and presided over the meetings. The discussions have been upon subjects bearing upon the work in which the associates have been engaged during the day. Mr. William Widdowson kindly volunteered to conduct a class on materia medica and pharmacy for those young men who were preparing for the London Minor examination. Those who have had the opportunity of attending bear testimony to the value the lectures have been to them, and the thanks of the Council and Association were given to Mr. Widdowson for his kindness in undertaking this work. The library has been well used by the associates, the number of issues having been larger than in any previous year. The Association has lost by death during the year Mr. J. H. Atherton, F.C.S., a former President, Mr. S. Littlewood, Sutton-in-Ashfield, and Mr. Thomas Harrison, late of Wheeler Gate, all of whom had been members of the Society since its commencement.

A vote of thanks was passed to the Officers and Council of the past year on the motion of Mr. Roberts Jackson, seconded by Mr. Inger.

The ballot for the Officers for 1884 and 1885 was next taken, and resulted as follows:—President, Mr. Councillor Fitzhugh, F.C.S.; Vice-President, Mr. M. H. Humphries; Treasurer, Mr. W. H. Parker; Honorary Secretary, Mr. C. A. Bolton; Council—Messrs. A. E. Beilby, T. B. Fletcher, S. V. Holgate, A. Smith, C. W. Warriner, F. White, J. Wilford and W. Widdowson.

Messrs. R. H. Beverley and J. Lewis were appointed the Auditors.

The Treasurer presented his Annual Financial Statement, which showed the finances to be in a most satisfactory and healthy condition. The expenditure had been £53 13*s.* 5*d.* Income £73 5*s.* 10*d.* The balance, including amount on deposit in the bank, reaches £73 3*s.* 8*d.*

The prizes kindly offered by Mr. J. H. Haywood, of £1 1*s.*, and Mr. A. Middleton, of 10*s.* 6*d.*, at the commencement of the session, not having been able to be competed for by the associates at an examination, were allowed to stand over until next session.

OLDHAM CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

On Sunday, May 25, the members of the above Association, with a few friends, took a botanical ramble in the neighbourhood of Marple, Cheshire. The facilities afforded by the district of Oldham for the practical study of botany are exceedingly few, as for miles around are nothing but cotton mills and iron-works, etc.; this being the case, those who wish to study botany from fresh specimens are obliged to travel many miles to meet with anything like a fair amount of vegetation. This was the object of their journey, and a large store of spring flowers for study was gathered.

On Tuesday evening, at the usual weekly meeting of the Association, held in their room, Church Institute, the numerous plants gathered on Sunday were classified, each plant being placed in its natural order, its peculiarities of structure, mode and place of growth being noticed.

MANCHESTER PHARMACY STUDENTS' ASSOCIATION.

A meeting of the above Association was held in the Materia Medica Museum, Owens College, on Thursday evening, May 22. Mr. A. H. Jackson, B.Sc., President, in the chair.

The minutes of the previous meeting having been read and confirmed, the Chairman called upon Mr. A. D. Breeze, to read a paper on "The Poisons Question—Is Legislation Necessary?"

The author, having quoted Sections II. and XVII. of the Pharmacy Act, 1868, gave a very interesting summary of the existing grievances relating to the retailing of poisons and sale of patent medicines of a poisonous nature, suggesting that the infliction of a heavier penalty than that now prescribed by the Act would prove beneficial in discouraging the illegal sale of poisonous drugs.

The paper was followed by a lengthy discussion in which the Chairman, Messrs. Elborne, Thornley, Mitchell, Rhodes, Thomas and Kirkby, took part; and the following resolution, proposed by the Secretary, was carried by the majority of members present:—"That all poisons sold as 'vermin killers' should be classed in Part I. of the Poison Schedule, unless labelled as not containing any of the poisons mentioned therein.

The Chairman then called upon the Secretary to read a letter which had been received from the manager of Messrs. Tennants and Co., inviting the members of the Association to inspect their large chemical and sulphuric acid works, at Ardwick Green. It was resolved that the kind invitation be accepted.

The Secretary then read a letter from Mr. James Hart, of Embden Street, Manchester, expressing his pleasure that a Pharmacy Students' Association had been formed in Manchester. This, he thought, was a move in the right direction, and augured better for the "future of pharmacy" than anything that had yet taken place there. As one who took great interest in the future welfare of the trade, he was prepared to offer as an incentive an annual prize of one guinea for competition amongst the members of the Association, for the best collection of plants found within a given radius of Manchester, or to be devoted to the furtherance of pharmaceutical research in any way which the Committee might consider expedient.

It was unanimously resolved to accept Mr. Hart's kind offer, the best mode of awarding the prize being referred to the Committee for consideration.

The next meeting will be held on Thursday evening, June 19, at 8 p.m., when a paper will be read by Mr. J. Brooks Thornley on "Sulphuric Acid Manufacture."

On Saturday afternoon, May 24, at the Botanical Gardens, Old Trafford, Mr. William Elborne (Assistant-Lecturer on Materia Medica, Owens College) delivered an interesting lecture on "Botany," to a social gathering of members of the above Association. The lecturer gave a general sketch of the characters of the various classes and divisions of the vegetable kingdom, and described in a very lucid manner the organs of nutrition and reproduction, their individual functions and structure. There was a good attendance, the consensus of opinion being that a most enjoyable afternoon had been spent.

HAWICK PHARMACEUTICAL ASSOCIATION.

The annual meeting of this Association was held on Tuesday, June 3. There was a good attendance, and Mr. Maben (Hon. President) occupied the chair.

After a few introductory remarks by the Chairman, the reports of the Secretary, Treasurer and Librarian were submitted. From these it appeared that the Society was in a good condition in every respect.

The following office-bearers were elected for the ensuing year:—Hon. President, Mr. John Craig; President, Mr. Lawson; Secretary, Mr. J. A. Hislop; Treasurer, Mr. T. Maben; Librarian, Mr. W. B. Rawlinson.

It was moved and carried by a majority that the name of the Association be altered to "The Hawick Pharmaceutical and Chemical Association," and the constitution was amended so that all past and present science students would be eligible for membership.

It was resolved to apply to the Committee of the

British Pharmaceutical Conference for a copy of the 'Year-Book of Pharmacy.'

It was agreed to issue a syllabus for next session, for which a number of papers had already been promised, and also to have botanical excursions instead of in-door meetings during the summer months.

After the business had been disposed of, Mr. Dechan, chemist, showed and explained a large collection of apparatus as used in analysis. Amongst these was a novel arrangement for filtering at the boiling point, the idea of which was taken from an apparatus for a similar purpose figured in a recent number of the *Journal de Pharmacie et de Chimie.*

A herbarium of the flora of the district was on view, and the Hon. President described the method of collecting, drying and mounting specimens.

It may be stated that the Secretary's report referred to the fact that the Association had commenced to form a herbarium of the local flora; this has already made considerable progress, a number of plants connected therewith being on the table.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, June 5. Dr. W. H. Perkin, F.R.S., President, in the chair.

It was announced that a ballot for the election of Fellows would take place at the next meeting of the Society, June 19.

The following certificates were read for the first time: —F. Broughton, F. J. Down, F. G. Holmes, J. Hulme, C. Thompson, W. F. Wyley.

Mr. C. E. Groves then read a paper—

On β-Naphthaquinone.—In a preliminary notice read before the Society some time back (*Chem. News.*, xliii., 267) the author mentioned that he had carefully repeated some experiments of Liebermann, but could not agree with him as to the value of β-naphthol orange as a source of β-naphthaquinone. In the present paper, full details are given of the preparation of amido-β-naphthol hydrochloride from the β-orange, by reduction with stannous chloride and with alkaline sulphides. Although this reaction is interesting theoretically it is far inferior in simplicity and economy to the process originally proposed by Stenhouse and the author (*Jour. Chem. Soc.*, 1877, ii., 47, and 1878, *Trans.*, 415), which consisted in preparing nitroso-β-naphthol from β-naphthol by the action of nitrosyl sulphate and then reducing the barium derivative by ammonium sulphide. As sodium nitrite is prepared now on the large scale almost pure, the author has substituted for the nitrosyl sulphate, a mixture of sodium nitrite and dilute sulphuric acid; the sodium nitroso-β-naphthol is then introduced in the moist state into a solution of stannous chloride and hydrochloric acid and thus converted into amido-β-naphthol, a large excess of stannous chloride being avoided. The author prefers the use of ferric chloride to convert the amido derivative into the quinone. This process is much simpler and cheaper than the method proposed by Liebermann. Nitro-β-naphthaquinol $C_{10}H_5NO_2(HO)_2$— In a former paper it was mentioned that this body, together with the amido-β-naphthaquinol, was obtained by the action of hydriodic acid and phosphorus on the nitroquinone. These bodies can be more conveniently prepared by the employment of stannous chloride as the reducing agent. In conclusion the author draws attention to the fact, that, although he had, in a paper published in conjunction with the late Dr. Stenhouse, mentioned the production of amido-β-naphthaquinone by the action of reducing agents and more recently had stated in the *Berichte* that he was engaged in an investigation of nitro-β-naphthaquinone and the products obtained from it by the action of reducing agents, yet a student of Professor Liebermann's has recently published a note in which he describes the reduction of nitro-β-naphthaquinone to amido-β-naphthaquinone without the slightest reference to its having been already done.

The two following papers were then read by the Secretary:—

On a Bye-Product of the Manufacture of Aurin (Part II). By A. Staub and Watson Smith.—In a previous paper it was shown that the product in question, phenylorthooxalic ether, was formed by the direct union of two molecules of phenol with one of anhydrous oxalic acid. The authors have prepared a perfectly pure specimen by repeated recrystallization from glacial acetic acid, and an analysis agrees with the formula $C_{14}H_{14}O_6$. Analogous compounds with α and β naphthols have been obtained, but no corresponding body could be obtained with resorcinol. The melting point of the phenylorthooxalate was found to be 126°–127°. When heated with strong sulphuric acid, aurin is obtained. If phenol be present the yield of aurin is not increased. Only traces of formic acid are evolved during the reaction. The authors conclude that the orthophenyloxalate plays no part as an intermediate product in the formation of aurin. They also prove that not a trace of aurin is formed by the action of nascent carbon dioxide on phenol.

On Calcium Hydrosulphides. By E. Divers and Tetsukichi Shimidzu, of Tokio.—One part of lime prepared by igniting precipitated calcium carbonate is made into a thick paste by mixing with four parts of water, hydrogen sulphide is passed through, the lime gradually dissolves, more lime is added, until a solution of the hydrosulphide strong enough to crystallize when cooled is obtained. The preparation of such a solution may take several days. Air must be completely excluded and the process is facilitated by cooling. The solution having been prepared is allowed to settle at a slightly warm temperature, so that any crystals which have formed may be dissolved, and then decanted in an atmosphere of hydrogen sulphide. On cooling, colourless prismatic crystals of $Ca(HS)_2, 6H_2O$ separate out. They are very soluble in water and alcohol; decompose when heated and when exposed to the air. Analyses are given proving the above composition. When this substance is treated with water and calcium hydrate, calcium hydroxyhydrosulphide is formed, $CaHSHO,3H_2O$. This body crystallizes in colourless four-sided prisms, slowly evolving hydrogen sulphide when exposed to the air. By gently heating the hydrosulphide in a current of hydrogen sulphide, calcium monosulphide mixed with some hydroxide was obtained as a white amorphous solid. Carbon dioxide decomposes the calcium hydrosulphides, and the authors find that hydrogen sulphide decomposes calcium carbonate, so that carbon dioxide mixed with an excess of hydrogen sulphide may be passed through lime water without causing a turbidity. Odling states that when calcium hydrosulphide is boiled with sulphur, hydrogen sulphide is liberated; calcium pentasulphide is formed under these circumstances. The authors show that hydrogen sulphide bubbled through a cold dilute solution of pentasulphide effects the reverse reaction, and reforms the hydrosulphide. In conclusion, the authors have investigated the formation of thiosulphate from the hydrosulphide and the pentasulphide, and they conclude that in both cases it is not a direct oxidation, but that the hydrogen sulphide oxidizes, and then by the reaction of its products forms the thiosulphate. They give the following equations:—

$$CaHSHO + 2O_2 + HS_2 = CaS_2O_3 + 2H_2O$$
$$CaS_5 + 2H_2O = CaHSHO + 3S + H_2S.$$

The hydrosulphide then reacts with oxygen and the hydrogen sulphide as above.

The Society then adjourned to June 19, when a ballot for the election of Fellows will be held, and the following papers read:—"On the Magnetic Rotation of Chemical

Bodies in relation to their Composition and Constitution." By W. H. Perkin, F.R.S.; "On the Effect of High Temperature on Petroleum Hydrocarbons." By Drs. Armstrong and Miller; "On Nitrification," Part III. By R. Warington.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, May 29, Mr. H. G. Greenish, Vice-President, in the chair.

The first paper read consisted of some notes on—

ASAFŒTIDA.

BY R. W. C. PIERCE.

The name asafœtida is derived from the Arabic "asa," healing, or "isa," remedy, and the Latin "fœtidus," fetid. The botanical source of asafœtida is now generally attributed to two large umbelliferous plants, *Ferula narthex*, the *Narthex asafœtida* of Falconer, and *Ferula scorodosma*, or the *Scorodosma fœtidum* of Bunge. *Ferula narthex* was discovered by Dr. Falconer in 1838 on the northern slopes of the mountains dividing Kashmir from Western Thibet, seeds of which he sent to the Edinburgh Botanic Gardens, where they germinated and produced a plant which flourished for several years, but died after flowering. Plants more or less allied, and also said to afford asafœtida, have been met with in Herat and Afghanistan. *Ferula scorodosma* was collected in 1841 by Lehmann on the east side of the sea of Aral, and also in Bucharia. It probably extends over a wide district of Turkestan, Northern Afghanistan and Eastern Persia. Whether this plant is the *Ferula asafœtida* of Linnæus cannot be certainly decided. There is no doubt that the drug is afforded by other allied species of *Ferula* besides the two previously mentioned. The *Ferula asafœtida* of Bunge, now called *Ferula alliacea*, yields asafœtida, which is known in the Bombay market as "Hing" at the present day. Asafœtida is, according to Flückiger and Hanbury, the produce entirely of Afghanistan, but, according to Dr. Dymock, it is also produced in the province of Laristan, in Persia. The drug is forwarded to Bombay principally by way of the Persian Gulf. The asafœtida which comes from Southern Persia is supposed to be derived from *Ferula scorodosma*, and that from Afghanistan is supposed to come from *Ferula narthex*. This latter plant, however, has never been found by anyone except Falconer for certain, and by him only in Thibet, hence the botanical source of the Afghanistan asafœtida is merely conjectural. The consumption of asafœtida in Europe, America and other places is small in comparison with the amount used in Persia and India, where it is known as "Hingra." Asafœtida was known to the Arabians and Persians of the middle ages, who mention two kinds, one good, or sweet, the other fetid. In the 13th century the Meddygon Myddfai, or physicians of Myddfai, considered it as one of the substances which every physician ought to know and use. It constitutes a favourite seasoning for food with the inhabitants of many parts of the East. The Indian Banians, who never eat animal food, use it in almost all their dishes and before their meals; even rub their mouths with it in order to stimulate their appetite. It is sometimes used by our own cooks, but in very minute quantity, in place of garlic. In many parts of Arabia and Persia it is much esteemed as a remedy for various internal diseases and as an external application to wounds. With us it is considered a powerful medicine in several disorders. It has been applied with suceess in the cure of whooping cough and worms, and in flatulent colics. The part of the plant from which the drug is obtained is the root, in which, after it is four years old, incisions are made. The upper part of the root, which is sometimes as thick as a man's leg, rises somewhat above the surface of the ground. When cut, the asafœtida exudes in the form of a white thick juice like cream, which, from exposure to the air, becomes at last of a dark brown colour. It is very apt to run to putrefaction, and hence those who collect it carefully defend it from the sun. The fresh juice has an excessively strong smell; a single drachm of it is said to smell more than a hundred pounds of the dry asafœtida brought to us. The harvest commences when the leaves begin to decay, and the whole gathering is performed by the inhabitants of the place by four different journeys to the mountains. The quantity yielded by a root varies from half an ounce to two pounds. The product got from the first cutting, which is thinner, more milky and less esteemed than that obtained afterwards, is not sold in its natural state, but is mixed with soft earth, which is added to the extent of an equal, or even double, weight of the gum resin, according to the softness of the latter. It is stated that a single ship is exclusively devoted to transporting the bulk of the drug to ports in the Persian gulf, and that when smaller parcels are carried it is usual to tie them to the top of the mast.

As found in the shops asafœtida is in irregular masses, softish when not long exposed, of a yellowish or reddish-brown colour, externally, exhibiting when broken an irregular whitish, somewhat shining surface, which soon becomes red on exposure and ultimately passes into a dull yellowish brown. This change of colour is characteristic of asafœtida, and is ascribed to the influence o air and light upon its resinous ingredient. The massef appear as if composed of distinct portions agglutinated together, sometimes of white, almost pearly tears embedded in a darker, softer and more fetid paste. It is rarely met with in separate tears, which are roundish flattened, oval or of irregular shape, from the size of a pea to that of a large almond or larger, yellowish or brownish externally and white within, and not unlike ammoniac tears, for which they might be mistaken except for their odour, which, however, is weaker than that of the masses, to which latter they are considered inferior. A very fine variety of asafœtida is said to be obtained from the leaf-bud in the centre of the root. It is known in the Indian bazaars as kandahari hing, but it is not found in European commerce. It occurs in moist flaky pieces and tears, yielding a reddish-yellow oil on pressure and mostly mixed with the remains of leaf-buds. Asafœtida has a powerful but not purely alliaceous odour and a bitter acrid and durable taste. It becomes harder and more brittle by keeping and also diminishes in smell and taste It softens by heat without melting, and is difficult to powder. According to Berzelius its specific gravity is 1·327. I have taken the specific gravity of two specimens, one being 1·2 and the other, which we shall see further on contains a very large amount of adulteration, being 1·7. It is inflammable, burning with a clear lively flame. It yields all its virtues to alcohol and forms a clear tincture which becomes milky on the addition of water. It forms a whitish or pinkish-white emulsion with water. When rubbed up with sulphuric acid in a mortar, then diluted and the solution neutralized by ammonia, the then slightly coloured solution exhibits a bluish fluorescence, which is due to the presence of umbelliferone. Touched with nitric acid, specific gravity 1·2, the tear becomes of an evanescent green colour. The asafœtida of commerce has been shown to be always more or less impure. The common impurities are stones, sand, powdered gypsum and wheat or barley flour, mixed in varying proportions according to the consistence of the gum resin. At Bombay it is further adulterated, frequently by opening the packages and mixing it with gum arabic.

Asafœtida consists of resin, gum and essential oil in varying proportions. The proportion of oil varies from 3 to 9 per cent. the gum from 26 to 32 per cent, and the resin from 47·2 to 65 per cent. The resin is almost entirely soluble in alcohol, ether, and chloroform, it dissolves without decomposition in warm concentrated nitric acid. It contains a little ferulaic acid. Fused with caustic potash it yields resorcin, and by distillation oils of a green, violet or red tint, besides about ¼ per cent. of umbelliferone, $C_6H_9O_3$. The mucilaginous matter of asafœtida consists of a gum soluble in water and an insoluble portion which is bassorin. The volatile oil has a light yellow colour, with a very repulsive odour. It is at first neutral, but on exposure becomes acid and acquires a different odour. It contains from 20 to 25 per cent. of sulphur, and on being distilled evolves sulphuretted hydrogen.

"Hing," the medicinal asafœtida of the natives of India, obtained from *Ferula alliacea*, consists of 37·50 resin and essential oil, 23·75 of gum. It may be distinguished from commercial asafœtida by not yielding a fluorescent solution, by its tincture not being precipitated by acetate of lead and by containing slices of roots, stem remains only being found in ordinary asafœtida, whilst the alcoholic tincture of the latter is precipitated by acetate of lead.

In the British Pharmacopœia the test for asafœtida is that it dissolves almost entirely in rectified spirit. As there is from 26 to 32 per cent. of gum this cannot be true, without taking into account impurities which are always present. According to the United States Pharmacopœia it is partly soluble in ether, and at least 60 per cent. of it should dissolve in alcohol of specific gravity ·820, containing 91 per cent. by weight of C_2H_5HO. The German Pharmacopœia gives the following characters:—"It gives a yellow colour with caustic soda. Does not strongly effervesce with hydrochloric acid, and is not coloured by contact with the acid for six hours. It should not leave more than 10 per cent. of ash." I have worked a little upon these tests with the following results:—

No. 1. Tear asafœtida yielded 5 per cent. of ash and yielded 56 per cent. to s. v. r.

No. 2. Lump asafœtida yielded 56 per cent. of ash and yielded 26 per cent. to s. v. r.

No. 3. Lump asafœtida, specific gravity 1·77, yielded 56 per cent. ash and yielded 26 per cent. to s. v. r.

No. 4. "Strained" asafœtida yielded 25 per cent. ash and yielded 50 per cent. to s. v. r.

No. 5. Lump asafœtida, specific gravity 1·2, yielded 12 per cent. ash and yielded 54 per cent. to s. v. r.

They all gave the NaHO reaction and the fluorescence, but they were all coloured of a greenish blue by HCl almost immediately. Nos. 3 and 4 are very impure, heavy, and have a sandy appearance.

The samples were obtained from different wholesale and retail houses, and from the Society's Museum.

Some years ago Professor Maisch, of Philadelphia, published the result of his analyses of several samples of asafœtida taken by the drug inspector of the port from different cases and from different parts of the mass. It was as follows:—

	1.	2.	3.	4.	5
Total resin and volatile oil . .	36·48	43·89	62·93	39·48	30·08
Impurities . . .	57·50	44·01	15·20	51·70	62·09
Gum, moisture and loss	6·02	12·10	21·87	8·82	7·83
	100	100	100	100	100

These were samples of amygdaloid asafœtida which a year previously were rejected by the purchaser as adulterated, he claiming that good asafœtida should be entirely free from sulphate of lime. The impurities in the above instance consisted of gypsum and vegetable fragments, as always met with in the resinous matter agglutinating the tears.

Dr. Dymock, in his 'Materia Medica,' states that asafœtida of an ordinary commercial quality in tears yields at least 7 per cent. residue to petroleum ether, lump at least 5 per cent., and that the volatile constituents should not be less than 5 per cent. in tear or 3 per cent. in lump asafœtida.

In the French Codex a "purified asafœtida" is included, and which is directed to be prepared as follows:—

Dissolve the gum resin with heat in a sufficient quantity of 60 per cent. (by volume) alcohol, strain and press, drive away the alcohol by evaporation over a water-bath until the product is sufficiently thick, that when a few drops are thrown into cold water they have enough consistence to work up between the fingers without adhering to them.

A discussion ensued, in which the Chairman, Messrs. Cullinan, Dymond, Lowe and Short took part.

The Reporter on Inorganic Chemistry, Mr. A. J. G. Lowe, then made a report on the "Purification of Crude Antimony Sulphide." This paper will be published in a future number of this Journal.

In the discussion that followed, the Chairman, Assistant-Secretary, Messrs. Cullinan, Dymond and Ince took part.

The Assistant-Secretary announced that at a meeting of the Executive Committee a grant from the Research Fund had been made to Mr. R. A. Cripps for the examination of commercial concentrated infusions and decoctions.

The meeting then adjourned.

INTERNATIONAL HEALTH EXHIBITION.

Conferences on Sanitary Subjects.

The third of the series of Conferences held under the auspices of the Mansion House Council on the "Dwellings of the Poor" was held on Friday, June 6, in the Conference Hall of the Exhibition. Cardinal Manning in the chair.

The first paper read was by Mr. Shirley F. Murphy, M.R.C.S., entitled "Some Difficulties of Sanitary Administration in the Metropolis." He stated that health was everywhere deemed of less importance than mere pocket interests, and, even if people held no higher view of health and life than their pecuniary value, they would be acting wisely in making some sacrifices for their preservation. The only thought which had controlled the arrangement of houses upon a site was for the convenience of traffic and not for the health requirements of the inhabitants. It was not until the year 1855 that London insisted upon the preservation of open spaces at the back or side of the houses which were covering the land, and not until 1862 that the height of a building was held to have any relation to the need for ventilation, and even then only to buildings about be erected in new streets of less than 50 feet in width. To existing streets this provision did not apply, and high, back to back, unventilated houses were permitted on all sides. In 1882 some advance was made, the amount of space in the rear of houses was to have some relation to their size, and for new houses built upon land not previously occupied in whole or in part, before the passing of the Act, an open space equivalent to a strip of little more than 10 feet, continued in proportion to the width of the house, was deemed necessary, and frequently requiring this open space to extend across the whole width of the house. It was true, London possessed sanitary authorities, but it was only after houses were erected and the inhabitants had suffered ill health or lost their lives, that the authorities had power to act. At the present time, the sanitary authorities existed rather for the removal of nuisances than for the prevention of disease. The reason that there had been so little thought for health in the government of the Metropolis was to be found in the difficulties attendant upon the government of London. For years there had been a tendency to place upon central boards duties which should be entrusted only to a body appointed as guardians of the public health. After referring to the difficulties with which sanitary administration was surrounded, he concluded by saying, that at present, no sanitary administration deserving of the name could be said to exist; the local sanitary authorities had no jurisdiction over many subjects of vital importance to the public health, and the authorities upon whom these duties devolved were not primarily concerned in the prevention of disease.

The next paper, by Dr. B. A. Whitelegge, was upon the same subject. After speaking of the evil effects of overcrowding and bad drainage, he said, in the laws bearing upon metropolitan sanitation, there were many important omissions, but still it was none the less incumbent upon the sanitary authorities to faithfully exercise the powers entrusted to them alone, and to their default in so doing many of the present evils were attributable. Repeated and careful inspection of tenement houses was necessary, and the absurdity of alloting to one man a district with a population of 50,000 or 60,000 was obvious. With the sanitary authority rested the responsibility of taking the initiative in active measures, but in many cases it was reluctant to do so, as all sanitary action meant expense, and short-sighted economy too often interfered with due care for the public health. Much might be done by individual and collective action in organizing public opinion. The poor should be educated as to the vital importance of healthy homes and surroundings, and the means by which unhealthy conditions might be avoided or remedied. The attention of the authorities should be called to all unhealthy conditions which could be found, and care be taken that the evils so reported were remedied. A great deal had been done in this direction by the thirty local sanitary aid committees, formed in connection with the Mansion House Council on the Dwellings of the Poor, over five hundred cases having been inquired into, and in all cases brought before the Committee the utmost secresy was observed as to the quarter from which they received information.

The third paper, by Mr. C. M. Sawell, was entitled "Suggestions to the Royal Commissioners on the Dwellings of the Poor," and proved a somewhat lengthy document. The first suggestion was that no immediate transformation in the condition of the poor could be expected, and that their character needed improvement above all things. Next, it was suggested that the housing of the poor had become a practical monopoly, and various instances were given of the exorbitant rents charged for the vilest accommodation. Thirdly, the system of leases was remarked upon as having a tendency to accentuate the evils complained of, and a suggestion was made that some draconic powers should be given to municipalities to acquire property without paying excessive compensation. Next came some remarks on the land question generally, and the remaining suggestions dealt with the licensing question, the registration of inspection of all houses let out in lodgings, the disqualifying owners of unsanitary property for local offices, the extension of the hours during which common lodging houses may be inspected, Government loans to aid in reconstruction, a reduction of rates on "improved dwellings," and the enforcement of cheap railway accommodation.

Dr. Alfred Carpenter said the practical side of the question bristled with difficulties, one being the antagonism which existed between local self-government and centralization. This difficulty had been enhanced to a great degree by legislation, and therefore they must go to Parliament to get it removed. Another difficulty was that the exigencies of political life prevented arrangements which were made from being carried out. A Commission appointed to inquire into infectious hospitals in connection with London, of which he was a member, recommended the necessity of the separation of sanitary work from that connected with the destitution of the Metropolis, but this proposition had not yet been carried out. He thought it was only by meetings, such as the present, that pressure could be brought to bear upon those on whom hope depended.

The Rev. G. M. Murphy suggested that as speedily as possible the Mansion House Council should call a conference of *bonâ fide* working men; also that there should be a unification of the sanitary laws, and simplicity and promptitude in action.

The Rev. S. Buss suggested that the Artizans Dwellings Act, the Nuisance Removal Act, and various other Acts should be consolidated and amended, and that the building of houses should be entrusted to a department of the State.

The Rev. G. W. McCree thought that if sanitary inspectors were made independent of the body by whom they were appointed, they would do their duty better, not having the fear of dismissal before them in the event of taking action in certain cases.

The Chairman said he thought the proposal that labouring men should become their own landlords was a very good one, and he would always do, as he had hitherto, his best to encourage it. At present the great block buildings housed artizans and even clerks in the city, failing altogether to reach the very poor for whom they were intended. On the Statute Books would be found Acts to meet every case, all that was wanted was a dynamic power to set them in motion, and this power would be obtained from societies like the Mansion House Committee.

On Monday the first of a series of Conferences, under the combined management of the Society of Medical Officers of Health, the Sanitary Institute of Great Britain, and the Parkes Museum of Hygiene, was held, under the presidency of Dr. Orme Dudfield, President of the Society of Medical Officers of Health and Medical Officer of Health for Kensington.

The first paper was by Dr. Tripe, Medical Officer for South Hackney, on "The Domestic Sanitary Arrangements of the Metropolitan Poor." The word "poor" was used in its largest sense, as including all who live in very small houses or tenements. The writer said the sanitary arrangements of many of those houses were disgustingly defective, and owing to the dirty habits of many of the inhabitants, even fairly good water closets were so misused as to convert them into the most filthy places it was possible to conceive. Persons of this class could scarcely be said to have any sanitary arrangements whatever. Another class of houses, those containing five or six rooms, in which two or more families lived, were somewhat better, and in such houses the enforcement of the regulations made under sec. 35 of the Sanitary Act was of great service. The difficulty was, however, that if inspection were very frequent, and the owners put to much expense, the rents were increased, and the tenants as a consequence, ejected, to carry a bad example elsewhere. On the other hand, if due regard were not paid to sanitary arrangements, disease might arise and spread. The opinion was expressed that the Peabody and similar buildings were not so suitable for the very poor as smaller houses with outbuildings. The most important of sanitary arrangements was the water supply, and a constant supply was much preferable to an intermittent one; there should always be a cistern which would supply the closet, but the water for potable purposes might be drawn from the main before it reached the cistern. Where the constant system was not in operation there should always be a flushing box between the cistern and the closet, and great care must be exercised to see that this flushing box was properly arranged and fixed, or it would be rendered useless. The different kinds of taps, etc., in use under the constant system were then discussed, many complaints being made of the time required in some cases to draw a pail of water. A direct connection between the sink and the sewer was a fruitful source of mischief from the influx of sewer gas. The heads of rain-water pipes often opened near windows, and when connected directly with the sewer acted in the same way as conductors of foul gases. The drainage of old houses was often very defective, being constructed of bricks with open joints; all such drains should be relaid in pipes laid in concrete. Dustbins were usually a source of discomfort and often of disease; when made of wood they were frequently destroyed, and strong sheet iron was much preferable. The practice of asking for gratuities when the dust was removed was a great check on the frequent emptying of the dustbins, and where the removal was contracted for at a lump sum it was the interest of the contractor to remove it as rarely as possible.

The next paper, by Mr. Ernest Turner, F.R.I.B.A., was on "The Improvement of the Sanitary Arrangements of Metropolitan Houses." He thought the real problem was the sanitary housing, not of the artizan, but of the labourer, and, in order to solve it, they must face its conditions as they arose, and not invent them. The most inexorable of these conditions was just the one which many had hitherto devoutly refused to accept. The labourer had to live in one room, and it was no good endeavouring to persuade him that he could occupy more, as he could not afford more than 3*s.* 6*d.* to 4*s.* a week, and for this sum only one room could be obtained. The introduction of common kitchens and dormitories either undivided or divided into cubicles was a question well worthy of the consideration of the new Royal Commission. Common lodging-houses were by far the most sanitary of any dwellings of the poor, owing to systematic inspection, and if model lodging-houses were constructed to look a shade less like model prisons they would be regarded with more favour by the poor. Upon the question of sanitary fittings he strongly endorsed Dr. Tripe's views as to the supreme advantage of absolute simplicity. He drew attention to plans of a block of buildings recently erected in Westminster, which were admirably constructed in every way,—the soil pipes outside the buildings, and properly ventilated,—and yet paying more than 7 per cent. A very important improvement in the construction of these rooms was the character of the partitions formed of corrugated sheet iron covered with plaster, a specimen of which was exhibited. These partitions are only two inches thick, thus saving space, and they were believed to be fire-proof, owing to the addition of sulphur to the cement, and would be readily disinfected. The most common defects, from a sanitary point of view, were next referred to briefly, all of which might be seen illustrated in the model of the unsanitary house in the Exhibition, whilst the sanitary house by the side would show what the corresponding arrangements should be. Old houses, though usually defective, would often stand pulling about a little better than new ones, and one thing, the most necessary, could always be done, viz., disconnecting the drains by interposing a water-trap and communication with the fresh air between the sewer and the house; waste pipes should also be made to discharge in the open air, and the water cistern rendered easily accessible, properly covered, and cut off from all communication with the drains.

Mr. Rogers Field emphasized the importance of means of attending to the water supply of the cistern being readily accessible, and of effective flushing apparatus for closets. He did not expect to find any house free from sanitary defects if built more than ten years, and many of those now being built were equally defective. London not being under the Public Health Act, 1875, the immense number of houses constantly being built in the metropolitan district were not properly under control; though in many cases proper arrangements were cheaper than bad ones, they were too often neglected. The only two instances in which he had been interfered with by the sanitary authorities were to prevent his constructing ventilating man-holes.

Professor Corfield drew attention to the importance of dustbins being frequently cleansed and all refuse removed. Some years ago contractors had large sums for the dust and were therefore anxious to get it; now the system was reversed and therefore the only way to insure its regular removal was for the sanitary authorities to undertake the work themselves. The most common defect in London houses was the connection of the water cistern with the drain or sewer.

Dr. Alfred Carpenter agreed with Dr. Corfield as to the removal of dust, and said it was also important that the quantity of dust should be kept as small as possible by improved fire places and the use of gas for cooking and heating. He also recommended frequent visits to the Parkes Museum, Margaret Street, where the best appliances of all kinds, both with regard to drainage and water supply, might be seen.

Dr. Bartlett, in the course of his remarks, alluding to the danger from fire in large blocks of buildings, unless they were thoroughly fire-proof, said from some experiments he had made with cement with which sulphur had been incorporated he believed it would be very valuable in enabling it to stand both fire and water.

Dr. Bernays, spoke of the good quality of London water as supplied by the companies before it got contaminated in the cisterns and said that much of the dustbin nuisance would be removed if vegetables were more carefully prepared before they were supplied to the consumer.

Mr. John Slater referred to the importance of a damp course and of ventilating under the ground-floor, and also advocated iron pipes for drains under houses.

The second of this series of Conferences took place on Tuesday, Captain Douglas Galton, R.E., C.B., F.R.S., in the chair.

The first paper read was on "Domestic Sanitation in Rural Districts," by Dr. George Wilson, Medical Officer of Health, Mid-Warwick District. Dr. Wilson's paper dealt with the questions of labourers' dwellings, water supply, and the disposal of refuse. On the first point he quoted an estimate based on the report of the Agricultural Commission of 1867, that one-third of the rural homes of England were unfit for human habitation, and that, therefore, 700,000 hovels ought to be pulled down. In many villages with which he was acquainted 10 to 15 per cent. of the cottages only contained one sleeping room and about half only two; though in that district, viz., Warwickshire, the defects were, according to the report of the Commission, much less glaring than in many other counties. Many of these defects could be dealt with under the Public Health Act, but a do-nothing policy was often encouraged by the appointment of officers of health at merely nominal salaries. Where they were precluded from engaging in private practice the improvement had been very marked, and the evil was diminished by the decline of the rural population. One of the great obstacles to improvement lay in the poverty of the owners, and another in the low wages of the occupiers, which prevented their paying rents which would encourage private enterprise in building cottages. Another impediment to improvement was the fact that unless the sanitary authorities applied for urban powers they had no control over the erection of new cottages, and thus jerry-building of the worst description and total absence of sanitary appliances were liable to occur. Thus even in the case of country mansions the cesspool was often in close proximity to the well, the drains leaky and unventilated, and the drinking water cistern connected with the water-closet. There was, therefore, a need for further powers and adequate bye-laws. The defects of water supply were next dealt with, and the provisions of the Public Health (Water) Act shown to be in most respects adequate to meet the case, if only they were put in force. The remainder of the paper was devoted to the three important points of closet accommodation, scavenging, and drainage. The old-fashioned privies and cesspools should be converted into pail or ash-pit closets, the contents of which should be frequently removed and put on the gardens, and this could be done at very small expense. The great desideratum was to keep the excreta dry and prevent undue accumulation. Where the garden space was insufficient to receive the excreta due provision should be made for removing it at frequent intervals, and this might be accomplished under the Public Health Act. This still left the slops and refuse water to be disposed of, and in villages and places where the population was increasing, covered drains ought to replace the open gutters and the sewage treated by irrigation if there were any danger of its flowing into streams from which the water supply was derived.

The second paper, on "Sanitary Houses for the Working Classes in Urban Districts," by Mr. H. P. Boulnois, was mainly occupied with technical details of construction which should be attended to in workmen's dwellings. Huge block-buildings were considered to be undesirable, though sometimes from the great value of land they were the only means of bringing decent accommodation within the reach of men earning small wages. Basement rooms were condemned, and flat roofs recommended as affording a drying ground or garden, and a means of escape in case of fire. A narrow street at the back was desirable as a means of removing the refuse daily, and all main streets should be at least forty feet wide. The water supply should be constant, and if intermittent the greatest care should be taken in the construction and fitting of the cistern. The principal obstacles in the way of erecting such dwellings were: 1. The avarice of the builder. 2. The ignorance of both builders and tenants. 3. The want of sufficient supervision by the sanitary authorities, mainly owing to a deficiency in the staff.

Sir Henry Acland, Bart., M.D., in opening the discussion, pressed the necessity of relying more upon the general education of the people than upon compulsion for improving sanitary conditions. He also pointed out the necessity of studying economy in the matter.

Sir Robert Rawlinson, C.B., also dwelt principally in his remarks on the necessity of greater economy in carrying out sanitary works, saying he was often shocked at the exaggerated estimates which came before him, and also at the great expense incurred in arbitrations arising out of sanitary improvements.

Dr. Thursfield remarked on the difficulty of carrying out the provisions of the Public Health (Water) Act owing to the limit of expense which could be incurred in providing a water supply, the utmost limit being about £13.

Dr. Woodford (Berkshire) referred to the difficulties which arose from rural sanitary authorities having no power to regulate the erection of building unless they applied for urban powers, and said though these were generally granted on applicetion they very often came too late to prevent the evil.

Dr. Alfred Carpenter spoke at some length on the necessity for further education, which he thought ought to be relied on more than compulsion. The greatest part of the obstacles which medical officers met with in getting their requirements carried out was ignorance on the part of the people.

Sir Thomas Acland, Bart., M.P., also dwelt on the importance of education, and thought it was very desirable that all officers appointed under sanitary authorities or boards of guardians should possess some certificate of competence to fulfil the duties.

Dr. Alfred Carpenter said the Sanitary Institute of Great Britain quarterly held examinations for surveyors and inspectors of nuisances in order to meet this requirement.

The Chairman said no doubt all agreed pretty well as to what might be called a sanitary house, but the mode of construction must differ according to the circumstances of the case. There was no reason why buildings in flats should not be as healthy as smaller houses if they were properly arranged. The great difficulty was finding the money to build these houses. In the country districts he did not see why proper dwellings should not be provided for the labourers who had to cultivate the farms, in the same way as stables were built for the horses, and even in towns it might be desirable for manufacturers to build houses for their workmen, as had been done at Mulhaus and various parts of the Continent, where the workman got a good house built for him and shared in the year's profits. He believed more powers were required, but still those already existing were not utilized to nearly their full extent. In many cases he thought it would be right that public authorities should erect workmen's dwellings, and that they might be made to yield a fair return. He agreed with what had been said on the importance of education, and he believed the Health Exhibition would, in that point of view, have a very lasting effect on the improvement of the sanitary administration of the country.

(To be continued.)

ROYAL INSTITUTION.

Electric Induction Experiments.

A lecture of some interest on the above subject was delivered by Mr. Willoughby Smith, before the Royal Institution, on Friday, the 6th inst. The results of some experiments were described by the lecturer as seeming at variance with those of similar experiments by Faraday. Mr. Smith commenced by explaining the methods of producing induced currents, and showed that their comparative strength could be easily measured by means of the reflecting galvanometer. One of the first experiments he made was to show the changes effected by the introduction of a plate of copper or iron between the primary and secondary circuits of an induction coil. If the induced current was formed by one hundred reversals per minute, the insertion of an iron plate caused the induced current to decrease by more than one-half, whilst the insertion of a similar copper plate produced no apparent change. If, however, the reversals were increased to the rate of one thousand per minute, the insertion of the iron plate still reduced the current rather more than one-half, but the insertion of the copper plate caused a decrease to about one-fifth. The lecturer then referred to the experiments made by Arago and Faraday upon a revolving disc of copper in an electric field, and stated that he considered from the results he obtained that the revolving disc might consist of iron or any other metal which is a good conductor. He also remarked that although an equal induced current was obtained from a revolving disc of iron at equal distances before and after the disc entered the electric field, yet with a copper disc the induced current was about two and a half times as strong at a certain point of the disc after leaving the electric field as at an equal distance before entering it. The lecturer considered this difference due to the slowness with which the polarization of copper is effected, and stated that this difference is increased in metals of lower conductivity, with the exception of lead.

Parliamentary and Law Proceedings.

The Extraordinary Case of Strychnia Poisoning.

The adjourned inquest on the body of Thomas Cross, aged 72, a road-sweeper, who was supposed to have died from the effects of the administration of strychnia, was resumed by Dr. Danford Thomas, the Coroner for Central Middlesex, on May 30.

It will be remembered that the deceased suffered from chronic bronchitis, and died suddenly after taking a powder, given him by a married daughter named Isabella Todd, who had recently arrived on a visit from Herne Bay.

The jury considered that the attendance of the drug gist from whom the powders were purchased was most desirable.

Mr. W. Neville Wheeler, druggist, of the Hackney Road, said the powders in question were sold by him. They contained nothing but calomel, and it was not possible that a mistake of any kind could have occurred. The poisons were kept apart from the other medicines, and he had not supplied strychnia or nux vomica in any shape or form.

Mr. Augustus Joseph Pepper, Examiner in Forensic Medicine in the University of London, and Surgeon to St. Mary's Hospital, stated that he had received the contents of the stomach for analysis, and had handed them on to Mr. Luff.

Mr. Arthur Pearson Luff, of the Marylebone Road, said that he had made the required analysis, and had detected the presence of strychnia. Neither he nor Mr. Pepper could say how much poison the stomach contained, but it was more than sufficient to kill the deceased.

Mr. Josiah Haynes, who described himself as an auctioneer, said that Mrs. Isabella Todd had formerly lived with him as his housekeeper. She was in the habit of taking calomel powders. He had some strychnia in his possession, which he had purchased to kill a dog, and this he gave to Mrs. Todd by mistake. They had been out together one day; and, at the Victoria Park Station, she not being very well, he took from his pocket what he thought was a calomel powder, telling her to take it at bedtime, as it would do her good.

The Coroner remarked that it was highly dangerous to carry about deadly poisons in one's pocket, and asked how it was that witness had it with him.

Mr. Haynes replied that about four years ago, wishing to kill a dog, he purchased from a friend, a druggist in Somersetshire, some strychnia, some of which he gave to the dog and killed it, whilst the remainder was put away in a box. A few days ago, whilst turning over some papers, he accidentally came across it, and put it in his waistcoat pocket for safety. On reading an account of the case in the papers, he felt in his pocket for the strychnia and found it gone, whilst the calomel powders were still there.

Mrs. Todd, on being recalled, said that Mr. Haynes had at different times given her calomel powders and other medicines, and she remembered his giving her one a fortnight ago, telling her it would do her good.

The Coroner said, if the jury believed the evidence of Haynes, the whole matter was explained as to how Mrs. Todd became possessed of the poison, and there could be no doubt that she divided it into two parts and gave it to her parents.

The Jury returned a verdict to the effect, that death had resulted from strychnia, administered by Isabella Todd in mistake for calomel; and censured the witness Haynes for his "careless and inexcusable conduct" in carrying about poisonous powders.

Death from Chloral.

On Monday, June 9, an inquest was held at Batley, before Mr. Taylor, Coroner, to inquire into the cause of death of Mrs. Mary Hepper. The deceased, who was 67 years old, has for the previous fortnight been at the house of her son-in-law, Mr. C. D. Grundy, dentist, Batley, on a visit. It appeared from the evidence that about eleven years ago the deceased had a fall, which caused a shock to her nervous system, from which she never perfectly recovered. A doctor prescribed for her small doses of chloral to induce sleep, and she had continued the practice of taking this drug ever since, with the exception of a period of two years. It was shown that during her visit to Batley she had taken several doses, although her daughter and son-in-law had tried to prevent her having access to it. She was in bed most of last week, and on Friday night she had a small dose of chloral, after which she continued in a state of slumber until about half-past four o'clock on Saturday afternoon, when she died before a doctor could be got to see her.

The Jury returned a verdict of "Died by misadventure, through taking an overdose of chloral."—*Leeds Mercury.*

Poisoning by a Patent Medicine.

Dr. George Danford Thomas has held an inquest at the University College Hospital, relative to the death of Louisa Hilda, aged twelve months, daughter of a hawker.

Evidence having been given as to the administering of a patent medicine to the infant, the Coroner said there was no doubt whatever that patent medicines were very injurious to children, and should only be given to them under medical advice, for it was well known that they sometimes contained an amount of morphia which would, especially in the case of a child such as the deceased, do more harm than good. The poor saw these patent medicines widely advertised to cure all diseases, but it was to be hoped that before long the law would be altered so that persons would have to make known the contents of each patent medicine before selling it.

The Jury, in returning a verdict in accordance with the medical evidence, expressed their disapproval of patent medicines being given to children without medical advice.—*Standard.*

Obituary.

Notice has been received of the death of the following:—

On the 6th of May, Mr. Richard Lake, Pharmaceutical Chemist, Plymouth. Aged 38 years.

On the 16th of May, Mr. William Adams, Chemist and Druggist, Plymouth. Aged 77 years.

On the 25th of May, Mr. William Pike, Chemist and Druggist, Lower Kennington Lane, London. Aged 58 years.

On the 26th of May, Mr. John Edisbury, Chemist and Druggist, Liverpool. Aged 68 years.

On the 1st of June, Mr. Frederick John Gunn, Chemist and Druggist, late of Axminster. Aged 56 years.

On the 3rd of June, Mr. David Reid, Pharmaceutical Chemist, Aberdeen. Aged 63 years. Mr. Reid had been a Member of the Pharmaceutical Society since 1853.

ANSWERS TO CORRESPONDENTS.

F. Chabot.—Your letter has been handed to the Secretary, who will probably communicate with you on the subject of it.

"*Joules.*"—(1) With pure bromide of sodium and distilled water the phenomenon mentioned has never been observed by us. (2) If the potassium iodide be dissolved in half the water, and the liq. hydrarg. perchlor. be diluted before being mixed, the hydrarg. biniod. formed will be redissolved and the mixture will remain clear.

W. Lyle.—See a paper on "Oleate of Bismuth" in the *Pharmaceutical Journal*, [3], vol. vii., p. 469. There is no recognized formula for an ung. bismuthi oleatis, but a 10 per cent. ointment would be a suitable strength, reducing the oleate either by simple ointment or vaseline.

X. Y. Z.—A pharmaceutical chemist is not exempted as such from filling the office of overseer.

J. H. Beacock.—A reply to your question would involve giving an opinion upon a legal point, for which we have no qualification.

Communications, Letters, etc., have been received from Messrs. Mercier, Wilkes, Fennell, Marshall, White, No. 1.

A NEW GLUCOSIDE FROM STRYCHNOS NUX-VOMICA.

[*First Notice.*]

BY WYNDHAM R. DUNSTAN,

Assistant Lecturer in Chemistry and Physics to the Pharmaceutical Society and Demonstrator of Practical Chemistry in the School of Pharmacy;

AND F. W. SHORT,

Assistant Demonstrator of Practical Chemistry in the School of Pharmacy.

In the course of a complete chemical and botanical investigation of *Strychnos Nux-vomica*, with which we have been occupied for some time past (the results of which will shortly be published), a hitherto unnoticed constituent of the fruit has been discovered, and on further examination proved to be a new glucoside.

The body was first isolated from the pulp in which the seeds lie embedded within the fruit. This pulp has never received a full chemical examination. It was tested for strychnine by Hanbury ('Pharmacographia'), and the presence of this alkaloid definitely shown. In order to fully examine the constituents of nux vomica pulp, it was dried and exhausted with that mixture of chloroform and alcohol (100 : 25) which we have previously shown to be the best and most suitable solvent for extracting the alkaloidal constituents from nux vomica seeds. The exhaustion was effected in the apparatus for hot repercolation and continuous extraction devised by us and described in this Journal (*Pharm. Journ.*, [3], xiii., 633). The chloroform-alcohol percolate as it cooled deposited crystals; these were separated and dissolved in alcohol and the solution spontaneously evaporated. In this way a mass of nearly colourless prismatic crystals was obtained. These crystals fused when strongly heated, then charred, and finally oxidized without leaving any ash; they contained no nitrogen, as was shown by their yielding no sodium cyanide when heated with metallic sodium. A larger quantity of pulp was next exhausted with chloroform and alcohol. The crystals deposited from the solution were thrice recrystallized from ordinary alcohol, and finally again from absolute alcohol. The perfectly colourless prismatic crystals thus obtained were analysed by combustion with lead chromate, when the following results were obtained:—

	Found. I.	Found. II.	Calculated. For $C_{25}H_{34}O_{14}$.	Calculated. For $C_{25}H_{36}O_{14}$.
C	53·38	53·77	53·76	53·57
H	6·61	6·59	6·09	6·43
O	40·01	39·64	40·15	40·00
	100·00	100·00	100·00	100·00

It is seen from these results that the formula of the substance which we propose to call *loganin* (Loganiaceæ) is most probably $C_{25}H_{34}O_{14}$, although this formula will require confirmation in other ways, for these empirical results might also lead to the formula $C_{25}H_{36}O_{14}$. The first formula is that given to the glucoside arbutin (from *Arctostaphylos Uva-ursi* and *Pyrola umbellata*) by Hlasiwetz and Habermann (*Ann. Chem. Pharm.*, clxxvii., 339), although, according to Schiff, the substance analysed by these chemists was a mixture of arbutin ($C_{12}H_{16}O_7$) and methyl arbutin ($C_{13}H_{18}O_7$). Habermann has since (*Monats. f. Chem.*, iv., 753) upheld the correctness of the original formula by further experimental results. But, be this as it may, the glucoside from *Strychnos Nux-vomica* is shown to be radically distinct from both arbutin and methyl arbutin, by a much higher melting point, and by not yielding quinol (hydroquinone) or methyl-quinol when acted on by diluted sulphuric acid.

The crystals of loganin lose no water when slowly heated from 100°—180° C. When further heated they liquefy at 215° C., this observation being made with the substance very gradually heated on the surface of mercury contained in a beaker, supported on a non-conductor in an air-bath—in fact, by a modification of the method for determining melting points originally suggested by Professor Redwood. This melting point was redetermined, using a capillary tube sealed at one end, into which the substance was introduced, the tube being slowly heated in a bath of glycerol (glycerin). It was noticed that the crystals softened at 200° C. and become transparently liquid at 215° C. Loganin is easily soluble in water and alcohol, less soluble in ether, chloroform and benzene. The aqueous solution is not precipitated by any of the alkaloid reagents, neither by lead acetate nor silver nitrate; further the solution is not affected by ferric chloride. Loganin develops no colour when acted upon by nitric acid or other oxidizing agents, although it is powerfully oxidized by a mixture of sulphuric acid and potassium dichromate; bromine water is decolorized by a solution of the glucoside. The most characteristic reaction of the substance is found in its behaviour with concentrated sulphuric acid. A very small quantity of loganin, when gently warmed with a few drops of concentrated sulphuric acid, yields a fine red colour, which, on standing, develops into a deep purple. An aqueous solution of loganin does not reduce Fehling's solution. When boiled with dilute sulphuric acid the glucoside is resolved into a glucose (reducing Fehling's solution) and a body which we propose to call *loganetin*. This substance, like loganin, gives the characteristic reaction with sulphuric acid although the purple colour does not develop so rapidly. Loganetin is soluble in water and alcohol, less soluble in ether and chloroform. The aqueous solution of loganetin is not precipitated by silver nitrate or lead actate, nor coloured by ferric chloride. The substance gives no colour when acted on by nitric acid. We are now engaged in a further study of loganetin.

From the amount of loganin obtained from the pulp on which we worked it appears to exist to the extent of from 4 to 5 per cent. in the dried material.

We now proceeded to examine the seeds of *Strychnos Nux-vomica* for the same glucoside, although its occurrence has never been noticed by other observers, nor does any mention of such a constituent appear in the original analysis of Pelletier and Caventou. About one hundred grains of the finely powdered seeds of *Strychnos Nux-vomica* were exhausted with boiling alcohol. The alcoholic solution was treated with tannin to precipitate alkaloid, and the excess of tannin was removed, together with colouring matter, by evaporating to dryness with lead hydrate. The dry residue was exhausted with absolute alcohol; this when evaporated left a small quantity of residue giving the characteristic purple colour which loganin forms with sulphuric acid. The aqueous solution of the residue did not reduce Fehling's solution until it had been boiled with dilute sulphuric acid. In a second experiment the alcoholic solution of the seeds was evaporated to dryness, extracted with water, and the aqueous solution precipitated by lead oxyacetate. From the filtered liquid the alkaloid was nearly entirely precipitated by tannin. The solution after filtering was evaporated to dryness and extracted with chloroform. When the chloroform was evaporated, a residue was obtained which gave the reaction for loganin with sulphuric acid very distinctly. We have since found that the presence of loganin may be detected with great readiness in the alcoholic extract of nux vomica which is official in the British Pharmacopœia by extracting it with boiling ether, which removes also a little oil with a trace of alkaloid. The residue from the evaporation of the ethereal solution gives the reaction of loganin when gently warmed with sulphuric acid.

It has been shown in this preliminary note that the pulp of the fruit of *Strychnos Nux-vomica* contains to the extent of 4 or 5 per cent. a new glucoside which we have termed loganin, the chemical composition and properties of which have been described. It has also been shown that loganin is contained in small quantity in the seeds of *Strychnos Nux-vomica* and in the pharmaceutical preparations made from them. In the future we hope to be able to indicate the chemical constitution of loganin and loganetin and to discover the relations (if any) of these bodies to the alkaloids strychnine and brucine. The physiological action of loganin will also receive attention. The pulp of *Strychnos Nux-vomica* was collected and prepared for us through the kindness of Dr. W. C. Ondaatje, F.L.S., of Galle, Ceylon, to whose invaluable services in aiding this investigation we shall allude in a forthcoming paper. For this is the least of our obligations to him.

THE ECONOMIC APPLICATIONS OF SEAWEED.*

BY EDWARD C. C. STANFORD, F.C.S.

(*Continued from page* 1012.)

There are two distinct and well defined varieties of kelp:—Cut weed or black-wrack kelp, and drift weed or red ware kelp. Cut weed kelp is the old soda-producing variety, and is made from the three Fuci, *Fucus vesiculosus*, *F. nodosus* and *F. serratus*; these grow on the rocks in the order named, the latter being the most submerged and containing the most iodine, though all contain but little. The plants are cut at low tide, floated ashore, dried and burnt; the weed does not soften much by rain, and it can always be obtained in the fine natural harbours of the West of Scotland and Ireland. This kelp, burnt into a dense fused slag, contained the most carbonate of soda, and was that variety which employed so many poor crofters and cottars, and enriched so many highland lairds. It is now worthless, and the Fuci, which hang from the rocks at low water in luxurious festoons in these lochs, are now entirely unutilized. I have seen 10,000 tons of this weed cut in a single loch, in a few weeks of summer.

The drift kelp is made from two varieties of red weeds, or laminaria, the *L. digitata*, and the *L. stenophylla*, the former known as tangle. Both are always submerged, and are torn up by the violent gales, so common on the west coast; both are sometimes cut in Ireland with long hooks under water from boats. These plants, especially the latter, suffer very much from rain, and are often, after drying, almost valueless; but if well saved, contain ten times as much iodine as the Fuci.

This is the only kelp now used for making iodine, and it ought to be burnt into a loose ash; but although they employ a different material, we have to deal with the same people, and they still insist on raking it into a molten slag, with iron clauts, at great extra trouble, so much so that the men of the family are obliged to do this part of the work, under the erroneous impression that it will weigh heavier, thus mistaking specific gravity for weight; the fact being that they drive off more than half the iodine, and a great deal of the salts, spending several extra laborious hours in reducing the value to a half. It may be asked why we allow it? An incident which occurred to me may answer that question.

Some years ago, when I had to take a large quantity of black wrack kelp in North Uist, it was made to enable the people to pay their rents, and could not then be given up, though it has been since. I tried hard to get some improvement made in the direction of burning the weed at a lower temperature. The people were assembled in great numbers, and the sheriff eloquently harangued them in Gaelic for me. Their objections were threefold: it would not yield so much, it would not be so good and it would take too long. The late Sir John P. Orde, the proprietor, and his factor were present, and it was agreed at last that the most experienced kelper and myself should try the experiment, each to have a certain quantity of weed weighed out to him, and each to burn it his own way. As I expected, my lot was finished first. The yield was 25 per cent. greater, and the product was also, weight for weight, 25 per cent. more valuable. Any one can understand this double advantage of ash *versus* slag. The old man, my opponent, on the result being explained to him, make a remark in Gaelic, which was translated for me as follows:—"I have been making kelp for fifty years and more, and am I to be taught by a young Sassenach with no beard on his face to speak of?" That was the only result of the experiment. How could I explain to him, especially in Gaelic, the difference between specific gravity and weight, to say nothing of quality? As they would not improve the process, the work had to be stopped, and their evidence before the Royal Commission shows how much they have missed it. We took away their clauts, but it was no use; landing once in the middle of the night, I came upon a group hard at work with new irons, raking off the salts, and making themselves hideous, for so intense is the heat, that the soda volatilized gives a strong monochromatic yellow flame which does not improve the beauty of the workers.

To show that this extraordinary idea still prevails, I quote the following from a daily paper, referring to the island of Tyree this year:—

"The men attending the kilns used to turn over the burning mass with iron 'clauts,' but about two years ago the company forbade the use of the 'clauts,' and the kelp is simply reduced to ashes instead of a hard substance. It may be better fitted for manufacture in this state, but it is also evident that it will take more of it to make a ton than by the old process."

It has one advantage for them; being on the sandy shore, or shingle, it enables them to rake in, and embody with the fused kelp a quantity of sand and stones. We sometimes get a block of granite thinly veneered with kelp from our Irish friends, to remind us, I presume, of their national wrongs, and take a slight revenge.

The great heat involves the additional disadvantage that the carbon reduces the sulphates to sulphides, which involve considerable expenditure of oil of vitriol to decompose them, so that sulphur thus deposited is one of the bye-products of the lixiviation of kelp. We are, therefore, compelled to reverse the ordinary process, and manufacture sulphur from sulphuric acid.

The usual yield of kelp from 100 tons of wet seaweed is 5 tons, and as only half of this is soluble, 2½ tons forms the total valuable product of the labour of cutting, carrying, drying, and burning 100 tons of wet seaweed. The burner in many parts, does not receive more

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than £2 per ton, sometimes less, so that all this labour is done for 2*s.* per ton of weed. When it is also remembered that bad weather often reduces this payment to nothing, it is easy to understand that this occupation is soon given up where any other employment can be obtained. Moreover, the weed is dried in a climate where a native comes up to you with the rain pouring off his hat and nose, and outrages your sense of sight by informing you, if he knows "the English," that it is "a wee misty." The large mass of material to be dealt with, the stormy character of the coasts, the constant moisture of the climate, all tend to still further reduce the quantity obtained. Even with favourable conditions the yield is only 5 per cent., which is quite inadequate to afford profit either to the maker or to the lixiviator.

These evils were fully pointed out in my former paper, and a method was then suggested by which several new products could be obtained, and the whole of the iodine secured. I proposed to submit the seaweed to destructive distillation in iron retorts, thus obtaining a loose, porous charcoal, which retains the salts and the iodine; ammonia, acetic acid and tar were obtained from the distillate. In looking over the tables published in my former papers, some of the diagrams of which are once more on the wall, I notice that the amount of iodine lost in kelp was much under-estimated; much too low a figure having been taken for the produce of iodine. The amount of kelp then made was 10,000 tons in this country, and 24,000 in France; and I estimated the loss of iodine, in this country alone, at 50,000 lbs. annually, it really was about three times that amount, or 150,000 lbs., worth, even at the present low price, £37,500, a sum in excess of the whole value of the additional new products proposed to be recovered.

The Duke of Argyll was the first to see the value of the improvement suggested, and the new process was first carried out in his island of Tyree, in 1863, where works were erected for the pnrpose; soon afterwards works were also erected in North Uist, under an arrangement with the late proprietor, Sir John P. Orde; and more recently in Ireland.

In some respects, Tyree was the best place that could have been selected; in others, the worst. The wildness of its shores, and its numerous outlying rocks, make it the deposit of much drift weed. The inaccessibility and the great difficulty of landing heavy machinery, etc., made the erection of works extremely difficult. The factor calculated that 30,000 tons were used annually for manure, and that four times that quantity was lost. Our calculations were based on recovering 16,000 tons of this, and if even that quantity could have been obtained, the works there would have had a very great success, and turned ont more iodine than all the other Highland shores put together. It is impossible, however, to estimate the amount of seaweed thrown up in a storm, and the sea has an awkward habit of calling again, and removing a good deal of it, or covering it over with sand. This seaweed is also much injured by rain, which soon washes out the salts and iodine. It is a nitrogenous substance, and is quickly devoured by maggots, which become flies, and the material, like some other riches, speedily takes to itself wings and flies away, so that when once I carted a large quantity to the works for experiment, some knowing ones observed that the Sassenach had taken a great deal of trouble to put in the material, but it would not give him any kind of pains to put it out, as it would leave him of its own accord. I may add that it did not; there is nothing so offensive as rotten seaweed, but I had preserved the weed with chloride of calcium. In the winter the long sea rods are thrown up, and these when properly stacked bear a good deal of exposure. There was much difficulty in getting the people to collect these at first, for it was a new thing, and they did not believe in it. They soon found out, however, that it affords winter employment for what they call "a lairge sma' family," and which, to do them credit, most of them possess, as children can work at it. It consists simply in stacking the tangle out of reach of the tide. This work has been going on ever since 1863, and none is lost that can be secured. The works in Tyree and in North Uist are still continued, to the great advantage of the people. For the latter the tangle is also collected in South Uist and shipped to Loch Eport. Both these islands also yielded large quantities of black-wrack kelp, which is now entirely given up.

The works were lighted with the gas obtained by distillation, but after the gas has passed through all the purifiers, it still burns with a strong monochromatic yellow flame. The ammonia obtained is all used as manure for the farm; for whatever other business you follow in these outer islands, you must be a farmer, to feed your horses, etc. The tar is used for the roof of the works; and I may state here, that after great experience of large roofs, many of which have been blown away, I prefer a lattice girder low felt root. No one who has not witnessed a winter gale in one of the Hebrides can form an idea of it. We find it advisable to raise the walls two feet above the girders on each side. I would also mention here that there is no building so efficient or suitable for the damp climate of these outer islands as concrete. The shingle of the shore is always there as the bulk of the material, and cement only has to be sent out. A vessel loaded with quick lime, anchored off one of these islands in a gale, is not a happy or a safe possession, and I know from experience that it does not contribute to the sweetness of sleep.

Iron retorts, heated by coal or peat, were at first used, but these were superseded by brick ovens, which are now employed without fuel. The tangle swells in the retort, and produces a charcoal of great porosity, from which the salts are easily washed out, and there are no sulphides. The residual charcoal is a very efficient decolorizer and deodorizer, but has never been largely used for these purposes. I shall mention presently an application of it.

The following analysis shows the comparison of this charcoal with that from bone. It does not in any way approach the composition of that from wood:—

	Seaweed.	Bone.
Carbon	52·54	11·77
Phosphates	10·92	77·70
Calcium carbonate	15·56	8·43
Calcium sulphate	—	·35
Magnesium carbonate	11·34	—
Alkaline salt	5·70	1·09
Silica, etc.	3·94	·66
	100·00	100·00

My experience in the use of peat may be worth recording. I found it give a very fair red heat; we cut and stacked about 600 tons a year of good quality in North Uist, it cost 2*s.* 6*d.* per ton, and I do not think it can be obtained for less. There was no royalty or rent, and the bog was close to the works. It required three times the quantity compared with coal, which greatly increases cost of firing. There is this peculiarity about peat that, where a large supply is required, its cost increases with the quantity collected, because a larger area must be worked.

The winter tangle forms but a small part of the seaweed used for kelp. In the spring and autumn large quantities of Bardarrig or tangle top come ashore, and this is the substance most difficult to deal with. It is ruined for kelp-making by rain, and it will not repay cartage to a long distance. Even washing about in the sea spoils it. To work it by my process would require a large number of small works, which is out of the question, so that it is still mostly made into kelp in the old way, with all its attendant evils. It is this substance which I propose now mainly to deal with. I am convinced that no process will deal effectually with it unless it will afford the means of removing it to central works, say at Glasgow, involving a cost for carriage equal probably to the cost of the weed, doubling in fact its first cost. There are two ways of removing it, either wet or air dry. I prefer the latter, although I have proved that it can be perfectly well kept in a silo, a specimen so kept for several month having reached me perfectly good, and still containing 83·8 per cent. moisture; and it has been also proved that such a covering of earth as that used for potatoes is an available silo. Most of this material can, however, be got air dry, if, as soon as obtained, it is put in a rick and thatched over, a good deal of it being lost at present while they are waiting for enough to burn into kelp, which cannot be made in a small quantity, and for a way they have of putting it in small stacks to get damp again, because they object to burning it too dry. Twenty thousand tons of this dry material could easily be got in Ireland alone. Four hundred thousand tons of the black wrack was the usual annual collection in the Hebrides in former years, now all unutilized, so that there is ample material if use can be found for it. It is a well known fact that the Fuci grow better when regularly cut.

We are not, of course, limited to Ireland and the Highlands, as any demand for the raw material would open up new and very extensive sources of supply.

The difference between kelp-making and distillation in retorts is shown by the following actual experiment on eight tons of tangle. Four tons were burnt with great care into kelp, and four tons were carbonized in a retort with the following results:—

	Cwt.	Per cent.
Kelp produced	15	18·7
Char „	30	37·5
	Salts. Cwt.	Iodine. Lbs.
Produce of char	8·77	29·25
„ kelp	6·57	13·27
Loss in kelp	2·10	15·98
„ per ton of tangle . . .	0·53	4·00

As a rule the kelp does not contain anything like this. The presence of sand, particularly, adds much to the volatility of the iodine.

A rich sample of seaweed ash, exposed in a platinum capsule over an ordinary Bunsen burner for twenty-four hours, will not retain a trace of iodine.

The sand in kelp is either shell sand, which is mostly carbonate of lime, or flint sand, which is silica; both are highly prejudicial, as the following experiment shows—100 grains of a rich seaweed ash was in each case heated for ten hours over an ordinary Bunsen burner.

	Per cent.	Lbs. per ton.
The ash contained of iodine . .	·8930	20
The ash after heating ten hours .	·4911	11
The ash with 50 per cent. limestone	·3572	8
The ash with 50 per cent. sand .	·2235	5

New Process.

The salts made from kelp at present are as follows, taking an average on 20,000 tons:—

	Per ton.
Muriate (95 per cent. potassium chloride)	5 cwt.
Sulphate (75 per cent. potassium sulphate)	1·8 cwt.
Kelp salt (sodium chloride, containing carbonate = 8 per cent. alkali) . .	3·8 cwt.
	10·6

Iodine, 12½ lbs per ton.

I found, in the first instance, that these salts could be easily extracted from the seaweed, by simple maceration in cold water; the amount so removed from air-dry Laminaria is pretty regularly about one-third of the weight, or 33 per cent., of which 20 to 22 per cent. are mineral salts, and the balance consists of dextrine, mannite, and extractive matter, leaving two-thirds of the plant, or 66 per cent., for further treatment, apparently unaltered.

This residue contains a peculiar new substance, to which I have given the name of algin; and the cellulose; the whole plant being thus utilized.

The comparison between the three processes will, therefore, be as follows, on 100 tons of air-dry Laminaria:—

Kelp Process.

Per cent. utilized, 18.

Kelp, 18 tons	Salts, 9 tons. Iodine, 270 lbs.	Residuals— Kelp waste, 18 tons, valueless.

Char Process.

Per cent. utilized, 36.

Char, 36 tons	Salts, 15 tons. Iodine, 600 lbs.	Residuals—Charcoal, 36 tons, tar, and ammonia.

Wet Process.

Per cent. utilized, 70.

Water extract, 33 tons.	Salts, 20 tons. Iodine, 600 lbs.	Residuals — algin 20 tons, cellulose 15 tons, dextrine, etc.

Showing that the last process has the first advantage of taking out more salts and iodine from the weed than any other; and these, even at present prices, are sufficient to recoup all the expense of carriage and working. Moreover, in the two prior processes, the residuals are those of the first product, in the last these are from the weed itself.

The water extract is carbonized, and the salts extracted. I append analyses of these; they differ from the kelp in containing no sulphides, and in containing calcium and magnesium salts.

Air Dry (Laminaria stenophylla).

21 per cent. salts.

	Per cent.
Calcium sulphate	1·93
Potassium sulphate	9·72
Potassium chloride	31·97
Sodium chloride	48·67
Sodium iodide	1·79
Sodium hydrate	0·13
Magnesium chloride	5·74
	99·95

Residual Weed (Laminaria stenophylla).

2·32 per cent. salts.

	Per cent.
Potassium sulphate	35·27
Potassium chloride	6·72
Potassium carbonate	5·00
Sodium carbonate	49·97
Sodium iodide	2·63
	99·49

It will be seen that 90 per cent. of all the salts are thus removed, and much of those that remain are products of decomposition. These salts are obtained by the carbonization of the water extract. This is not necessary, and may not be advisable; the salts can be fished out during evaporation. I append analysis of a 2 cwt. sample so fished:—

	Per cent.
Calcium sulphate	1·18
Potassium sulphate	14·20
Potassium chloride	27·81
Sodium chloride	55·11
Sodium iodide	1·69
	99·99

Iodine 32 lbs. per ton.

Also of the mother-liquor 54° Twad. evaporated—

	Per cent.
Potassium sulphate	16·35
Potassium chloride	17·48
Sodium chloride	54·98
Sodium carbonate	5·13
Sodium iodide	5·27
Water	·70
	99·91

Iodine 100 lbs. per ton.

(*To be continued.*)

THE INFLUENCE OF TECHNICAL INSTRUCTION ON CERTAIN BRANCHES OF CHEMICAL INDUSTRY.

The following notes on certain special industries, viz.: (1), chemical colours; (2), beet sugar; (3), the alkali trade, upon which the influence of technical education is plainly observable, are contained in the recently issued report of the Royal Commission on Technical Instruction.

I.—*Influence of Technical Training on the Chemical Colour Industry of Germany and Switzerland.*

Among the coal-tar colour works visited by the Commissioners, were those erected on the banks of the Rhine, at Basle, by Messrs. Bindschedler and Busch. These works, though far less extensive than those of Messrs. Meister, Lucius, and Brüning, at Höchst, or of the Baden Aniline and Soda Works, at Ludwigshafen, are carried on in a no less scientific spirit, and the general method of working adopted in all these establishments is identical.

The first principle which guides the commercial heads of all the Continental colour works, is the absolute necessity of having highly-trained scientific chemists, not only at the head of the works, but at the head of every department of the works where a special manufacture is being carried on. In this respect this method of working stands in absolute contrast to that too often adopted in chemical works in this country, where the control of the processes is left in the hands of men whose only rule is that of the thumb, and whose only knowledge is that bequeathed to them by their fathers.

On entering the works of Messrs. Bindschedler and Busch, one is struck, in the first place, with the adaptation of means to ends, with the substantially-built, well-lighted, well-ventilated workshops, and above all, with the all-pervading cleanliness and neatness. But it is not of these things that we now desire to speak, but rather of the method by which their business is conducted. In the first place, then, the scientific director (Dr. Bindschedler) is a thoroughly-educated chemist, cognizant of, and able to make use of the discoveries emanating from the various scientific laboratories of the world. Under him are three scientific chemists, to each of whom is entrusted one of the three main departments into which the works are divided. Each of these head chemists, who have in this instance all enjoyed a thorough training in the Zurich Polytechnic, has several assistant chemists placed under him, and all these are gentlemen who have had a theoretical education in either a German University or in a Polytechnic School. An important part of the system has now to be noticed, viz., that directly under these scientific assistants come the common workmen, who have, of course, no knowledge whatever of scientific principles, and who are, in fact, simple machines, acting under the will of a superior intelligence. The many and great advantages of this arrangement are patent to all; and the fact of having men of education and refinement in positions of the kind, renders the foreign manufacturer who adopts this system less liable to annoyance and loss (from sources which we need not more nearly specify) than his English competitor, who works on a different plan.

So much for the *personnel* of the works. Now for the mode in which they carry on their work. To begin at the beginning, we find no less than ten well-equipped, airy, experimental laboratories in these works, perfectly distinct from the workshops where the manufacturing processes are carried on. In these ten laboratories, the chief departmental chemists and their assistants work out their investigations respecting the production of new colouring matters, or the more economic manufacture of old ones. To assist them in their work, a complete scientific library is at hand, containing all the newest researches, for these, as we have said, form the material out of which the colour-chemist builds up his manufacture, and no sooner do the results appear of a perhaps purely scientific research which may possibly yield practical issues, than the works-chemist seizes on them and repeats these experiments, modifying and altering them so as at last to bring them within the charmed circle of financial success.

Thanks to Dr. Bindschedler, we are able to quote a specially representative case, and a clear description of one such case is worth a host of generalities. Through the original investigations of Messrs. Emil and Otto Fischer, the attention of the manufacturer was drawn to the leuco or colourless base obtained by the action of benzaldehyde on dimethylaniline, inasmuch as they stated that the salts of these colourless bases become green on exposure to air. Founded on these observations, an endeavour was made to effect the practical manufacture of a green colouring matter by oxidation of these colourless bodies. In order to attain the desired end, the following investigations had to be made by the chemist and his assistants who were to conduct the operations:—

(1.) A cheap method had to be found for manufacturing benzaldehyde.

(2.) A profitable mode of making the leuco-base had to be worked out.

(3.) The proper oxidizing agents and their best method of application had to be determined.

(4.) The best method of purifying and of crystallizing the green colouring matter had to be discovered.

The laboratory experiments on the above points having proved so far successful as to give prospects of good results, operations on a somewhat larger scale were started, and these yielding a satisfactory issue, the manufacture proper of the colouring matter, now well known as malachite green, on the technical scale was commenced; all the operations being watched by, and constantly being under the control of the chemists. But even now their scientific work is by no means ended. Continuous laboratory experiments go on for the purpose of finding improvements in the mode of manufacture. Thus, for example, the improved yield, both as to quality and quantity, of the benzaldehyde is a matter of investigation. Again, the synthetic production of the pure leuco-base by a more direct process is sought for, so as to get rid of loss in working, and to obtain a yield as close as possible to that pointed out by theory. In the same way improvements in the materials used for oxidation, and in their application, are made, so as to effect the oxidation quantitatively, without the formation of bye-products. Lastly, the action of various solvents is examined, so as to obtain the best form of the crystallized colouring matter. As indicating the value of these improvements made after the colour became a marketable article, it is only necessary to state that the price of the crystallized oxalate has been reduced from £2 to £1 4*s.* per kilo.

The foregoing may serve to give a picture of a really scientifically conducted works, where each step in advance is made systematically, as the result of a well-devised plan of operations. This is, indeed, the only means of progress, and this fact is so well recognized in Germany that each of the much larger colour works at Höchst and Ludwigshafen possesses a staff of from thirty to forty well paid and thoroughly trained chemists to conduct their operations. But we are, of course, far from believing that because the methods adopted in these foreign colour works are scientific and productive of good, those made use of in all English works must therefore be unscientific and bad. Taking the whole applications of chemical science we may, no doubt, with truth say that the English industrial chemists have been at least as successful commercially, and certainly as productive in new and important discoveries, as their Continental rivals. The Germans and Swiss, however, have been and still are distinctly before us, not only in the facilities which they possess of obtaining the highest technical training in their numerous Universities and Polytechnic Schools, but what is even more to the point, before us in the general recognition of the value and importance of such training for the successful prosecution of any branch of applied science.

The following statistics give some idea of the magnitude of the colour works of Messrs. Meister, Lucius and Co., at Höchst, near Frankfort, referred to above, and founded in 1862.

The establishment occupies an area of one hundred and fifty acres, of which twenty are covered with buildings. The staff includes fifty-one scientific chemists, fifty foremen, fifteen managers and engineers, and seventy-seven clerks and commercial men, with fourteen hundred workpeople. The works possesses its own railways, forty-one boilers, with a heating surface of four thousand square yards, and seventy-one motors, either steam, water, or gas-engines. The workmen and officials are domiciled in houses belonging to the company, and restaurants, baths, sick clubs, and pension funds have been established for the good of the employés. There is also a fire-brigade with five hand-engines, and one steam fire-engine. The total supply of water, from one hundred and forty-five fire cocks, amounts to 30,000 cubic feet per hour.

In 1882 the products of these works amounted to:—

(1.) 6,600,000 lbs. weight of alizarine.

(2.) 2,200,000 lbs. weight of aniline oil.

(3.) 1,540,000 lbs. weight of aniline, resorcin, and naphthol.

Colours.

The following are the separate products classed together under the last head:—

Aniline and aniline salts.

Fuchsine (no arsenic acid is used in its preparation).

Methyl violet.

Green and blue colours.

Eosin colours.

Naphthol colours.

Alizarine and artificial indigo.

Quinoline derivative (kairin a new substitute for quinine).

Acids.

The most important raw materials employed in manufacturing the foregoing products are as follows:—

40,000	tons	coal.
3,000	,,	tar products.
2,400	,,	caustic soda.
400	,,	potash salts.
2,900	,,	carbonate of soda.
17,400	,,	sulphuric acid.
10,100	,,	various other acids.
1,500	,,	iron borings and filings.
250	,,	wood spirit and spirits of wine.
1,000	,,	various chemicals.
6,800	,,	common salt.
2,050	,,	carbonate of lime.

The whole of the sulphuric, hydrochloric, and nitric acids used, is made on the works.

From about 70 to 80 per cent. of all the aniline colours manufactured are exported, the remainder used in Germany.

About 90 per cent. of the total make of alizarine is exported chiefly to England, but considerable quantities find their way to America, Russia, France, Holland, Spain, and Italy.

One of the most recent and most interesting additions to the above list of products is a derivative of quinoline, termed kairin, lately discovered by Emil Fischer. This substance, which is now being made at Höchst at the rate of about 22 lbs. daily, has been shown to possess important febrifuge properties, even exceeding quinine in activity, and it is not impossible that this artificial product obtained from coal tar may be the means of supplanting altogether the natural alkaloid. The importance of this discovery, should it serve the above purpose, can of course hardly be overrated, and it will then add another and most striking example to the numerous ones which already exist, of the immense importance to the human race of researches in purely scientific organic chemistry, which, at one time, appeared to have no practical value or possible application. It may, therefore, serve again to point the moral, which cannot be too strongly insisted upon, that it is only by the highest and most elaborate achievements of pure scientific investigation that the greatest practical advantages to mankind can be secured.

II.—Influence of Technical Training on the Beet-sugar Manufacture.

Probably no more striking illustration of the rise of a successful and most important industry depending upon the application of the scientific principles of engineering and chemistry can be found than in the Continental beet-root sugar manufacture. The increase in the consumption of sugar in this country has been very great. In 1843 it amounted to 200,000 tons; this figure was doubled in 1854; in 1874 it reached 850,000 tons, and in 1882 1,000,000 tons of sugar were consumed in the United Kingdom. Of these quantities in 1870, 165,000 tons consisted of beet-root sugar, whilst in 1882 the total was over 400,000 tons, valued at £10,000,000. The whole of this amount is imported from Belgium, France, and Germany, as no beet-root sugar is manufactured in this country.

To show the extent and growth of the Continental industry in a small country, we may cite the case of Belgium, with a population of 5,600,000. In 1846 the area under cultivation for beet-root was only 5421 acres; in 1866 this was increased to 44,480 acres, and in 1882 to 86,490 acres. The quantities of raw beet-sugar manufactured in Belgium were in 1880–81 68,000; in 1881–82 73,000; and in 1883 probably 80,000 tons were manufactured in one hundred and fifty-six works; that is, about one ton of sugar is obtained from one acre of beet-root crop. In France and Germany the area of beet crop and the consequent production of sugar is very much larger. The processes of extraction and purification of sugar from beet are complicated and delicate, requiring both scientific knowledge and capital, as the plant necessary for working up the juice into refined sugar is of a very costly character, and the operations require careful and scientific handling in order to ensure success. The juice contains not only sugar crystallizable and uncrystallizable, but also a considerable quantity of inorganic salts and organic substances other than sugar, and the presence of these latter ingredients prevents a large portion of the sugar from crystallizing, and therefore they require to be removed. This removal of the injurious constituents can only be effected when an exact analysis of the juice and of the sugar has been made, and this must be done at each stage of the operation, so that the mode of working shall be properly regulated, and such an investigation is a somewhat complicated process, needing skilled chemical knowledge. The quantity of sugar which is rendered uncrystallizable by the presence of inorganic salts or ash is about five times the weight of the ash.

In order to obtain the sugar which would otherwise be thus lost, many processes have been adopted, and of these that involving the use of strontia is the most recent. This method was secretly worked for some years in certain works in Germany, but it has now been generally adopted under the patent of Dr. Scheibler, chemist to the Beet-root Sugar Institution. By the use of the strontia process large profits have been made, and the plan has been successfully introduced into France and Belgium. The Continental beet-root sugar manufacture, partly of course in consequence of the Government bounties, has been a very profitable one; annual dividends as high as 100 per cent. having been paid by some sugar-mills. It would seem, however, that owing to the great increase in the number of these establishments, the trade has seen its best days.

The question of the cultivation of suger beet in the United Kingdom, and especially in Ireland, though it has received a certain amount of attention in various quarters, has not come to any practical issue. About 1850, Lord Clarendon, then the Lord Lieutenant of Ireland, ordered an official inquiry on the subject of the growth of beet-root in that country, and the results of that inquiry, presented to Parliament in 1852, showed that 78 per cent. of the beets grown in Ireland were rich enough in sugar to be worked, whilst the corresponding amounts for England and Belgium were 75 and 70 per cent. respectively. At that time the West India sugar had the command of the market; the sugar trade has, however, since that date been revolutionized, but no step has yet been taken by agriculturists and capitalists to commence the growth of sugar beet and the manufacture of beet sugar in this country. To produce the 400,000 tons of beet sugar now imported from the Continent we should need as many acres, but as the beet crop is taken only every three years the total acreage required would be 1,200,000. A large proportion of this, if not the whole of it, could be found in Ireland, and there can be no doubt that the introduction of such an industry would do much to improve the general agriculture of that country.*

[For further information on the Belgian Beet Sugar Industry, see paper by M. Melin, of Wanze, read before the Liége meeting of the Institution of Mechanical Engineers, 1883.]

III.—Influence of Technical Training on the Alkali Manufacture.

The beneficial action of high scientific and technical training upon the chemical colour and beet sugar industries having thus been shown, it becomes of interest to examine the effects of such education on another no less important branch of chemical manufacture, viz., the alkali trade, and in this instance the comparison of the relative position of the Continental and English works is by no means all in favour of the former. In the first place, as regards the workmen themselves, it may be truly said that in no country does any real amount of scientific education reach the ordinary workmen in alkali works, who are rather labourers than artizans. Moreover, the foremen, both in this country and abroad, are almost invariably men who enter the works either as laboratory boys or as ordinary workmen, and who have risen by virtue of industry and native intelligence, but who have had no scientific training beyond that afforded by the occupation in which they have been engaged. So far, therefore, as the education of the workmen employed in alkali works is concerned, the foreigner has no advantage over us, nor have we any over the foreigner. In the case of the managers and proprietors the matter is, of course, different. On the Continent nearly every manager of a soda works is a man of a very high degree of scientific attainment,—a highly trained engineer, and a highly trained chemist. An English manager, one at least of the older school, on the other hand, is scarcely ever a man who has had a similar training to that of Continental managers before they enter upon the duties of management. The Continental alkali makers are men of wider knowledge and of more extended scientific attainments than their English brethren. Thus, whilst probably none of our English alkali makers could discuss the chemistry of the latest organic colouring matter, nearly all the Continental masters are able to do so. But in the opinion of those best qualified to judge, and speaking of course of the managers of the first class works in each case, there is no doubt that the English alkali makers are just as well acquainted with the scientific bearings and relations of their own manufacture as their Continental rivals. Nor is the foreigner a better alkali maker than the Englishman, for even in cases in which the former obtains better results than are usual in this country, as regards economy of fuel and raw material, the cause is to be sought rather in the fact that his cheaper labour permits him, and his dearer fuel and raw materlal compels him, to do what dear labour and cheap fuel and material absolutely forbid to the English alkali maker, than in any superiority in scientific training of the one over the other. It certainly cannot be said that the English soda industry suffers in comparison with that of the Continent, owing to the want of scientific knowledge on the part of those who conduct it. Men of the highest talent and most eminent for their scientific knowledge are found in all our large alkali works, and it is a remarkable fact that with one or two exceptions, everything in the way of important improvements in the alkali manufacture by the Leblanc process has originated in England. Hydrochloric acid condensing towers, revolving black-ash furnaces, Glover-towers, mechanical calcining furnaces, mechanical salt-cake furnaces, plus-press furnaces, and last but not least, the Weldon plant; each one of these English improvements marks an era in the alkali manufacture, and has been at once adopted as a necessity by all manufacturers. Even the well-known ammonia-soda process, first successfully worked in Belgium, is chemically an English invention (Dyer and Hemming), though made industrial by a Belgian (Solvay). No less remarkable is it that, certainly often in England, and in some cases abroad, those men who have made the most important improvements or discoveries in the alkali manufacture have been self-taught, proving the truth of the axiom that a scientific education cannot stand in place of natural sagacity and workshop training.

It is the opinion of those intimately acquainted with the present condition and future prospects of the alkali trade, both at home and abroad, that such differences as exist between the results obtained on the Continent and at home, are due to differences of national character and local circumstances rather than to a superiority of scientific education, and it may be questioned whether many Continental alkali works could survive in face of English competition, if the import duties by which they are at present protected were abolished.

FAILURE OF THE CINCHONA CULTIVATION IN ST. HELENA.

Following closely upon the unfavourable report upon cinchona cultivation in Ceylon, to which we referred last week, a report has been received from Mr. D. Morris, Director of Public Gardens and Plantations, Jamaica, on the Present Position and Prospects of the Agricultural Resources of the Island of St. Helena, which records the practical collapse of the cinchona acclimatization experiment in that island. Mr. Morris gives the following

* The sugar factory of Mr. Duncan, established some years ago at Lavenham, and which was not successful, is about to be reopened. The use of strontia and other improvements in the manufacture, together with lower railway charges on the roots, encourage the new proprietors to anticipate better results.

detailed account of the various attempts and their results:—

"The proposal to introduce the cultivation of cinchona into St. Helena appears to have been made, in the first instance, by the late Dr. Roxburgh, who, as far back as 1814, recommended that seeds of *Cinchona officinalis* be obtained from South America, and that after plants had been established at St. Helena they should be transmitted to India.

"Sir Joseph Hooker, having on two occasions, namely, in 1839 and 1843, had favourable opportunities of forming an opinion respecting the resources and climate of St. Helena, when Sir Charles Elliott in 1864 began to develop planting operations in the island by the introduction of new and valuable plants, it occurred to him that cinchona, if properly tried, was likely to lay the foundations of a remunerative and successful industry.

"To undertake experiments a skilled gardener, Mr. J. H. Chalmers, was sent out from Kew in 1869, who, having been supplied with seeds, succeeded within a short period in raising several thousand cinchona plants in nurseries at Plantation House. Soon after a nursery was established at Newfoundland (altitude 2400 feet), in the immediate neighbourhood of the highest peaks and of the only uncleared natural forest remaining in the island.

"Mr. Chalmers succeeded altogether in raising about ten thousand plants from seed; and of these possibly more than one-half were planted out either on the slope above Newfoundland and under Actæon's Peak; or, on the Peak itself.

"This portion of the island, it may be explained, lies along the inclines of the central ridge of which Actæon's Peak, Diana's Peak, and Cuckold's Pit Peak form the culminating points. The general elevation is between 2500 and 2700 feet; the mean annual temperature rather below 60° Fah.; and the soil composed of a rich black vegetable mould—peat—overlying marl or decomposed volcanic rock. At this elevation the ridge is bathed in moisture for at least three days of every week; and thus favoured, as pointed out by Sir Charles Elliott, it has become covered with a luxuriant growth of ferns and other plants usually found in the home of cinchonas in South America.

"The prospect for cinchona at first was full of promise; and indeed if the cultivation had been attempted at an earlier period when there was a larger area of indigenous forest to select from, and when plantations might have been established on the northern and more sheltered slopes of the central range the results might have been very different.

"As it was, the plants put out on the terraces at the foot of Actæon's Peak began to die off, and, driven to a last resource, the cultivation was ultimately confined to the narrow ridges of Actæon's and Diana's Peak, which, in many places, are only a few feet wide and fully exposed to the strong trade winds which usually blow in St. Helena for about nine or ten months in the year. Here the soil on the surface was of a promising character, being composed of rich vegetable humus formed by the decayed leaves and stems of tree-ferns and native plants. Below, however, there was nothing but a cold, wet, indurated or slightly friable marl, very unsuitable for the growth of cinchonas, and which in Ceylon and India is known by experience to develop rot or canker in the roots, and to destroy every plant in contact with it. In his last report on the subject, dated December 12, 1871, Mr. Chalmers rightly attributes the large percentage of losses amongst his plants to the superficial nature of the soil, and reports that 'they invariably died soonest in shallow ground, and, on the contrary, lived longest where the soil was of greatest depth.' Further, he remarks, 'there is nothing, either in the climate or situation, of an unsuitable character; the soil alone seems to be at fault, being insufficient for the further development of the plants.'

"Out of about five thousand plants put out by Mr. Chalmers between January, 1869, and November, 1871, at the latter date there were only five hundred and forty of all ages then remaining. These were as follows:—

Cinchona succirubra,	over 2 feet	221
"	" 6 "	84
Cinchona officinalis	" 2 "	81
"	" 6 "	3
Number of both kinds under 2 feet. . .		151
Total . . .		540

"Further experimental trial was stopped by the reduction of the establishments effected by the late Admiral Patey, and Mr. Chalmers left the island.

"From 1872 up to the date of my visit the cinchona trees still living had received some attention, but practically their cultivation was abandoned.

"I went up to the central ridge with the Governor and Colonel Phillips, R.E., on July 31, and spent the day examining the soil and noticing the condition and state of the cinchona trees still remaining.

"Of the trees planted by Mr. Chalmers there were forty fine trees of *C. officinalis*, from 8 to 20 feet high; of *C. succirubra* there were one hundred and sixteen trees, from 8 to 20 feet high. The largest tree of all was a red-bark tree, *C. succirubra*, which measured 18 inches in circumference at 1 foot from the base. Except a few trees in exceptionally sheltered spots, they were all much damaged by wind, and presented a stunted and half-starved condition.

"The ridge on which they were growing formed a portion of the rim of the old volcanic crater of Sandy Bay. On the southern side there was a steep, almost perpendicular, wall of rock, about 100 to 250 feet deep, reaching down to broken lands and ravines clothed with ferns, briars, and the low, bushy growths of cabbage trees, jelico, wild olive and lobelia. On the northern and western sides the slopes, in places, were somewhat easier, but in no place was the ridge more than about 20 feet or 30 feet across. In many places, indeed, it was so narrow that it appeared like an old castle wall, clothed with vegetation.

"The length of the ridge on which cinchona had been attempted was altogether under ¼ mile in a direct line.

"Under the most favourable circumstances it was not possible to place more than about 5 or 7 acres under cultivation in cinchona; but in view of the very unsuitable nature of the subsoil and the large mortality which had taken place amongst the young plants, it is very undesirable to attempt any further experiments. According to the statement of a very intelligent native gardener, trained by Mr. Chalmers, who has been employed since at Plantation House and is occasionally looking after the cinchona plants on the ridge, more than 90 per cent. of the plants put out were lost owing to the unsuitable nature of the soil.

"I visited the ridge again on August 1, and spent the day in exploring the lands in the immediate neighbourhood of the peaks, with the view of finding land offering better facilities for cinchona planting than the ridge itself. In this I was disappointed. Except on the crest of the ridge there is no vegetable deposit or surface soil likely to grow cinchona, the soil elsewhere being very shallow and immediately overlying rock or cold impervious clay.

"Summing up the results of my inquiry, I am of opinion that, while the first impressions were favourable to the possibility of growing cinchona on the highest peaks in St. Helena, the character of the subsoil, together with the exposed position of the locality, would entirely preclude the undertaking being commercially a success; and on other grounds it would be very undesirable to cut down any more of the indigenous forest, which already is reduced to such a small extent."

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HAY FEVER.

About this time of the year many persons suffer severe inconvenience from a complaint which does not appear to have been recognized by the medical faculty as a definite form of disease until the earlier years of the present century. It has been defined as a peculiar affection of the mucous membrane of the nose, eyes and air passages, giving rise to catarrh and asthma, and is referred to generally under the name of "hay fever," though it is also variously termed "hay asthma," "pollen catarrh," "summer catarrh" and "rose catarrh." Whether the silence of the older medical writers upon the subject is to be attributed to the disease having been confounded with others that it resembled more or less closely, or whether it is a penalty attendant upon an advance in civilization, and marks an evolutional increase in the sensitiveness of the olfactory organ since the time when the patriarch failed to discriminate between the odour of the skin of the kid of a goat and the smell of a field, is not altogether clear; at any rate the first detailed account of hay fever was not published until the year 1819, whilst perhaps the most interesting contribution to the literature of the subject was made only a short time since by Dr. Morell Mackenzie, in a lecture delivered at the London Hospital Medical College, and published in the *British Medical Journal.** Few, however, as have been the years during which the etiology of the disease has been systematically studied the theories as to its determining cause have been many. Effluvia from grass or hay, heat, and especially the first heat of summer, the continuous action of light, dust, excess of ozone in the atmosphere, the influence of benzoic acid, coumarin and other volatile compounds, have all been put forward as causes with more or less plausibility; but most of them have been put out of court by known facts. For instance, in the United States hay fever is much more common in autumn than during the almost tropical summer; it does not occur at sea in the most sultry latitudes, whilst it is hardly known in the "land of the midnight sun," where the light lasts during the longest periods continuously; neither is it produced by the inhalation of air highly impregnated with ozone. In the opinion of Dr. Mackenzie, however, it has been clearly demonstrated by the experiments of Mr. Blackley, of Manchester, that the cause of hay fever is the action of plant pollen on the mucous membrane.

In the experiments made by Mr. Blackley, upon himself and others, he found that the inhalation of air containing pollen always produced the characteristic symptoms of hay fever, and that there was a direct relation between the intensity of the symptoms and the amount of pollen suspended in the air inhaled. This result is quite consistent with the common belief that the affection is produced by emanations from plants, although the bad name given to the sweet-scented vernal grass (*Anthoxanthum odoratum*) and the holy grass (*Hierochloe borealis*) seems to be based principally upon their more demonstrative fragrant odour, since there is no reason to suppose that their pollen is more active than that of the fox-tail grass (*Alopecurus pratensis*) or those of various species of *Poa* and *Lolium*. The pollen of rye is still more potent, and those of wheat, oats and barley are also very active. Indeed, the chief culprits, in this country at least, seem to be members of the grass family, and careful observations made by Mr. Blackley led him to the conclusion that 95 per cent. of the pollen occurring suspended in the atmosphere in England during the prevalence of hay fever is derived from the Gramineæ. Plants of this order come into blossom between the end of May and the latter part of July, which is precisely the period of the year when hay fever prevails. In America, however, the pollen of a Composite plant, the Roman wormwood (*Ambrosia artemisifolia*) is thought to be the most common cause of the disease. This plant blossoms in August and September, which is precisely the time that hay fever is most prevalent in North America. Besides the exciting causes of this disorder, however, Dr. Mackenzie recognizes the existence of a predisposing idiosyncrasy in certain persons, and among the circumstances supposed to influence this idiosyncrasy, race, temperament, occupation, education, mode of life, sex, heredity and age are enumerated. The influence of race appears in the fact that almost the only sufferers from hay fever are English and Americans, for natives of other countries resident where the disease prevails are rarely affected, it being never met with among Germans or French in New York, in which city it is comparatively common at certain seasons. On the other hand, in Asia and Africa only the English suffer from it. The nervous temperament appears to be a predisposing cause, whilst it is most singular that the complaint is almost exclusively confined to persons of some education and generally to those of fair social position. The rustic is much less subject to it than the citizen, and a larger proportion of men suffer from it than women. The idiosyncrasy is also undoubtedly

* The lecture has been reprinted in the form of a shilling pamphlet, which is published by Messrs. Churchill.

hereditary and becomes manifest in the majority of cases before the age of forty.

It is admitted that at present the treatment of hay fever is unsatisfactory, and that it is better for persons subject to it to keep themselves out of the way of possible excitants than to rely upon obtaining relief by the use of drugs or otherwise when the complaint has once been set up. When, however, it is necessary for such persons to remain exposed to the perils of a pollen-infested neighbourhood, the plugging of the nostrils with cotton-wool, the protection of the eyes by specially constructed spectacles, or the wearing of a gauze bag drawn over the head, somewhat after the *mode* of the veiled prophet introduced to the English-reading public by THOMAS MOORE, are among the protective artifices recommended. As has been mentioned, persons who suffer from hay fever are most commonly of nervous temperament: nerve tonics and other constitutional remedies, such as quinine, arsenic, opium and belladonna, have therefore been employed to ward off or to control attacks. Dr. MACKENZIE states that he has found pills containing one grain of valerianate of zinc and two grains of compound asafœtida pill more useful than any other remedy, the pills being ordered to be taken as the hay season approaches. When the disease is established, tincture of opium in doses of five to seven drops twice daily, and a saline purgative, have been found useful in reducing the secretion, diminishing the sneezing and bracing up the system. The diet should be at the same time nutritious and easily digestible. Dr. MACKENZIE trusts very little to local applications for the relief of the complaint, since many of those recommended appear to be apt to intensify the disease, especially those of quinine and salicylic acid, the recommendations of which appear to have been based upon the assumption that the complaint is due to bacterial agency. He says, however, that when there is profuse secretion with an excessive tendency to sneeze the inhalation of strong ammonia salts often gives great relief, while a soothing effect sometimes follows the inhalation of a "vapour" prepared from compound tincture of benzoin or the insufflation several times a day of a powder containing one-sixteenth of a grain of morphia and one grain of bismuth. For the relief of the irritation of the eyes a lotion containing two grains of acetate of lead and two drops of acetic acid to an ounce of water has been found useful, or a sedative collyrium containing acetate of morphia may be dropped into the eye. The symptomatic phenomena of hay fever are fairly characteristic, and the points in which they differ from those of common catarrh on the one hand or spasmodic asthma on the other have now been clearly made out. For a description of them the reader cannot do better than turn to the lecture that has been the occasion of this notice. It must suffice here to say that hay fever usually comes on very suddenly, varies considerably in its intensity and duration, apparently in direct proportion to the abundance of the *materies morbi*, is marked by a characteristic œdematous puffiness of the eyes, and as a rule first attacks its victims in the daytime and in the summer.

The Registrar has received from the Privy Council Office a copy of an Order in Council of the 11th inst., confirming the appointment of Mr. W. H. Symons as a member of the Board of Examiners for England and Wales.

* * *

We have been favoured by Dr. Murrell with a copy of the programme of the arrangements, so far as completed up to the present time, for the business of the new Section of Pharmacology and Therapeutics of the British Medical Association, at the meeting to commence in Belfast, on the 29th of July. From this we learn that the President of the Section, Dr. Thomas John Maclagan, of London, proposes to move, at the conclusion of his Introductory Address, a series of resolutions relating to the "British Pharmacopœia" and the "Patent Medicines Stamp Act," which will be supported by the Vice-Presidents, Dr. Matthew Hay, of Aberdeen, Dr. Walter Smith, of Dublin, and Dr. William Whitla, of Belfast. An expression of medical opinion upon these two subjects, such as may be expected in the subsequent discussion, can hardly fail to be of considerable interest at the present juncture, especially as it may be supplemented by that of pharmaceutical chemists, several of whom have been invited to attend the meetings of the section and take part in the debates. Amongst the other business that is to be brought forward, there is to be a debate on Antipyretics, to be opened by Dr. Alexander Collie and Professor Quinlan; Dr. Dujardin-Beaumetz, Dr. Thursfield, Dr. Boys and Dr. Currie are to read papers on New Antipyretics; there is also to be the special debate on Indian Drugs, to which we referred last week; and Dr. Shoemaker, of Philadelphia, is to give an explanation of the *modus operandi* of the New Oleates which have been associated with his name.

* * *

The Bill to regulate the practice of pharmacy in France appears to share the experience of the attempts to legislate for medicine and pharmacy in this country. The Bill has been included among the orders of the day since the last week in May, without making progress, and a day or two since it was still as low down as No. 34.

* * *

A short Bill to extend the operation of the Factory Acts to shops, which has just been introduced into the House of Commons by Sir John Lubbock, contains some provisions that might prove very inconvenient if allowed to pass into law without modification. One of them would make it illegal to employ "a young person," *i.e.*, a person under eighteen years of age, during more than twelve hours or later than eight o'clock in the evening of any working day of the week, except one, the limit of which is fixed at ten, whilst on one day the working hours are not to exceed seven and not to terminate later than five in the evening. Another provision would make it illegal to employ "a young person" in a shop at all on Sunday. It is evident that both these provisions would clash very much with the arrangements under which, at present, the public is, in many places, supplied with necessary medicines.

At the last meeting of the Board of Pharmacy of the city of New York a report was presented stating that there were then 2019 registered pharmacists in the city, 860 of whom were proprietors of pharmacies and 1159 assistants. During the three years in which the Board had held office it had examined 107 candidates, of whom 63 failed to pass. There had also been about three hundred prosecutions for the offence of dispensing drugs without a certificate.

* * *

The experiment of raising a supply of medicinal plants in the Government Botanical Gardens in Ceylon appears to have met a fair amount of success. At Hakgala jalap plants have grown most vigorously, and although at the time of the report very few tubers had been found, the bed was full of underground stems by which the plant could be propagated. The few tubers had, moreover, grown to a large size, one that was taken up weighing sixteen ounces. As, however, in the Nilghiris the best results are obtained at an elevation of 7000 feet, whereas at Hakgala the elevation is only 5400, it is thought probable that this may be the explanation of the tendency of the plants to make more leaf and less tuber at the latter place. Tinnevelly senna (*Cassia angustifolia*, var., Vahl) has succeeded perfectly at Anuradhapura, from whence good samples of the drug were sent to the Agri-Horticultural Show in Colombo in August last. Seeds of Mecca senna (*C. acutifolia*, Vahl) have also done well. Beds of seedlings of *Rheum palmatum* and *R. officinale* have been made at Hakgala, but though the crowns look plump and healthy, the plants make little growth. Still as the common garden rhubarb does well, it is thought that the medicinal plants may succeed if kept going until somewhat acclimatized. At Hakgala, too, the chamomile has become thoroughly established and can be increased to any extent. Taraxacum has not, however, done quite so well, the soil being too poor, and the plants having been eaten down by elk. A considerable quantity of fair-sized roots were, however, available for the use of the Medical Department.

* * *

Mr. Bowen, who for the last five years has presided over the Pharmaceutical Society of Victoria, having declined to accept the position for a fresh term, the Council of the Society, at its meeting in April, elected Mr. Huntsman as President. The new Vice-President is Mr. E. G. Hooper, whilst Mr. Gamble and Mr. Shillinglaw have been unanimously re-elected Treasurer and Honorary Secretary respectively. It was reported that twenty-eight students were attending the College of Pharmacy.

* * *

Notwithstanding the declining value of the cochineal crop in Teneriffe, to which we recently referred, it appears from a recent report by Brigade-Surgeon Bidie, that the Indian Government has decided to obtain a supply of cochineal insects from Algeria, with a view to introducing their rearing as an industry into Madras. The fodder and resting plant for the insects to be experimented with is the local prickly pear (*Opuntia Dillenii*), on which, according to Roxburgh, they thrive and multiply.

* * *

According to a recent return there were in the Dutch Government plantations and nurseries in Java, at the end of last year, 3,299,500 cinchona trees, showing a slight decrease as compared with the previous year; in respect to the "Ledgeriana" plants however, there had been a considerable increase. The surplus seed from the Government plantations is now sold by auction at Bandong, and in consequence of the increasing cultivation of the cinchona by private enterprise in Java it has been in considerable demand. At the first auction as much as 20 fl. per gram was paid for some lots of seed from the original "Ledger" trees.

* * *

Referring to the subject of the leaves of a plant, mentioned on p. 976, as being smoked by the natives of Angola, we are informed by Mr. J. R. Jackson, the Curator of the Museum of the Royal Gardens, Kew, that the hemp (*Cannabis sativa*, L.), is no doubt the plant meant, as it is well known on the west coast of Africa under the name "liamber,"

* * *

M. Jamin has been elected to succeed the late M. Dumas as Perpetual Secretary to the French Academy of Sciences by thirty-nine votes against twelve votes given to the other candidate, M. Vulpian.

* * *

It has been announced that a new 'Flora of Oxfordshire' is being prepared by Mr. G. Claridge Druce, which is to be not only a catalogue, but a history of Oxfordshire plants and of the botanists connected with the University and County. Mr. Druce, who is a pharmaceutical chemist, residing in Oxford, and whose name will be familiar to many of our readers, has been promised access to manuscripts and herbaria in the possession of private individuals as well as the active assistance of many eminent botanists; but we doubt not that he will be glad also to receive from fellow pharmacists any information on the subject they may be able to place at his disposal.

* * *

A note in the *Répertoire de Pharmacie* mentions the occurrence of a quantity of tartrate of ammonium (probably the acid tartrate) in a sample of codeine. The tartrate resembled the codeine in its external appearance; it was crystallized in hard rhomboidal prisms, slightly soluble in cold water, but dissolving readily in boiling water, yielding a solution with an acid reaction. The salt is insoluble in alcohol, which property first led to the detection of the admixture and facilitated its separation from the codeine.

* * *

According to the *Pharmaceutical Record* the New York Board of Fire Commissioners has been compelling retail druggists to pay a licence tax of two dollars for keeping "ether, nitrate of silver, and a few other combustibles and explosives." The imposition has, however, been resisted by one druggist, who has obtained a legal decision in his favour, but against this the Board has appealed to a higher court.

* * *

A meeting of the School of Pharmacy Students' Association will be held on Thursday, June 26, at 8 p.m., when a "Further Report on the Purification of Crude Antimony Sulphide" will be made by Mr. A. J. G. Lowe. A Report on Physics will be made by Mr. H. Allen, B.Sc., and a "Note on Eykman's Process for the Estimation of Ethyl Nitrite," will be read by Mr. T. S. Dymond.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

June 18, 1884.

Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Southall, Symons, Tanner, Taylor and Thresh.

MAJOR EXAMINATION.

Seven candidates were examined. *Three* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Blain, Alfred Lucas .... Bolton.
Burnett, Joseph Fearon .... Hyde.
Prothero, George Rees .... Pontypridd.
Steward, Josiah William .... Bridgnorth.

MINOR EXAMINATION.

Twenty-five candidates were examined. *Seventeen* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Astley, Frederick Aspinall...... St. Anne's-on-Sea.
Barker, George...................... Mirfield.
Britton, William Brannam...... Barnstaple.
Bunn, James Early Smee ...... Halstead.
Cullinan, Edward.................... London.
Davies, Charles Gardiner ...... London.
Earle, Ernest Haworth .... Hull.
Evans, John Richard .... Dowlais.

June 19, 1884.

Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Corder, Ekin, Fletcher, Gale, Linford, Plowman, Southall, Symons, Tanner, Taylor and Thresh.

Dr. Greenhow attended on behalf of the Privy Council.

MINOR EXAMINATION.

Twenty-nine candidates were examined. *Twenty-one* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Burnby, John James .... Bardney.
Heron, Frederick Chambers ... London.
Johnston, William .... Montrose.
Jones, Llewellyn J. W. .... Swansea.
Saul, John Edward .... Rock Ferry.
Sloan, William Guley .... Barking.
Stevenson, George .... Hucknall Torkard.
Watson, Arthur John .... Great Bridge.

PRELIMINARY EXAMINATION.

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

Certificates of the College of Preceptors.

Bridgwood, Walter Stuart ...... Birmingham.
Jefferson, John...................... Carlisle.

Certificates of the University of Cambridge.

Poole, Jeffrey .... Birmingham.
Riches, Frank Fraser .... Torquay.

Certificate of the University of Oxford.

Kingzett, John Frank .... Weston-sub-Edge.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly stated meeting of the Council was held on Wednesday, June 4.

Present—Mr. James E. Brunker, M.A., President, in the chair; Messrs. W. N. Allen, Thomas Collins, M.R.C.S.E., Alexander E. Doran, John Evans, L.A.H., William Hayes, E. M. Hodgson (Treasurer), Robert Montgomery, L.A.H., M.R.C.S.E., Robert Simpson, and Aquilla Smith, M.D.

The Registrar read letters from Sir W. V. Harcourt, Home Secretary, and Sir R. H. Collins, thanking the Council for its vote of condolence with the Queen and the Duchess of Albany in their bereavement, which were ordered to be inserted on the minutes.

The Registrar read a communication from the Pharmaceutical Society of Great Britain, stating that after consideration of the circumstances mentioned in Mr. Fennell's letter of February 20, the Society had resolved to accept the offer contained in that letter, and would supply copies of the *Pharmaceutical Journal* to the members of the Society for an annual payment of £20.

The President said this arrangement was on the understanding that the number of members would not exceed about sixty. The Pharmaceutical Society of Great Britain had acted very liberally in this matter.

Mr. Hodgson (Treasnrer) moved—

"That the thanks of this Society be given to the Pharmaceutical Society of Great Britain for supplying the *Pharmaceutical Journal* to our members on the liberal terms mentioned in their letter of April 5, read this day."

Seconded by Mr. Doran and agreed to.

The Registrar read a letter from Mr. G. O. Trevelyan, Chief Secretary for Ireland, acknowledging the receipt of the statement sent by the Council of their views relative to the amendments sought for to the Pharmacy and Poisons Acts.

The President said letters had also been received from other members of Parliament, acknowledging the receipt of the statement sent by the Council. Among them were Messrs. Gibson, M.P., and Plunkett, M.P., both of whom promised to attend to the matter whenever the Bill came before the House of Commons.

A letter was read from Mr. William H. Greer, Belfast, stating that he purposed shortly to present himself for the Society's Final examination, and asking the Council to accept a certificate from Dr. Frankland of his having attended a course of instruction in practical chemistry at South Kensington, although not one of the institutions mentioned in the Society's regulations.

The Registrar was directed to inform Mr. Greer that the Society had no power to accept the certificate of South Kensington without the authority of the Privy Council, but that application would be made to obtain such authority as soon as possible.

The Registrar read a communication from Mr. J. P. Middleton, of Hardwick Street, Dublin, re-submitting a certificate for practical pharmacy given him by Mr. G. H. Grindley, for acceptance by the Council.

After some discussion as to the bearing of the Attorney-General's opinion on the case, and the reply recently given to Mr. Hardy, Dr. Montgomery said as there was some doubt about the case, and as it was stated that other gentlemen who had served their time in the same establishment had had their certificates accepted, he would propose that Mr. Middleton's certificate be accepted. Mr. Middleton had served his five years in the full expectation that he would be allowed to come in for his examination.

The motion was seconded by Mr. Evans and agreed to.

The Registrar read a letter from Mr. W. C. Spencer, of Cork, inquiring whether a pharmaceutical chemist could start a business in conjunction with a registered dentist not qualified as a chemist, and place over their door "E. and S., Chemists and Dentists."

It was resolved that the Registrar be instructed to reply to the letter, informing the writer that such a firm, consisting partly of persons not qualified, could not legally compound prescriptions.

Mr. Allen brought up the report of the Committee on the Visitation of Examinations.

The report contained several recommendations with reference to the conduct of the examinations for the licence, which were adopted.

The principal change recommended was the extension of the examination to three days, so as to give each examiner a day to himself.

The reports of the Examiners for the April Examinations were presented.

The following gentlemen passed the examination for the licence in April last:—

William James Baxter ....Coleraine.
Morgan M. J. D'Arcy............Kingstown.
John Wilson Dickson ....Ballymena.
William Alexander Frizell......Derry.
William H. Griffin ....Ranelagh.
William James Smyth ....Belfast.

Two were rejected. Out of four who presented themselves for the Preliminary Examination, three passed.

The Council then adjourned.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

Assistants' Association.

A general meeting was held in the Society's rooms, on May 28, for the purpose of terminating the session and arranging business for the ensuing one. The President (Mr. N. S. Smith), in congratulating the members upon their position, spoke of the necessity there had been for such an Association in Sheffield, the satisfactory state it was now in, and the fair prospect it had before it. He said that remembering the ready response which various applications of theirs had received, he looked forward to increased educational facilities for the next session, and felt certain if each member would steadfastly bear in mind the real objects of the Association it would have a long and prosperous career.

The Honorary Secretary, Mr. J. Marshall, read the report, showing the Association to be, in all points, in a healthy and flourishing condition.

The President and Secretary were unanimously re-elected, who, with a Committee, consisting of Messrs. Eberlin, Grierson and Humphrey, will manage the business of the Association in the ensuing session.

Proceedings of Scientific Societies.

ROYAL INSTITUTION.

Liquefied Gases.

The last of the Friday evening lectures at this Institution for the session 1884 was delivered on the 13th inst., by Professor Dewar, upon "Liquefied Gases," and proved especially interesting, as during the lecture experiments were made in which the lowest temperature that has probably been obtained in any lecture-room—about $-140°$ C.—was registered. Professor Dewar made an opening statement to the effect that he considered the liquefaction of gases had been one of the most useful aids to the advance of chemistry. He then explained the method by which Faraday effected the liquefaction of gases by heating them in closed tubes, and showed the formation of liquid chlorine by means of a projection upon the screen. He stated, however, that only a few gases could be liquefied by this method, and that the use of liquid carbonic acid as a refrigerating agent had superseded it. He reminded his audience that when this liquid was suddenly released from the pressure under which it had to be kept the fall of temperature consequent upon the vaporization of a portion of it caused the solidification of the remainder, which appeared in the form of a white snow that could be handled with impunity. If this snow were submitted to pressure a solid having the appearance of ice was produced, which unlike the snow sinks in water and emits dense white fumes; these fumes the lecturer showed to be due to the rapid ebullition of the carbonic acid in the water. The lecturer said some difficulty had been experienced in registering the low temperatures now obtainable, as both the air and alcohol thermometers become useless owing to their condition being changed; he therefore used a reflecting galvanometer to register his results. Prof. Dewar then referred to the laws formulated by Boyle, Andrews and others concerning density and pressure, showing that each new law became more complicated because of necessary corrections. This led to an explanation of the term critical point, the critical point of carbonic acid being admirably shown upon the screen by the lecturer, where the moving striæ and sudden change of condition could be distinctly observed. By taking advantage of the phenomenon of heat becoming latent during the vaporization or boiling of liquid carbonic acid a temperature of $-80°$ C. had been obtained, whilst the still lower temperature of $-115°$ C. had been reached by vaporization under a very low pressure. Liquid nitrous oxide had also been used for the same purpose, a temperature of $-90°$ C. being registered, but both these compounds solidify at a lower temperature and are therefore comparatively useless. The Polish chemists, Wroblewski and Olszewski, have obtained the best results, however, by the use of liquid ethylene, a transparent fluid hydrocarbon which is the chief illuminating constituent of coal gas. With the use of ethylene a temperature of $-140°$ C. is registered, which allows of oxygen and nitrogen being solidified, whilst by similarly using the liquid oxygen in further experiments a temperature of less than $-200°$ C. has been obtained and hydrogen converted into a viscous liquid. It is impossible to illustrate these last results in a lecture-room, but Professor Dewar in a series of experiments with liquid ethylene reduced alcohol to a gelatinous condition, in which crystals could be distinguished, whilst bisulphide of carbon was completely solidified. After the lecture he succeeded by careful manipulation of pressure in demonstrating the liquefaction of oxygen, an experiment probably not before shown at a lecture. Though several chemists have stated that they have obtained lower temperatures than those above mentioned, Professor Dewar considered their observations must be wrong, owing to the incorrect marking of their thermometers, as until lately no one had succeeded in solidifying oxygen.

INTERNATIONAL HEALTH EXHIBITION.

Series of Conferences under the Auspices of the Medical Officers of Health, the Sanitary Institute of Great Britain and the Parkes Museum of Hygiene.

At the Conference held on Wednesday, the 11th inst., under the presidency of Mr. Edwin Chadwick, C.B., Dr. J. Sayer Bristowe, F.R.S., read a paper on "Industrial diseases." He said that the investigation of the cause of disease was a subject which had ever engaged and still engaged the choicest intellects in the profession of medicine, for not only did it present the highest scientific fascination, but it was fully recognized that it was in the discovery of the causes of disease that our best hopes of dealing successfully with diseases, either in curing, in mitigating or in preventing them, resided. The special subject he proposed to deal with was diseases due to poisonous or other influences incidental to certain occupations, which could only be escaped, if escaped at all, by the adoption of special precautionary measures. One of the most interesting groups of industrial diseases was that in which injurious effects arose from the slow action of metallic or other inorganic substances, or their derivatives, upon the system. Speaking on chronic lead poisoning, he said this disease was not limited to operatives in lead, such as plumbers, type founders, and manufactures of lead toys, but the general public were by no means free from danger, and that isolated cases, or groups of cases, of plumbism, referable to the drinking of water stored in lead cisterns, to the use of hair washes or cosmetics containing lead, and even to the long continued employment of lead as a medicine, were often brought under the notice of medical men. After referring to the symptoms of chronic lead poisoning, the paper dealt with the subject of chronic copper poisoning, chronic arsenical poisoning, chronic mercurial poisoning, chronic phosphorus poisoning, and the effects of irritants applied to the skin and to the lungs. Apart from the inhalation of solid particles which irritated the lungs into disease, it was certain that many occupations tended to the production of pulmonary phthisis and fatal bronchial affections; and in proportion as the people of a district were attracted to any collective indoor occupation, in such proportion, other things being equal, the district death rate by lung diseases would be increased, for bad ventilation tended to develop among work people a large excess of phthisis. Upon the spread of infectious fevers he thought this might be due in no inconceivable degree to the collection and importation of rags, for the purpose of paper making. In 1865 he made an extensive inquiry into the question of infectious diseases by rags, and more especially among the workpeople engaged in paper manufacturing, and the result was to a considerable extent reassuring, for it appeared that no diseases special to foreign countries had ever been introduced amongst them by the agency of foreign rags, and that, as regarded native rags, the only disease that was ever spread by them was small-pox, and this only rarely. The next disease referred to was what is known in Bradford as the "wool-sorter's disease," which had been ascertained to be the anthrax fever or splenic fever of cattle which prevailed in many parts of the Continent, and also in Asia and America, and was known to spread rapidly from cattle to other animals and to man. The chief sufferers by this disease were those who handled the raw hides coming from abroad, namely wharf labourers, sorters' labourers, and tanners' labourers; but no evidence of the occurrence of the disease could be traced among fellmongers. The paper concluded with a reference to the disease known by the name of "clergyman's throat," to which all habitual or professional speakers and singers are liable, and "writer's cramp," to which persons who had acquired skill in the use of particular groups of muscles were liable, such as the pianist, the swordsman, and others.

Dr. Ord, in opening the discussion, referred to overcrowding, working in ill-ventilated and ill-lighted rooms, as a chief cause of industrial diseases.

Dr. Greenhow said the question the Conference had met to discuss was one which had received very little public attention, although it was second to no other sanitary question of the day, because the mortality produced by "industrial diseases" was very large. Operatives in cotton factories, miners, printers of colour, paper stainers and chaff cutters inhaled dust given off in their operations and were very liable to lung diseases. He hoped the effect of the discussion would be to stir up public attention upon the subject.

Dr. Vacher (Birkenhead), after referring to various unhealthy trades, suggested that employers of labour should be compelled to adopt the most approved scientific processes for rendering shops and warehouses healthy, by which means trade diseases would be very much mitigated and the greater part of them entirely repressed. The Alkali Acts had done a great deal to improve the state of health in the neighbourhood of alkali works, but not much towards improving the health of the workers in the various works. He agreed that dust was a source of great evil, millers, bakers, masons and coal whippers suffering therefrom, but this danger could be greatly diminished by proper ventilation; cases of lead poisoning would be less rare if the precautions suggested by Government Blue Books were taken.

Dr. Ogle referred to the enormous difference in the rate of mortality amongst different trades, and cited statistics to show that the largest death rate was amongst innkeepers, brewers, butchers, cabmen, carters, bargemen, hairdressers and others; and the lowest amongst clergymen, gardeners, farmers, agricultural labourers and grocers.

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At the Conference held on Thursday, June 12, under the auspices of the Society of Medical Officers of Health, the Sanitary Institute of Great Britain, and the Parkes Museum of Hygiene, Dr. Alfred Carpenter in the chair, the subject discussed was the "Spread of Infectious Diseases, first, through the Agency of Milk, and, next, through other Agencies."

Dr. W. N. Thursfield read the first paper, and stated that the subject was one with reference to which it was specially desirable, on the one hand, not to create undue alarm, and, on the other hand, not to make light of or pass over apparent sources of disease, however improbable they might appear at first sight. It was, however, one of growing importance. Milk was becoming daily more recognized as the staple food for children, as from a variety of causes the proportion of women physically incompetent to suckle their offspring was yearly increasing. The use of milk by adults had of late enormously increased, and, although he could not but consider that to drink milk as a beverage with heavy meals was a grave dietetic error, the modern practice of drinking glasses of milk instead of beer at railway refreshment bars and elsewhere was certainly not to be condemned. The greatest risk of danger from milk was in the fact that the chief consumers were of an age when the body was most susceptible of taking disease, and the consumption of unboiled milk might literally be said to bring the consumer into closer connection with the animal from which the milk was drawn, and always to some extent and often most intimately with the family and domestic arrangements of, at least, one householder, and often two. Since Dr. Ballard's report of an epidemic of typhoid fever in Islington in 1870, when attention was called to the matter, records of about a hundred epidemics alleged to be traceable to milk dissemination had been published, and others, not published, had been noted. Making allowance for all doubtful cases it might be accepted as an absolute fact that epidemics of typhoid fever and scarlet fever had been repeatedly disseminated by milk, and there was very strong evidence that diphtheria had been so disseminated. He believed there was very little accurate knowledge as to the mode in which milk became a vehicle for the germs of infectious disease. To effectually prevent milk epidemics precautions were necessary, first, at the house of the consumer, secondly, at the milk shop of the retailer, and, thirdly, at the dairy farm of the wholesale purveyor. Upon the first point he recommended boiling of milk, as it was a well-known fact the consumers of boiled milk had, as a rule, escaped in all milk epidemics. Upon the second point, he suggested that urban sanitary authorities should have the power to stop the sale of milk consigned from any particular farm on the occurrence of any infectious disease, and that it should be incumbent on retailers, when required by the sanitary authorities, to furnish a list of their customers. Upon the third point, he suggested that the premises on which the business of a milk purveyor was carried on should be registered with the local authority, and every registered dairy should be provided with a plentiful supply of good potable water for the use of the dairy and cows. The dairy used for storing the milk should not be subject to animal effluvia of any kind, and should be satisfactorily drained, and not used for general domestic purposes. Milk should not be transmitted for sale when presenting any marked deviation from ordinary appearances, in either colour, smell, or general condition, or when obtained from an animal manifestly the subject of constitutional disease, acute disease, or infectious disease of any kind. On the occurrence in the person or family of anyone employed about the cows or the dairy, of any eruptive or infectious disease at all, or of any throat complaint affecting three or more persons, the affected individuals should be isolated, and the fact notified to the health officer. He believed inspections might be so carried out that the inspector would come to be looked upon, not as an interloper only borne with so far as the law demanded, but as one in a position, under certain circumstances of disease incidence, to give advice, valuable from a commercial, as well as from a sanitary point of view. Whatever differences of opinion there might be on technical points and matters of detail, he thought that all who had carefully considered the subject would have formed a decided opinion that the adoption of regulations as to the sale of milk should be incumbent on local authorities, and not permissive, as at present, and that the regulations should be applied at the producing as well as the distributing depôts.

Dr. W. H. Corfield next read a paper on "How Infectious Diseases are Spread." He thought the atmosphere was the most universal medium of communication, though some poisons were more readily conveyed in this way than others. Poisons of several diseases might be conveyed by means of clothing, and laundries were often the agencies of dissemination. An instance was given where chicken pox had been communicated by means of letters. Drinking water was a most important vehicle for conveyance of cholera and enteric or typhoid fever with dysentery in hot climates; and diphtheria might be spread in this way. In some instances it had been shown that flies conveyed the poison of infectious deseases.

Professor de Chaumont, F.R.S., thought there could be no doubt that milk was a vehicle of communicating typhoid and enteric disease, and in a smaller degree also scarlet fever and diphtheria, although this view was by no means shared upon the Continent. Before attributing disease to milk the cause should always be thoroughly investigated, because it occasionally happened that it was due to other causes.

Mr. Shirley Murphy said in practice it was impossible to detect these poisons in milk in such a manner as to enable the investigation to be of use in stopping an outbreak. The only way in which it could be known whether milk was infected with the germs of scarlet fever or enteric fever was by the effect it produced on the people who drank it, and it was an unfortunate thing that medical officers of health were unable to prevent infection until a certain number of deaths had occurred. He agreed with the readers of the papers that there was less chance of infection to persons drinking boiled milk.

Dr. Flemming, Dr. George Wilson, Dr. Priestly, Dr. Pringle, Dr. Armstrong, Dr. Charles West, Dr. Anderson, Mr. Burns and Dr. Dudfield having also addressed the meeting,

The Duke of Buckingham (President of the International Health Exhibition) said this question was one in which he took an especial interest, and he hoped the result of these Conferences will be to draw the attention of the public to the subject. One of the most remarkable effects of that Exhibition would, he trusted, be the elucidation of a vast number of sanitary questions which affected the whole of the inhabitants of this country. The question of sanitary legislation was no doubt one which pressed more and more upon the attention of the public, and it came home to the labourer as well as to the rich man. He quite concurred in the view which had been expressed, that a more general control over sanitary matters was wanting in the country as much as in large towns, and Parliament must before long be called upon to deal with this question. The object of those Conferences was to bring forth the evils which now existed, and to elicit opinion as to the general grounds upon which they might be dealt with.

After a few remarks from the Chairman, the Conference adjourned.

At half-past 5 o'clock Miss Smithard gave a lecture on Dairy Management, with a practical demonstration of butter making. She dwelt especially on the necessity for absolute cleanliness in the dairy, and all vessels appertaining to it, and on attention being given to temperature, a slight rise or fall of which would prevent the formation of the butter. The Normandy and Danish systems of butter making were described, and some very nice looking butter was produced at the conclusion of the lecture, and worked up into proper form for market.

Lord Reay, who occupied the chair, in proposing a vote of thanks to Miss Smithard for her admirable lecture, expressed a hope that English farmers would pay more attention to dairy work, as there was no reason why England should not make the best butter in the world, and even export it to foreign countries instead of depending on them for her own supply.

The next Conference of this series was held on Friday, June 13, the Earl Fortescue in the chair. The Chairman said that in the promotion of sanitary reform affecting the widespread work of sanitation, it must be inevitable that individual liberty and the rights of property must to a certain extent be interfered with for the public good. He should listen attentively to the arguments for and against a novel, but by no means unprecedented, extension of that interference in the shape of compulsory notification of the existence of infectious diseases. It was for the advocates of any compulsory interference with individual liberty or with the rights of property to justify exceptional legislation for that purpose.

Dr. Alfred Hill read a paper on "The Notification of Infectious Diseases: its Importance and Difficulties." The paper, after referring to the value of compulsory notifications of births and deaths, dealt with the importance of sanitary authorities having the earliest possible information of disease in order that its spread might be prevented. The objection to voluntary notification was that it was incomplete, and consequently useless for the prevention of epidemics. The value of complete notifications was well seen in Birmingham during the early days of the present visitation of small-pox. After referring to the various objections to the proposal, namely, the compulsory character of the duty, the antagonism between medical practitioners and medical officers of health, the betrayal and destruction of that confidence which was necessary between doctor and patient, and that notification would be injurious to business, the lecturer concluded by expressing his opinion that these objections were for the most part of a hypothetical and speculative character, and that its principal opponents were persons who had no actual experience of its working. On the other hand, both the public and the medical profession in the thirty-eight towns where it had been already submitted to a practical test accepted it with satisfaction.

Dr. Alfred Carpenter also read a paper on the same subject, but dealt more particularly with the right and duty of the State to enforce the notification of infectious diseases. Having detailed the history of the progress which had been already made in the direction of notification of disease, he said the object of notification was not simply a registration, but a repression of disease, and if the repression was brought about the means whereby it was done was of no consequence. He suggested that they should try to get a general Act which should apply the same law as to infectious disease as now applied to contagious diseases among animals. If after a time the general application of such a law failed in its effect there would then be a sufficient reason for placing penalties upon the whole medical profession for not performing that which could only be regarded in the light of a moral duty. The power of instituting prosecution for not carrying out the law should be entrusted to the Medical Council of Great Britain, so as to get rid of the possibility of professional rivalry and vindictive or malicious action.

Mr. W. Blyth thought those who wished for compulsory notification had to make out a very strong case before it could be obtained. He believed that a case had been made out for some alteration, though he could not go so far as the readers of the papers. Some medical gentlemen imagined that compulsory notification would altogether stamp out infectious disease, but this was a fallacy, as many persons were every day walking about the streets suffering from scarlet fever, who did not even know they were suffering from the disease.

Dr. Carter (Liverpool) did not believe that the private Acts now in force would work without serious modifications, and that they did not control the spread of infectious disease more than it was controlled in other towns without such Acts. In support of this view he quoted statistics to show that in towns where the Act was in force the death rate had not been in the slightest degree reduced.

Dr. Armstrong (Medical Officer of Health of Newcastle-on-Tyne) maintained that since the Act had been in force in Newcastle great improvement in the health of the inhabitants had taken place.

Mr. William Young (Secretary to the Society for the Compulsory Abolition of Vaccination) objected to compulsory notification, and suggested that as zymotic diseases were being stamped out by the present sanitary arrangements they should be tried a little longer before legislation was attempted. He believed the bogie of infection had been raised up to serve some purpose.

Dr. Mahomet thought the system of notification and isolation would not answer; for in the case of measles the most infectious period was during the first four days, when the disease could not be diagnosed. Typhus had been almost banished by improved sanitary arrangements, and with regard to small-pox that could be prevented by vaccination. Isolation might do good in the case of scarlet fever if every case could be dealt with, but many persons had it without knowing it.

Dr. Dudfield spoke in favour of notification of infectious disease, and referred to the good effects of the system as carried out in Kensington.

Mr. James Bailey (Secretary to the Vigilance Association) urged that a good case must be made out before such a measure was attempted to be forced on the poorer classes, for he did not think sanitary officers would attempt to meddle with the rich. He agreed with Dr. Carter that the laws which were in force in certain towns compelling compulsory notification had not resulted in any marked diminution of disease.

Dr. N. Hardy, as a medical man, objected to the principle of compulsory notification, and referred to the great plague of London, when compulsory notification was necessary, as an instance that it would not stamp out disease.

Professor Corfield said it was absurd to say that the notification of epidemic diseases did not prevent the spread of disease. In such cases as measles, schools could be closed directly the disease was known to exist, and only recently this disease was checked in St. George's, Hanover Square, in this way. He objected to the liberty of the subject to spread infectious diseases.

Dr. Charles West testified to the immense advantage of notification, but did not go into the question of compulsion. He had seen the evil arising from concealment in a health resort in the South of France, and the diminution of contagious disease where notification was practised.

Dr. Taaffe (Brighton) said he could have prevented the spread of typhoid fever amongst ninety families, i the first case, which arose from contaminated milk, had been notified to him. He was in favour of compulsion.

The Chairman, in summing up the discussion, said it seemed to him that a case had been made out for compulsory notification of disease, but after the difference of opinion which appeared to exist amongst the medical profession he did not think a case had been made for compelling medical men to notify cases which came under their notice, but that the responsibility should lie on the householder. As an old sanitary reformer he could not conceal from himself that the fullest notification did not always prevent the spread of zymotic disease, whilst in other cases where favourable food conditions and cleanliness prevailed such diseases did not spread.

At the Conference on Saturday, Lieutenant-Colonel Sir J. M'Garel Hogg, Bart., K.C.B., M.P., in the chair, two papers were read: (1) "The Disposal of the Dead," (2) "Cremation." The first paper was read by Mr. A. Wynter Blyth, who said the term "disposal of the dead" in its popular narrow limitation meant simply the disposal of human remains, but, taken in its widest significance, included the disposal of everything which had had life, whether vegetable, animal, or human. He should confine himself to the methods of dealing with human remains, viz., simple exposure, burial in the ground, in the sea, cremation, and embalmment, under which head might be included all kinds and methods of preservation. The first method only existed among a few races and tribes, and as to the second, viz., earth burial, its origin had been confidently ascribed to sanitary precautions, but, so far as he could see, the study of the habits and methods of thought of primitive man by no means countenanced this view. If this plan were to be continued he would suggest that only one body should be buried in a grave at a minimum depth of six feet, that the use of vaults should be abolished, that no irremovable headstones or monuments should be allowed, and at the end of a certain number of years, reversion to agricultural purposes. With regard to burial in the sea he thought the same objection applied to that as to cremetion, that it too effectually disposed of the body, rendering certain crimes difficult of detection. With regard to cremation, he said the practical aspects had recently received a fresh impetus in the form of a declaration by Mr. Justice Stephen to the effect that there was nothing in the English law forbidding cremation, and by a Bill which was introduced into Parliament with the object of enacting regulations so as to insure that the practice of cremation was not applied to the concealment of crime. As to the objection against cremation that the discovery of organic poison in cases where murder had been committed would be impossible, he suggested that anyone desiring the cremation of a friend or relative should give notice to the coroner, who would thereupon direct a medical man to at once visit the case, make a *post-mortem*, and give the coroner a written report, and upon this report, if favourable, the coroner would give his certificate for cremation. The expense of the medical examination would of course fall on the relatives of the deceased. As to embalmment, he thought all persons found dead in the streets, and not identified, should be subjected to this method, and remain unburied for many months in order to give an opportunity of solving the problem of what were called "mysterious disappearances." In conclusion, he suggested that funerals should take place between 4 and 8 a.m., and that unnecessary expense should be dispensed with.

Mr. Wm. Eassie, C.E., next read a paper on "Cremation." He said that upwards of fifty lectures had been publicly delivered upon cremation since the foundation of the Cremation Society of England in 1874, and the general consensus of opinion was in favour of the introduction of the practice. With regard to the only tangible objection made to cremation, that it might serve as a screen for poisoners, he thought the conditions enforced by the Cremation Society before allowing the use of their Crematorium at Woking would fully meet the case. The following were the conditions:—"(1). An application in writing must be made by the friends or executors of the deceased—unless it has been made by the deceased person himself during life—stating that it was the wish of the deceased to be cremated after death. (2). A certificate must be sent in by one qualified medical man at least, who attended the deceased until the time of death, unhesitatingly stating that the cause of death was natural, and what that cause was. (3). If no medical man attended during illness, an autopsy must be made by a medical officer appointed by the society, or no cremation can take place." Crematories were now in full use in Gotha, Milan, Rome and other places, and during the last few years some five hundred bodies had thus been withheld from lingering corruption. Cremation societies, with thousands of adherents, existed in France, Holland, Sweden, Spain and Portugal, and the adoption was merely a matter of time in America. Cremation could be performed within two hours at the expense of a few shillings, and an ordinary body reduced to some three pounds weight of pure white ashes. The crematory chosen by the English society was built upon the Gorini pattern, a plan of which was exhibited, one of its chief advantages being that the commonest fuel could be made use of. On one occasion he destroyed 120 lbs. weight of a carcase at Woking, chiefly with a few faggots of wood, at a cost of $3\frac{1}{2}d.$ each. After referring at some length to the dangers attendant upon burial, and the advantages of cremation, especially in cases of persons who had perished from disease, the paper concluded, with the expression of a hope that some State regulations would soon be formulated, such as were contained in Dr. Cameron's Bill, and such as had been published by the Cremation Society of England.

Dr. Cameron, M.P., thought this subject was one of the most important that could well be discussed in connection with a Health Exhibition. From a report published in 1851, it appeared that in England and Wales as many persons died and were buried without any certificates as to death being given, as died in the metropolitan district in the course of three months, and in England, Scotland and Ireland the number of persons who were buried without a certificate in a year amounted to as many as died in the entire metropolis in five months. With regard to cremation, he thought it was very hard that if a person wished to be cremated he should not be allowed to have his wish, though he did not believe that cremation would become general for some time yet. If cremation was legal Government had no right to interfere in the matter. As to the objection that it would shield crime, he thought that was disposed of by the statement he had already made as to the numbers who went to their graves without any certificate of death.

Sir Spencer Wells, Bart., was of opinion that the present style of burying the dead perpetuated disease, and that cremation would be a great boon. He was glad to see that this question had been taken up by the Commissioners of Sewers, and no doubt cremation would soon be adopted.

Dr. Farquharson, M.P., referring to the discussion which had taken place in Parliament upon the subject, said the supporters of cremation had been twitted by Sir W. Harcourt that they had not the public at their back. Having said that, Sir William thought he had crushed the movement; but he must have been surprised to find that seventy voted in favour of the Bill, and that the Press almost unanimously supported the movement. The growth of opinion upon the subject was very rapid and as it had been held that cremation was legal. No doubt when the subject again came before Parliament it would meet with more success.

Rev. Brooke Lambert strongly advocated cremation and denied that it was contrary to religion. If it were supposed that the actual carcase of an individual comprised the title deeds to resurrection, then they came to this extraordinary conclusion, that the martyrs, who of all men in the world were supposed to have the best right to resurrection, were the very people who had lost their title deeds. Those who objected to cremation on religious grounds were the people who had least considered the subject.

Dr. Bartlett also supported cremation, dwelling chiefly upon the chemical aspects of the question.

After a few remarks from Dr. Pringle,

Captain Douglas Galton said, no doubt cremation had many advantages, but it would be a very long time before it became universal in England, and, therefore, sanitarians would do well to pay some attention to other modes of disposing of the dead.

Dr. Dudfield was glad to find the religious and sensational objections to cremation were so far on the decline that there was a chance of the question being discussed and settled upon its merits in the not far distant future. He recommended the erection of public mortuaries and the compulsory removal of dead bodies thereto, more especially from poor and crowded neighbourhoods, as there was no doubt that infectious diseases were often spread by dead bodies.

Dr. A. Carpenter, while not being prepared to go the length of saying the time had arrived for cremating all bodies, thought persons who had died of infectious diseases ought to be cremated.

Mr. Liggins strongly objected to cremation and urged that millions outside that Conference looked with horror upon such a radical change in the disposal of the dead.

Dr. Gibbons also spoke against cremation, and after a few words from Mr. Hodgson and Mr. Smith,

The Chairman said he entirely agreed with the suggestion as to the desirability of having public mortuaries and that in large blocks of artizans' dwellings a place should be provided for the dead.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, June 12, Mr. T. S. Dymond, Vice-President in the chair.

A paper was read by the Honorary Secretary (Mr. Wyndham Dunstan) on "A Process for the Separation of Chlorides, Bromides and Iodides."

The paper was followed by a discussion in which the Chairman, Messrs Blain, Cripps, Elliott, Lowe and Steward took part.

The thanks of the meeting were voted to Mr. Dunstan.

The Reporter on Practical Pharmacy, Mr. R. A. Cripps, then read a Report on "Concentrated Infusions and Decoctions."

The Report gave rise to a discussion in which the Chairman, Secretary, Messrs. Elliott, Job and Short joined.

After some miscellaneous business had been transacted, the meeting adjourned.

Parliamentary and Law Proceedings.

Prosecution under the Pharmacy Act.

In the Second Court at the Sheffield Town Hall, on Wednesday, June 11, before Mr. T. Turner and Mr. H. J. Wilson, Thomas Wilcock, provision dealer, of 81, South Street, Park, was summoned for that he, "on the 9th February did unlawfully sell by retail to one Ann Castle, certain poison, to wit, opium, being poison within the meaning of the Pharmacy Act, 1868, which poison, when sold, was contained in a bottle, and which bottle was not distinctly labelled with the name of the article and the word 'poison,' and without the name and address of you, the seller of such poison, contrary to the form of the statute."

Mr. Flux, of the firm of Messrs. Flux, Son, and Co.; London, solicitors to the Pharmaceutical Society, appeared on behalf of the prosecution, and Mr. S. B. Auty defended.

Several Sheffield chemists were in court during the proceedings, and the case was watched with much interest.

In opening the case, Mr. Flux said he would do so as shortly as possible and would not say one word to create prejudice. But he should ask to be allowed, at another stage of the proceedings, to make a few statements on public grounds. The prosecution was under clause 17 of the Pharmacy Act, 1868, which declared "it should be unlawful to sell any poison, either by wholesale or by retail, unless the box, bottle, vessel wrapper, or cover in which such poison is contained be distinctly labelled with the name of the article, and the word 'poison,' and with the name and address of the seller of the poison," and also that "any person selling poison otherwise than as herein provided shall, on summary conviction before two justices of the peace in England, be liable to a penalty not exceeding £5 for the first offence." The charge against the accused was that he sold poison in a bottle without labelling it; amongst the contents of the bottle was opium, or a preparation of opium within the meaning of the schedule, The sale was made to a Mrs. Castle, who had applied to the defendant for some "infant's mixture." A portion of the contents of the bottle was administered to an infant child by the mother; the infant died, and an inquest followed.

Mr. Turner: Is it necessary to bring this in?

Mr. Flux: Yes; because I am going to bring in evidence the depositions of the accused at the inquiry.

Mr. Dossey Wightman, Coroner, was then called and examined by Mr. Flux. He produced the depositions of the defendant, who gave evidence at the inquest on the 19th February on the body of Frederick Castle. He stated, amongst other things, that he had known the parents of the deceased about three years. He remembered the mother calling upon him, and saying she had a child which was poorly. She had with her a child, between two and three years of age, with its throat tied up, and she said that was also poorly. She asked for some mixture—he believed she specified it "infant's mixture"—and said she wanted it for the child who was with her. He replied that he had a mixture which he thought would do the child good. The woman purchased a quarter of an ounce. He read the dose to her from the label on the bottle which he had, and told her about ten drops would be the proper proportion to administer to the child. He did not put a label on the bottle which he gave the woman. He did not know the mixture contained any preparation of opium. The label on the bottle in his possession did not say "poison." He was not told the age of the child, but judged from its appearance.

Cross-examined by Mr. Turner: I understand you to say that the child which died was not the baby for whom this stuff was sold.

Mr. Wightman: The woman, according to her evidence, applied for the medicine, with a child with her, but this was not the child on which the inquest was held. The inquiry was concerning the baby, which was at home with her husband.

Mr. Turner: Not the child taken to the shop?

Mr. Wightman: No; and for aught I know that child is living now.

Mrs. Sarah Castle, the wife of William Castle, cutler, living in Leader Road, Hillsbro', examined by Mr. Flux, spoke to the purchasing the mixture from the defendant. She asked him if he had any stuff to soothe a baby, saying that she found the druggists' shops were closed. That was on a Saturday. She did not know the day of the month. The child died six days afterwards. The defendant told her he had some "infant's mixture," saying it had done many children good; it would, he said, soothe them. She wanted it for both children, but more so for the babe. She fetched a bottle and purchased a pennyworth of the mixture. She was told to give the babe ten drops and the other child half a teaspoonful, which she did as soon as she got home. The bottle was not labelled.

Cross-examined: I am twenty-two, and have been married about three years. A neighbour suggested that I should get some soothing syrup, and I was told to go to a druggist, but they were all shut up. When I went to the defendant, I asked for some "infant's mixture," telling him what it was for. I did not lead him to understand that I wanted the mixture for the girl that was with me. I said distinctly that I required it for the babe, and I gave it ten drops, as desired, when I got home, in some warm water and with some sugar. On the following Monday I again gave the babe some mixture. It did not seem to take any effect upon the child.

Mr. Turner: We do not seem to get any nearer to the point.

Mr. Wilson: Do you suggest that the man intended to poison the child? The questions would be more to the point if you would show that there was not opium in the bottle, or that it was labelled.

Mr. Auty: I think I have a right to put these questions. I want to get from the mother the effect the mixture had upon the child. If she found that it had a pernicious effect upon the child she should have stopped administering it.

Mr. Turner: But that would not affect the question whether there was poison in it.

William Castle, the father of the deceased child, examined, spoke to handing the bottle which had contained the mixture to the police. He found it in the cupboard. There was no label upon it. There were a few drops in it when he handed it to the police.

Cross-examined: I am twenty-seven years of age. I know nothing about my wife going for the mixture, but I asked her to get something for the baby, and I saw her give it the drops.

Police-constable Thornton, examined, stated that he received the bottle from the last witness on the 19th February. It then contained some ten or twelve drops. He handed the bottle to Mr. Allen, the Borough analyst. Witness also saw the larger bottle. Both were produced at the inquest.

Mr. Alfred Henry Allen, Borough Analyst, deposed that he was examined at the adjourned inquest. Previous to that he had analysed the contents of the large bottle produced. There were about five drops of the mixture in the lesser bottle, and the chief constituents were the same as in the large one, so the presumption was that the liquids were identical. The chief constituents were rhubarb, magnesia, spirit, some aromatic waters, and laudanum, or a preparation of opium. Whether introduced in the form of opium or not he could not say. Neither could he say whether it was introduced in the form of a tincture called laudanum.

Cross-examined: I am not certain that the small bottle contained opium. The quantity was too small for me to to be able to ascertain. I can swear that the large bottle contained opium.

Mr. Flux intimated that this was the conclusion of his case.

Mr. Auty asked whether he had a case to answer. Personally he thought there was nothing to answer. If their worships said there had been sufficient evidence given for the case to be proceeded with, he would say something in mitigation of the penalty.

Mr. Turner: We should like you to proceed.

Mr. Auty then called,

Henry Linley, Oakhill Road, Nether Edge, who said he formerly carried on the business of a chemist and druggist on Sheffield Moor. He was not a member of the Pharmaceutical Society or a Pharmaceutical Chemist. When in business he made up a mixture, and recognized the label on the larger bottle produced as similar to those he used for distinguishing the preparation. He made up two similar mixtures. One, which contained a small portion of laudanum, he sold to his retail customers; and the other, which contained no laudanum, he kept for wholesale purposes. He could not say whether the mixture in the larger bottle contained laudanum or not, seeing that it was between four and five years since it was sold. He should not sell the mixture containing laudanum to wholesale customers. It was not necessary to label a preparation "poison" if it contained only a small proportion of laudanum; but if the mixture went as a preparation of opium then it would be necessary to label it so.

Mr. Flux: You will not say that five years have not passed since the larger bottle left your hands?—No.

Nor that the defendant has not again and again had it refilled at the grocer's?—No.

Mr. Wilson asked Mr. Wightman whether the defendant positively admitted or swore at the inquest that the woman's bottle was filled with stuff from the larger bottle produced.

Mr. Wightman replied that that was his impression at the time. The larger bottle was produced by the defendant, and he admitted that the stuff in the lesser bottle was the same, but he did not remember whether the man said it was filled out of the larger bottle into the smaller one.

After a short consultation the magistrates fined the defendant 20*s.* and the costs, in all £3 1*s.*

Mr. Flux, addressing the Bench, said, Now that the case has been disposed of, I ask permission to mention that the Pharmaceutical Society of Great Britain have instructed me to conduct the prosecution. The 15th Section of the Pharmacy Act imposes on the Society duties in regard to offences under that section, but there is nowhere imposed on the Society the duty of prosecuting in cases of this kind. The Society has received information, on which reliance can be placed, that sales of poisons not labelled as contemplated by law for the protection of the public are made in this town, to a serious extent, by unqualified persons, and having that information the Society has, for the purpose of directing local attention to the state of things and especially to the law on the subject, charged me with the conduct of this prosecution. It will be seen on examination of Section 17 that any person may be prosecutor where an offence such as this has been committed, and I venture respectfully to suggest to your worships, sitting as magistrates of this town, that it may be for the public welfare that the attention of those who in this town are charged with the administration of the law shall be especially directed to the offences against the provisions of the 17th Section with a view to such prosecutions by the local authorities as will secure that the breaches of the law shall be discontinued.

Mr. Wilson: Mr. Flux, I entirely agree [with every word you have said.

Reviews.

GRUNDRISS DER PHARMACOGKNOSIE. Von F. A. FLÜCKIGER.*

The object of this little work appears to be to meet the need of medical and pharmaceutical students for such an elementary book on materia medica and pharmacognosy as shall contain all the useful information which it is imperative for them to know and remember, but shall exclude such matter as is only valuable for reference. It is of course intended for those to whom the German Pharmacopœia is the standard text-book, and consequently a number of drugs not commonly met with in English pharmacies are described in its pages. Besides those occurring in the German but not in the British Pharmacopœia a number of drugs which are of recent introduction, such as cola nuts, coca, curare, gelsemium, quebracho, etc., receive a full share of attention. The classification adopted in the 'Grundriss' differs from that of the larger work by the same author, 'Pharmakognosie der Pflanzenreiches,' in the drugs being arranged not according to their nature, but according to the natural orders to which they respectively belong. The awkwardness of finding the root of aconite, for instance, in one part of the same volume and the leaf in another part is thus avoided. In the present volume the cryptogams are placed first, then follow the phanerogams, and lastly the products derived from the animal kingdom. The classification of the phanerogams is not that followed in Great Britain, the dicotyledons being divided into *Choripetalæ*, including all which are either without petals or have them distinct, and *Sympetalæ*, comprising all which, in this country, are comprised under *Corolliforæ*. Thus *Myristicaceæ* and *Lauraceæ* come near *Magnoliaceæ*, and *Euphorbiaceæ* is placed between *Rhamnaceæ* and *Umbelliferæ*, an arrangement which would prove somewhat puzzling to many English readers, but which nevertheless presents some advantages from the point of view of materia medica, as well as from a botanical standpoint. The natural system is not, however, carried out with regard to the animal products; these being few in number are arranged alphabetically.

As an introduction to more extensive treatises on materia medica, this little volume will doubtless be most welcome to students and will serve to give a good foundation in the subject. If the author has devoted space to the history of the drugs which would perhaps have been better devoted to adding matter of more practical use in everyday life, it must be remembered that, the German tendency to prolixity being taken into consideration, the book is a marvel of conciseness and useful information of the kind that the student requires in commencing the study of materia medica.

In the majority of cases the information has been brought up to the latest date, but the notices of substitutions or falsifications of drugs are less full than might have been expected in a work of this kind. Thus we find no notice of Japanese aconite root, nor the means of detecting the various adulterations of saffron and belladonna root and digitalis, nor of the commercial varieties of jaborandi and jalap, ergot and cantharides, etc. Nevertheless, the book contains a large amount of information clearly and concisely put, and will probably give great satisfaction to the class of readers for whom it is intended.

In a few points, perhaps, one may venture to differ from the learned author, and if these are indicated here it is only with a view that the reader may recognize that there is a difference of opinion on these points. *Laminaria Cloustoni* is described (on p. 1) as a peculiar form of *L. digitata*, Lamoroux. On reference to the author's larger works, however, it will be seen that a better way of stating the facts of the case would be to say that it is a distinct species, formerly included erroneously under *L. digitata*, Lam. Dammar resin presents all the characters of a dipterocarpous product, although it is true that it is usually attributed to coniferous trees. The Arabian aloes possesses different chemical characters from that of Socotra and can scarcely be the product of *A. Perryi*, as suggested by the author.

* Berlin: R. Gaertner. 1884. Crown 8vo. Pp. i.-xxiv. 1-260.

WATER AND WATER-SUPPLIES, AND UNFERMENTED BEVERAGES. By JOHN ATTFIELD, Ph.D., F.R.S.*

Included in a series published under the auspices of the Executive Council of the International Health Exhibition is a volume by Professor Attfield, treating of water and water-supplies and unfermented beverages.

The work is intended to furnish those whose interest in such beverages is more than superficial with information

* London: W. Clowes and Sons. 1884. International Health Exhibition Handbook. Demy 8vo. Pp. i.-x., 1-114. 1*s.*

which is to them not generally easy of access, or is unintelligible when obtained. We congratulate the author on the simple and lucid manner in which he has placed before the unscientific reader the leading chemical and physical properties of water and scientific explanations of certain phenomena connected therewith.

Most interest will, perhaps, be taken in the chapters on the natural water supplies, dealing with the source, the methods of preventing contamination and the means of purifying water from suspended and other impurities: these are very complete. Mineral and aërated waters are described in Section II. But the fourth section of the work, treating of teas of various kinds, coffee, cocoa, chocolate and milk is certainly no less worthy of attention, although it occupies less than one-third of the whole work. We recommend the chapter on tea to the perusal of the fairer sex, who might refresh many hard-workers with a cup of that beverage in which the aroma was more and the tannin less perceptible than is now usually the case. The low price at which the book is published places it within the reach of all who are interested, and will, we think, ensure it the reception it deserves.

Correspondence.

Ethics and £ s. d.

Sir,—When "Ethics" get mixed up with prices they need cautious handling. Criticisms of our neighbour's system of business are more apt to exhibit our own jealousy than a desire for his reformation. They too often overlook the fact that the public good is the true *summum bonum*, and—other things being equal—that "cheapness" is a quality much desired by the public. Pharmacists are no exception to the economical doctrine that he who gives a certain service for 1*s.* is a more profitable public servant than he who gives the same service for 1*s.* 6*d.*; and pharmacy offers no exception to the rule that no good thing can be, in common phraseology, cheap. The public apply both dogmas with tolerable discrimination, and they have been shrewd enough to discover in the matter of medicine that the best is generally the cheapest; accordingly we see that the most successful dispensing businesses are conducted on the 1*s.* 6*d.* system, not upon the 1*s.* system.

The much attacked custom of dispensing by doctors has its origin and its justification in the same principle of public accommodation. The majority of patients cannot afford to pay guinea fees, and the majority of doctors are obliged to meet their medical necessities on other terms. No one imagines that if doctors had their choice they would elect to do double duty for small remuneration, instead of confining themselves to a purely consulting practice acknowledged (not paid for!) by handsome fees; and probably no patient supposes he is equally well served for the smaller cost. These arrangements need no justification; the only wonder is that anybody should think them fit objects for animadversion. When a pharmacist, suffering it may be from a painful insufficiency of that kind of business for which he has qualified himself at much pains and expense, finds fault with medical men for dispensing their own prescriptions he puts himself in a false position analogous to that taken by the latter when they rail at "counter prescribing" as the cause of their lack of fees. Each usage is a necessary concession to a legitimate public want.

Dispensing by medical men has, however, other phases than the typical one referred to in the above lines. Often the doctor enters into an unrecognized partnership with a pharmacist, which is always more or less objectionable. Whenever this happens there must be a pharmacist at least as much to blame as the doctor, and there is no case for accusation on the side of the one vocation against the other. It would be harsh to say that such Kilmainham understandings are immoral, for no doubt many honourable men have been parties to them; but they certainly operate unfairly, and, I think, they are disloyal. They are unfair as interfering with free competition, diverting customers, often against their will,—*experto crede*,—to the doctor's colleague, and because they make unfair distinctions in favour of the doctor's patients as against other customers. The former, in effect, receive a rebate on their medicines as a contribution to the costs of medical attendance. They are disloyal because they tend to perpetuate a system which is injurious to pharmacy.

But what shall be said for the latest development of the pharmaco-medical combination,—one which, I am told, prevails extensively in the suburbs of London? I have it on good authority that it is a practice with certain medical men, who profess to advise patients gratuitously, to inscribe on the prescriptions given in such cases the words "Acct. 2*s.* 6*d.*" (the amount being varied at discretion). This means that the pharmacist to whom the prescription is taken is to charge the patient 2*s.* 6*d.* (the ordinary price being, say, 1*s.* 6*d.*) and he is to credit the difference to the benevolent doctor who gives advice gratis to the poor!

I make no comment. If the naked deformity of the transaction does not ensure reprobation, neither would the strictures of

Outis.

Oil of Limes.

Sir,—Since the appearance of my remarks on Trinidad Oil of Limes in this Journal (p. 1005), I have received a letter from the Montserrat Co., Limited, in which I am informed that the statement therein quoted by me from Mr. Prestoe's letter, to the effect that "the plan is adopted in Dominica and Montserrat of crushing the limes, and then, on the attainment of a large quantity of pulp, proceeding to boil down, or distil," is quite incorrect, at all events as respects Montserrat. The writer adds the following remarks:—"We feel sure that Mr. Prestoe made this statement in ignorance, and would be the first to wish to correct it. The whole of the Montserrat lime essence is made upon our estates, which probably turn out three times as much as all the rest of the West Indies put together. All that we manufacture at present is hand made, neither submitted to boiling or distillation, and the quality is universally admitted to be the finest in the market." I have not had the opportunity of examining a sample of the oil of limes prepared by the Montserrat Co., but of all the samples met with in commerce that I have examined, not one would bear comparison in odour with the specimen of Trinidad oil of limes of which I wrote. In fact I am told that the latter was not recognized as oil of limes by the usual buyers of the article, which is sufficient evidence for my statement that it differs from the ordinary oil of limes.

The Montserrat Company's letter indicates, however, that the difference I have observed is not due to the reason assigned by Mr. Prestoe, and that there must be some other cause for it. I should be the last to wish to publish incorrect statements, or to injure the reputation of any genuine commercial product, and should be glad, therefore, if you will afford me the opportunity of publishing the above statement. If the product of the Montserrat Company has the same fragrance as the Trinidad specimen that I examined, there can be no reason why it should not still be considered the finest in the market.

E. M. Holmes.

Erratum.—In the report of Mr. R. Reynolds's remarks (p. 1016, col. ii., line 4), *for* "those who had *no* great reason to complain of the condition of pharmacy," *read* "those who had *so* great reason," etc.

T. J. Wilkes.—(1) *Viburnum Opulus.* (2) *Stellaria Holostea.* (3) *Corydalis claviculata.*

J. Hutchinson.—(1) *Carex riparia.* (2) *Lolium perenne.* (3) *Bromus sterilis.* (4) *Hordeum pratense.* (5) *Serrafalcus mollis.* (6) *Festuca ovina.*

"*Pertinctus.*"—Tinctura ferri pomata is an official preparation in the Pharmacopœa Germanica. It is made by dissolving one part of the official extractum ferri pomatum in nine parts of cinnamon water. The extract appears to be essentially a crude malate of iron made by digesting finely divided iron in apple juice at the heat of a water-bath until there is no further evolution of gas.

H. Brooks.—It is not advisable to accept as true all the statements made by customers with respect to the prices charged at other shops.

Communications, Letters, etc., have been received from Messrs. Ward, Ashwell, Humphrey, Botterill, Merck, Amo, H.

"THE MONTH."

The announcement of an electric battery which yields residual products of more value than that of the original materials used,—in which, in fact, the electric current generated is a kind of bye-product,—would, if capable of sustained demonstration, appear to solve one of the most difficult problems in the practical application of electricity. The Lalande battery, on behalf of which this claim is seriously put forward, is described as being formed of a series of cells, each one consisting of an iron tray containing oxide of copper, over which, but not in contact with it, is a zinc plate, the remainder of the tray being filled with solution of caustic soda. So long as the circuit remains open no action is set up; but upon the electric circuit being completed, action takes place between the oxide of copper and the zinc, the copper being reduced to the metallic state and oxide of zinc being formed. A battery made up of forty-eight such cells, each one foot square, is stated to give a current of between fifteen and twenty ampères, the electro-motive force being a little under one volt, and to be capable of supplying the current required for fifteen incandescent lamps of ten-candle power each. After the battery is exhausted the zinc oxide can be recovered from the soda solution and is estimated to be worth 25 per cent. more than the metallic zinc from which it is produced, whilst the copper oxide can be regenerated at a small cost. This claim is so far confirmed that the first practical application of the battery was by Mr. J. B. Spence, who was interested simply in the production of oxide of zinc more cheaply than by the ordinary process; but it is evident that the introduction of the battery to any considerable extent for electric purposes would tend to lower the value of the residual products.

Some months since (see before, p. 421) considerable interest was excited by the announcement that Dr. Freire, of Rio Janeiro, had detected the presence of the organism causing yellow fever in soil taken from graves of persons who had died of the fever, and that he had succeeded in communicating the disease to rabbits and guinea pigs by the injection of liquid in which the organisms had been cultivated. But in an interesting communication since forwarded to the Government from the island of Barbados an account is given of the results of a number of control experiments made by the Rev. J. H. S. Moxly, Chaplain to the Forces, who has had a medical education, and Mr. J. B. Harrison, Island Professor of Chemistry, which fail to confirm those reported by Dr. Freire in the least degree. Messrs. Moxly and Harrison's experiments were made with soil taken from the graves of persons who died of yellow fever in the epidemic of 1881 and at other times, from graves other than those of yellow fever patients, and from open fields on which no manure had been used. Previously sterilized chicken soup impregnated with any of these moulds and kept at the ordinary temperature usually became turbid in a few hours, and by the second day had assumed a bright yellow colour, especially at the top, the colour being most strongly manifested in the case of a soil from a yellow fever grave and one from an open field. The exceptions were liquids in which soil was sown taken from yellow fever graves where a layer of lime had been placed above the coffin. These coloured liquids, although crowded with bacteria, were injected into guinea pigs without producing any symptoms that could be referred to yellow fever, or, as a rule, any inconvenience. Similar negative results, so far as symptoms of yellow fever were concerned, were observed when decomposed matter was used from the coffin of a person who had died of the disease, the guinea pigs in such cases apparently dying of septicæmia, no bacteria being detected in the blood, the corpuscles of which were considerably disintegrated, and no albumen in the urine, though this is an invariable accompaniment of yellow fever in the human subject. When the "moulds" were cultivated at 98·5° F. the liquid acted much more virulently; but the symptoms were still those of blood-poisoning and not of yellow fever, the absence of bacteria from the bodies immediately after death being remarkable. Summing up their results, Messrs. Moxly and Harrison say that they can discover no difference between a micrococcus from a grave and one from a garden, and they add, with somewhat more than a *soupçon* of satire, that had Dr. Freire been a tyro with the microscope they would have been inclined to refer some of his observations to mismanagement of that instrument, but, seeing that the *Chemical News* looks upon him as possibly one of the greatest benefactors of the human race, and the *Lancet* anticipates with pleasure the continuation of the account of his experiments, they can only confess themselves "completely puzzled."

It is also noteworthy that Dr. Klein has failed to obtain results confirmatory of M. Pasteur's celebrated experience in respect to anthrax in sheep. According to M. Pasteur it is possible to obtain by cultivation of the *Bacillus anthracis* at a temperature of 42° to 43° C. a liquid that possesses the character of a vaccine against the disease. But Dr. Klein's experience with his artificial cultivations when injected into sheep was similar to a former trial upon rodents; either he obtained no result whatever from inoculation, or else the animal was killed by it, as it would be by inoculation with the original anthrax bacillus. Dr. Klein, therefore, obtained a supply of M. Pasteur's "vaccin charbonneux," as sold by the agent in Paris. This is described as consisting of two liquids,—"premier vaccin," and "deuxième vaccin," —which are to be used in succession, the two inoculations being alleged to confer on the animals immunity from charbon. But no such results were obtained by Dr. Klein: the "premier vaccin" in some cases caused death by anthrax, and the "deuxième vaccin" was even more fatal; whilst animals that survived the two inoculations died of typical anthrax when subsequently inoculated with cultivations of *Bacillus anthracis*, showing that M. Pasteur's "vaccin" had not conferred upon them the desired immunity. Without, therefore, wishing to throw doubt on the accuracy of M. Pasteur's statement as to the results obtained in France by the vaccination of sheep with anthrax vaccine, Dr. Klein questions his statements as to the universal applicability of his results, whilst it is suggested by Dr. Buchanan that probably the conditions for the manufacture of an attenuated anthrax virus are numerous, and not all understood by M. Pasteur himself. One observation made by Dr. Klein seems to indicate a behaviour of the anthrax virus similar to that with which the small-pox virus is generally credited, and which M. Pasteur has recently attributed to the virus of hydrophobia, in undergoing an attenuating modification in the body of particular animals.

It was found that the blood of a mouse that had died from anthrax, although it affected constitutionally a sheep vaccinated with it, did not produce a fatal effect, whilst the sheep became insusceptible to further inoculation with virulent material. Dr. Klein also differs from M. Pasteur as to the anthrax bacillus being capable of forming spores in the body of a dead animal and so becoming a source of danger, through the medium of earthworms, to sheep grazing in the neighbourhood.

A new reagent showing the presence of sodium and sodium salts is described by Dr. Hager (*Pharm. Central.*, June 19, p. 291), which, though subject to several limitations as to its applicability, would seem to give more satisfactory qualitative indications than the flame test in such cases as the examination of potassium carbonate or hydrate. It consists in a solution of potassio-stannous chloride, made by dissolving five parts of crystals of chloride of tin in ten parts of distilled water and adding sufficient potash solution, sp. gr. 1·145, to render it nearly, but not quite, clear; after standing an hour five parts more of potash solution and fifteen of water are added, the solution is again allowed to stand for some hours and then filtered. The solution to be examined, if acid, should be made faintly alkaline with pure potash solution, or if decidedly alkaline, neutralized with hydrochloric acid, and any salts of the earth metals should be separated by pure potassium carbonate. Boric acid also interferes with the reaction and a solution containing sodium borate requires to be mixed with potassium chloride or sulphate before adding the tin reagent. In the presence of any of the salts of sodium the reagent gives, after two or three minutes, a white precipitate or turbidity, even with only minute traces, a fact that should be remembered in preparing it, as caustic potash is seldom quite free from soda. Lithium and ammonium salts seem to behave towards this reagent similarly to sodium salts, except that the reaction with lithium is not influenced by the presence of a borate. As alcohol in the proportion of 8 per cent. also gives a white turbidity with potassio-stannous chloride its presence would require to be excluded.

Herr Sturcke has been engaged in an investigation of the constituents of carnauba wax, which, notwithstanding its growing importance, had previously been only partially examined. He reports (*Lieb. Annalen*, ccxxiii., 283) that he has recognized the presence in carnauba wax of the following bodies: (1) a crystalline paraffin-like hydrocarbon, melting at 59° to 59·5° C.; (2) an alcohol, represented by the formula $C_{26}H_{53}.CH_2OH$, and melting at 76° C.; (3) myricyl alcohol ($C_{29}H_{59}.CH_2OH$) melting at 85·5°, from which melissinic acid ($C_{29}H_{59}.COOH$) was prepared; (4) a bibasic acid, $C_{23}H_{46}(CH_2OH)_2$, melting at 103·5° to 103·8° C., and yielding the acid $C_{23}H_{46}(C_2OH)_2$, melting at 102·5° C.; (5) an acid ($C_{23}H_{47}.COOH$), melting at 72·5° C., and isomeric with lignocerinic acid; (6) an acid ($C_{26}H_{53}COOH$), melting at 79° C., identical or isomeric with cerotinic acid; and (7) an acid ($C_{19}H_{38}.CH_2OH.COOH$) melting at 103·5° C.

M. Naudin reports (*Bull. Soc. Chim.*, xli., 483) that he has separated from chamomile flowers two crystallizable bodies, one of which he has closely examined. A mixture of the two bodies was obtained by exhaustion of the flowers with light petroleum spirit and they were separated by repeated recrystallization from absolute alcohol. The compound insoluble in cold alcohol is soluble in hot alcohol and also in ether, petroleum, carbon bisulphide and chloroform, but is insoluble in water. It crystallizes in delicate microscopic needles, melting at a temperature of 63°—64° C. M. Naudin proposes to name this compound "anthemen." Upon analysis it gave results corresponding with the formula $C_{16}H_{36}$. Anthemen does appear to yield a bromine addition-product; it resists the action of strong sulphuric acid, but is slowly attacked when heated with nitric or chromic acid, with the formation of acids of the fatty series, in which property it resembles a hydrocarbon discovered by Schutzenberger in Caucasian petroleum.

The gum of a species of *Grevillea* acclimatized in Algeria has recently been examined by M. G. Fleury (*Journ. de Pharm.*, p. 479). The gum is of a yellowish or reddish brown colour, and horny consistence. In water it swells, diffuses slowly, and produces a white emulsion of a very persistent character, which easily passes through the filter. It is found by M. Fleury to consist of a gum approaching in character that of gum arabic, and a fluid reddish transparent resin without odour soluble in alcohol. This resin is also soluble in alkalies, in methylic alcohol and bisulphide of carbon; it possesses feebly acid properties and forms about 5 to 6 per cent. of the gum. The separated gum does not actually dissolve in water, but if a little potash, lime, or carbonate of potash be added to it when swelled up by water, solution takes place immediately, the solution becoming gelatinous upon the addition of a ferric salt. An alkaline solution becomes darker and more viscous if exposed to the air.

The poisonous coating of some arrows brought home by the Riebeck expedition to the east coast of Africa and the Soudan has been submitted to an examination by Professor Harnack. He reports (*Arch. exp. Path. u. Pharm.*, xviii., 1) that it resembles in appearance a vegetable extract and that he has separated from it a glucosidal non-nitrogenous substance, resembling digitalin closely in its physiological action and its products of chemical decomposition. Traces were also found of a basic substance, which appeared, however, to have no characteristic physiological action. Nothing is known respecting the source from which this poison had been derived.

Referring to the opinion recently expressed by Dr. Schunck that chlorophyll is a glucoside (see before, p. 602), Dr. A. B. Griffiths recalls his observation of the presence of crystals of ferrous sulphate in proximity to the chlorophyll granules in certain plants, and suggests that probably iron enters into the constitution of green chlorophyll, and that perhaps chlorophyll may consist of a complex molecule of iron and this glucoside (*Chem. News*, May 30, p. 237). He points out that no green chlorophyll is produced in plants growing in soils or other media free from iron, and explains the value of ferrous sulphate as manure by saying that the iron most probably acts as food for the chlorophyll granules, and the sulphur as food for the protoplasm of the cells, etc.

Muscarine, the heart paralysing alkaloid of the fly agaric, the nitrate of which is now used to some extent in medicine as a sudorific when subcutaneously injected, can be prepared artificially by the oxidation of neurine, from which it differs in containing one more atom of oxygen. In investigating its constitution with a view to its more advantageous preparation, Herr Berleinerblaue availed himself of Herr Schmiedeberg's conclusion that it is a trimethylamine base, and inferred that by heating monochloracetal together with trimethylamine in a closed tube to 100°—120° C. a product would be obtained capable of yielding muscarine by suitable saponification (*Berichte*, xvii., 1139). The reaction went on as expected and a compound was formed that appeared to correspond in composition with a neutral ethyl ether of natural muscarine, together with another base that contained a molecule of water of hydration less. Both bases appeared to correspond qualitatively with muscarine in their physiological action, but that of the ether was the weaker.

A correspondent of the *Pharmaceutische Centralhalle* (xxv., 281) recommends the use of water that has been redistilled in the preparation of solutions of morphine for subcutaneous injection and the use of a salt as free from contamination with dust particles as possible. Ordinarily he dissolves 10 grams of morphine hydrochlorate in 200 c.c. of redistilled water at a temperature not exceeding 35° C., the solution only being submitted to filtration if any particles can be detected swimming in it with the naked eye. Such a solution he has found to keep unaltered during a month.

In reply to a question as to the best solution for an iodoform "spray," Mr. Alfred Leach writes (*Lancet*, May 31, p. 1012) that he finds it convenient to use a mixture of ethereal and chloroform solutions. The proportions he uses are—ethere salolution of iodoform, one drachm; chloroformic solution of iodoform, one scruple; fresh tincture of senega, a drachm and a half; water to two ounces. The addition of a little ol. pini sylvestris before the water is found to mask the odour of the iodoform considerably. The mixture is said to be of a straw colour, and to hold iodoform in suspension in a minute state of division.

According to Dr. Biel (*Pharm. Zeit. Russl.*, xxiii., 301) the increased consumption of iodoform in medicine has led to considerable sophistication. He recommends that it should be tested by shaking a small quantity with water, and filtering, when the filtrate should be colourless. If this filtrate be treated with solution of potassium cyanide it undergoes no change if the iodoform used was pure, but if it contained only a trace of picric acid the liquor within ten minutes shows the red-brown colour of isopurpuric acid.

In the *British Medical Journal* (June 7, p. 1126), a correspondent points out that the use of strychnia in medicine causes a distaste for tobacco and affords an easy means of breaking off the habit of smoking to those who are desirous of doing so. He found that, both when taking tincture of nux vomica and Easton's syrup, he no longer cared for his pipe, and after a time took a positive dislike to it. This may perhaps be explained on the principle that strychnia is a physiological antidote to tobacco, and that smoking would therefore cease to give its soothing effect when the system was under the influence of strychnia. If this be correct, a physiological antidote to the effects of alcohol would be worth seeking, on the chance of it producing an analogous result.

Some experiments made by Dr. Queirolo with kairin in the medical clinic at Genoa are reported (*Archiv*, xi., 425) to have shown that when this antipyretic is administered subcutaneously a greater fall of temperature is produced, which commences more rapidly and lasts longer than that following when it is taken by the mouth; whilst these effects are obtained with smaller and less frequent doses. The hypodermic injection of kairin is said not to produce any general disturbance or local symptoms, apart from a slight smarting at the point of puncture, which soon passes away. Injections were used containing 10 to 50 centigrams of kairin to each gram of distilled water, brought to a clear solution by the aid of heat and used while still at a temperature between 30° and 35° C.

Another synthetically prepared alkaloid is being put forward as an antipyretic under the name of "antipyrin," concerning the chemical constitution of which nothing has yet been published beyond the statement that it contains oxygen. It is the work of Dr. Knorr, of Munich, and is described s forming a white crystalline powder, freely soluble in water, and having only a very faint taste that can be easily masked if desired (*Pharm. Post*, June 7, p. 513). It has been very favourably reported upon by Professor Filehne, who states that he found it to reduce the temperature in cases of fever very considerably, without producing objectionable symptoms, and that its effects were very prolonged. It was given to adults in two gram doses repeated two or three times at intervals of an hour.

Abrus precatorius still seems to be attracting some attention and is to form one of the subjects for the debate on Indian drugs at the meeting of the British Medical Association at Belfast. In the *Journal de Pharmacie* (June, p. 468), M. Patein gives an account of an examination of the testa of these seeds. He finds them to contain a large proportion of carbonate of lime and rather more iron than hæmoglobin. The colouring matter is soluble in alcohol and contains, so far as has been ascertained, a salt of iron. It is thrown down completely by subacetate of lead as a greenish precipitate. It is also turned green by alkalies and is reddened again by acids.

Reasoning from the known fact that when an infusion of jequerity seeds is applied to what are known as "granular lids" it sets up a specific ophthalmia of a croupous nature, which destroys the granulations and leaves the surface in a condition favourable for healing, Dr. Shoemaker was led to the deduction that the remedy might be applicable to other morbid processes consisting in exuberant granulations and proliferating cell growths, and showing a tendency to a slowly degenerating condition. In a paper read before the Pennsylvania Medical Society (*Med. Bul.*, May 16) he reports that he first tried it in lupoid conditions, epithelioma, and sloughing ulcers, but found the weak infusion used in ophthalmic practice of little avail, though when he used a stronger "emulsio-infusion," a specific inflammation was set up, which occasionally, when applied over extensive surfaces on sensitive patients, assumed alarming proportions. The products of the inflammation, however, formed an immense crust, under the protection of which the constructive process rapidly developed, leaving a new and healthier surface when it was removed, so that by repetition of the application cures were speedily effected. Dr. Shoemaker therefore thinks jequerity will prove to be a most powerful agent in certain affections of the skin, though only to be used with due caution.

In severe cases of small pox, Dr. Pioch recommends (*Archiv*, xi., 425) the painting of the entire body with a mixture of 30 grams of tincture of iodine, 60 grams of glycerine and 25 centigrams of potassium iodide, the solution being applied every six hours with a broad brush. The treatment should begin on the fifth or sixth day of the eruption and last until the eleventh or twelfth day, the subsidence of the eruption being the indication for its cessation. A further advantage of this treatment is said to be the avoidance of pock-marks.

Dr. R. N. Wolfenden directs attention (*Practitioner*, p. 431) to the use of hydrobromate of conia in epilepsy. The dose given by him is ¼ to 1½ grain, according to age, and the results obtained appear to be such as would warrant further trial.

Signor Silvio Plevani (*Lancet*, June 7, p. 1042) has suggested among other economic antiseptic dressings the preparation of absorbent tow, which is effected in the following manner:—The tow is boiled for some time in a lye made of wood ashes or in a 10 per cent. solution of carbonate of sodium and then washed repeatedly in water. When thus deprived of greasy and resinous matter it is immersed in a 10 per cent. solution of chloride of lime and kept in it for some hours with an occasional stirring until it becomes perfectly white. It is then washed thoroughly, dried and carded.

The time for hay fever to be prevalent is now rapidly approaching, and those who suffer from it will doubtless only be too glad to learn of any successful method of treatment. Dr. W. T. Phillips, of Andover, recommends belladonna, which he found successful last year (*Br. Med. Journ.*, July 14, 1883). In the same journal (June 7, p. 1090) he now gives the dose as 1¼ minim of the succus every hour till relieved (30 min. to 3 ozs. of water). For coryza, Dr. G. E. Dobson recommends (*Lancet*, May 31, p. 978) the inhalation of the vapour of camphor and steam, the vapour being made to come in contact with the outer surface of the face surrounding the nose by means of a paper cone placed with the narrow end downwards in a vessel containing hot water and a drachm of coarsely powdered or shredded camphor. If this is continued ten or twenty minutes at a time, and repeated three or four times in as many hours, a cure is usually effected.

A new diuretic is mentioned in the *Therapeutic Gazette*, for May (p. 208), by Dr. U. S. Newlon, of Oswego, who has made some experiments with a cruciferous plant, *Vesicaria gracilis*, which grows west of the Mississippi, and finds that it is a stimulating diuretic of considerable power. Its virtues are best extracted by alcohol or acetic acid.

Dr. Campardon, in the *Bull. Gén. de Thérapeutique*, speaks highly of the use of *Lythrum Salicaria* in acute or chronic inflammations of the gastrointestinal mucous membrane. Its properties appear to be due to tannin and mucilage. An excessive dose, such as 10 to 12 grams per day, produces gastric disturbance. The application of the powder and infusion has been found of service in the treatment of varicose ulcers. The infusion is made of the strength of 30 parts of leaves and stalks to 1000 of water. Of the powder, the dose is 1 gram in a wafer as a dose three times a day (*Therap. Gazette*, p. 238).

The fruit of *Sizygium jambolanum*, an East Indian plant belonging to the natural order Myrtaceæ, has recently been somewhat in demand on the Continent for use in the treatment of diabetes. M. Banatrala (*Répertoire de Pharmacie*, p. 169) has found, in three cases in which he has tried it, that its use led to a diminution in the amount of urine secreted and that it caused the disappearance of the sugar. These results were manifested in forty-eight hours after taking the medicine. During the time that the patients were submitted to the action of the drug they could take amylaceous food with impunity. The astringent rind of the fruit appears to be the active part.

In the *Journal de Pharmacie* for this month (p. 456) Professor H. Baillon describes a Malagasy plant called "hazigne," the fruits of which yield an oil, and the stem a resin, which are used by the natives as a remedy in certain skin diseases, such as leprosy, the itch, and ulcers. The oil obtained from the seeds is also used as food and for lamps The hazigne is a handsome tree belonging to the Guttiferæ, and is named *Symphonia fasciculata*. The fruit is known to the natives by the name of "voa-souvouara." Some of the seeds are now being submitted to chemical analysis by Messrs. N. J. Regnaud and Villejean, and the results will be published in a future number of the *Journal de Pharmacie.*

In the *Practitioner* (p. 435) it is pointed out that the *Pois d'Achery*, a sort of kidney bean (*Phaseolus limatus*, L.), cultivated in the Mauritius and used there as an occasional article of diet by the Creoles, exists in the form of two varieties: the one white, which is generally esteemed wholesome, and the other very prettily variegated, which is regarded as poisonous. The poisonous character of the latter is due, according to Drs. Davidson and Stevenson, to hydrocyanic acid, which is formed when the beans are macerated in water by a similar process to that by which it is produced in certain plants of the Rosaceæ, such as the almond and cherry laurel. The reason why two varieties of a plant which cannot be distinguished from each other by any definite botanical characters should produce different chemical compounds is a most interesting problem, and seems to deserve further investigation.

A Mexican plant, by name "palillo," which appears to be *Croton morifolius*, has recently been the subject of experiment in France, by Messrs Duges and Armendaris (*Bull. Soc. Bot.*, [2], v., p. 233). Two or three drops of the oil contained in the seeds act like a moderate dose of castor oil. The natives of Mexico use the leaves of the plant in the form of infusion as a remedy for gastralgia and atony of stomach. The tincture of the leaves is said by the above-named experimentalists to give excellent results in neuralgia, especially when occurring in the face, either when used as liniment, or dropped into the ears, or taken in the dose of 10 or 15 drops in orange-flower water.

At the last meeting of the New Jersey Pharmaceutical Association (*Amer. Journ. Pharm.*, June, p. 344) Professor Maisch stated that he had recently received from California some "tubers of the parent plant of the cultivated potato." The plant had been discovered by Professor Lemmon, in the Huachuca mountains, Arizona, at an elevation of nine thousand feet, and had been named *Solanum tuberosum*, var. *boreale*, by Professor Asa Gray. The tubers, which had sprouted to such an extent that they had to be planted in order to save them, are described as of two varieties, one white and the other red, but both quite small, being only about half an inch or little more in length.

An interesting paper on the "Existence and Use of Manganese in Animals and Plants" is given in *Comptes Rendus* (p. 1418), by M. E. Maumené. He points out that it is constantly excreted by animals, and therefore does not appear to be necessary to life. On the other hand, certain plants, such as tea, coffee and tobacco, require an abundance, and the want of success in their cultivation may be attributed without doubt to the absence or insufficient quantity of this metal in the soil in which they are planted.

In the *Gardeners' Chronicle* (June 14, p. 777), an illustration is given of a curious malformed fuchsia flower in which two green leaves proceed from outside the middle of the ovary, one of the leaves having a single stamen in its axil, and the other two stamens in its axil, the filaments of which are united half way.

At a recent meeting of the Royal Horticultural Society, a wallflower was exhibited which had grown through the pith of a black currant stem. In this case there was no true epidermis on the stem, which was of two years' growth, and the pith was destroyed or partly converted into cork (*Gard. Chron.*, p. 782).

Science Gossip for this month gives an illustrated paper on the Alpine gentians, the descriptions including the species which yield the gentian root of commerce, *G. lutea*, *G. purpurea*, *G. pannonica* and *G. punctata*.

Those who take an interest in the cause of variation of species in plants will find an interesting article in the *Journal of Botany*, on "Euphrasia officinalis," a species which is very polymorphic. The plant is proterogynous, but has also provision for at least two modes of self-fertilization in case cross-fertilization is not effected, the one in the larger-flowered form by the lengthening of the corolla tube so that the stamens are brought in contact with the stigma, and the other in the smaller-flowered forms by the curving downwards of the upper portion of the style. No less than eight groups, each containing several forms, are enumerated by the author, Mr. F. Townsend. In the some number of this journal a very useful list is given of the new phanerogamic plants published in periodicals during the year 1883, with references to each, the whole being arranged alphabetically. Literature of this kind is so scattered, that the list is sure to prove most useful and will doubtless help to diminish the evils arising from the multiplication of botanical names.

Dr. P. Calvo (*Journal of the British Dental Association*, p. 373) gives as the results of experiments during the last three years a remedy for lessening the sensibility of dentine of decayed teeth which does not injure the vitality of the pulp. This he has found in quicklime. By carefully drying the cavities of the teeth before inserting the powdered lime an undue rise of temperature is avoided, in consequence of the hydration taking place slowly and but little heat being developed. Lime appears to have the advantage over the more soluble alkalies of coagulating the albumen of the immediate surface and thus limiting its caustic action.

At a recent meeting of the Physiological Society of Berlin, Professor Busch (*Nature*, June 5, p. 140) made some interesting observations on caries of the teeth. He mentioned that it has been observed in none of the lower animals, and appears to be peculiar to man. It is not, however, characteristic of civilized races, but has been observed in skulls of prehistoric time. Some races are more disposed to it than others, the Celtic, Arabian and Polish races appearing to possess a relative immunity. Certain families, however, are predisposed to it. This is manifest in the undulating character of the enamel, teeth with smooth enamel having much greater power of resistance. In strong teeth the dentine tubes run regularly side by side close to each other, but in those disposed to caries the dentine tubes branch and surround cellular bodies or small air vesicles. No pain occurs in the course of caries until the pulp of the tooth is reached.

At a recent meeting of the King's County Pharmaceutical Society, Mr. Stevens reported the results of an experiment to determine the loss by volatilization of camphor when exposed to the air. A fresh block of hard camphor was selected, the corners were sharpened and the weight was ascertained to be 2606 grains. It was placed on the 26th of April on one edge in a situation open to the air, but not subject to radiant heat, direct sunlight or currents of air. The accumulated dust was occasionally lightly blown off with the breath, but the block was not dusted or rubbed. On the 13th of May, seventeen days afterwards, the block weighed 2104 grains, showing a loss of 509 grains (over 19 per cent.), or an average daily loss of 29½ grains. In length the block had lost half an inch.

THE ECONOMIC APPLICATIONS OF SEAWEED.*

BY EDWARD C. C. STANFORD, F.C.S.

(*Concluded from page* 1029.)

We now come to the treatment of the residual weed. If the long fronds of the *Laminaria stenophylla* be observed after exposure to rain, a tumid appearance will be noticed, and sacs of fluid are formed from the endosmosis of the water through the membrane, dissolving a peculiar glutinous principle. If the sacs be cut, a neutral glairy colourless fluid escapes. It may often be seen partially evaporated on the frond as a colourless jelly. This substance, which is then insoluble in water, is the remarkable body to which I have given the name of algin. The natural liquid itself is miscible with water, but coagulated by alcohol and by mineral acids. It contains calcium, magnesium, and sodium, in combination with a new acid which I call alginic acid. When this natural liquid is evaporated to dryness, it becomes insoluble in water, but it is very soluble in alkalies. This new substance is so abundant in the plant that, on maceration for twenty-four hours in sodium carbonate in the cold, the plant is completely disintegrated. The mass thus obtained is a glutinous mass of great viscosity, and difficult to deal with on that account. It consists of the cellulose of the plant mixed with sodium alginate. The cells are so small that they pass through many filters, but by cautiously heating it, the mass can be filtered through a rough linen filter bag, the cellulose being left behind, and after the algin is removed, this is easily pressed.

The solution contains dextrine and other extractive matter, and it is then precipitated by hydrochloric or sulphuric acid; the alginic acid precipitates in light grey albuminous flocks, and is easily washed and pressed, in an ordinary wooden screw press. A filter press, made for me by Messrs. Johnson and Company, answers perfectly well for this operation, but not so well for the preceding. It forms a compact cake, resembling new cheese, and has only to be stored in an ordinary cool

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drying room, where it can be kept any length of time. If desired, by adding a little b'each during the precipitation, it can be obtained perfectly white. The algin can be sent out in this state, it is only necessary to dissolve it in sodium carbonate in the cold for use. If, however, it be sent out as sodium alginate, it must be dissolved to saturation in sodium carbonate; the carbonic acid is disengaged, and sodium alginate is formed. If potassium or ammonium carbonate be used, the alginates of potassium or ammonium are formed, which are similar to the soda salt. The bicarbonates of these alkalies may also be used; but the caustic alkalies are not such good solvents.

The sodium alginate forms a thick solution at 2 per cent., it cannot be made above 5 per cent., and will not pour at that strength. Its viscosity is extraordinary. It was compared with well-boiled wheat starch, and with gum arabic in an ordinary viscometer tube; the strengths employed were as follows; it was found impossible to make the algin run at all over the strength employed:—

			Seconds.
Gum arabic solution,	25 per cent.	took	75 = 1 in 3
Wheat starch	1·5 ,,	,,	25 = 1 in 8
Algin	1·25 ,,	,,	140 = 1 in 112

So that the algin has fourteen times the viscosity of starch, and thirty-seven times that of gum arabic.

I append analyses of two samples of commercial sodium alginate of average composition:—

	No. 1.		No. 2.	
Water	17·13		19·30	
Organic matter	59·97		58·125	
Carbonate soda	18·32	P.C. ash 22·90	17·78	P.C. ash 22·575
Neutral salts	2·98		2·77	
Insoluble ash	1·60		2·025	
	100·00		100·00	
Dry algin	67·58		65·50	
Soda (Na_2O)	10·71		10·40	
Per cent. of Na_2O	15·85		15·87	

Showing that, excluding the water, salts, and ash, the composition is uniform.

The solution may be alkaline, or neutral, or acid, according to the degree of saturation; if alkaline, it may be made distinctly acid by the addition of hydrochloric acid, but any excess at once coagulates it; a 2 per cent. solution becomes semi-solid on this addition.

The evaporation is effected in a similar manner to that of gelatine, in thin layers on trays or slate shelves, in a drying room with a current of air, or on revolving cylinders heated internally by steam; high temperature must be avoided. The solution keeps well. Thus obtained, the sodium alginate presents the form of thin, almost colourless, sheets, resembling gelatine but very flexible. It has several remarkable properties which distinguish it from all other known substances.

Algin, or sodium alginate in solution is precipitated or coagulated by alcohol, ethylic and methylic, acetone, and collodion (but not by ether), by hydrochloric, sulphoindigotic, nitric, sulphuric, sulphurous, phosphoric, citric, tartaric, lactic, oxalic, and picric acids; salts of cobalt, copper, platinum, nickel, silver, bismuth, antimony, zinc, cadmium, aluminium, chromium, uranium, barium, calcium, strontium, and tin chloride and bichloride; mercury pernitrate and protonitrate; iron sulphate (white), and iron perchloride (brown); lead acetate, and basic acetate; lime water, and baryta water.

The solution is not precipitated nor coagulated by alkalies and salts of alkalies, including lithium, alkaline silicates, potassium bichromate (not coagulated by boiling), and chromate; sodium stannate, succinate, biborate and tungstate; magnesium and manganese salts, starch, glycerine, ether, cane sugar, amylic alcohol, boracic acid, acetic, carbolic, tannic, butyric, benzoic, gallic, pyrogallic, arsenious and succinic acids; potassium ferrocyanide, mercury iodide, ferricyanide, and permanganate; bromine, iodine and chlorine water; molybdate of ammonia, tartar emetic and peroxide hydrogen. It does not precipitate the ordinary alkaloids.

It is distinguished from albumen, which it most resembles, by not coagulating on heating, and from gelose by not gelatizing on cooling, by containing nitrogen, and by dissolving in weak alkaline solution, and being insoluble in boiling water.

From gelatine, by giving no reaction with tannin; from starch, by giving no colour with iodine; from dextrine, gum arabic, tragacanth, and pectin, by its insolubility in dilute alcohol and dilute mineral acids.

It is remarkable that it precipitates the salts of the alkaline earths, with the exception of magnesium, and also most of the metals, but it gives no precipitate with mercury bichloride nor potassium silicate.

It has a strong rotary power on polarized light. Mr. Tatlock estimated it for me as having a specific rotary power of 86·5° on Laurent's polariscope. This again fixes its position among animal bodies, gelatine and albumen, and not amongst such vegetable products as pectin, which is neutral.

Alginic acid is insoluble in cold water, very slightly in boiling. It is insoluble in alcohol, ether and glycerine. The proportion of soda ash used is one-tenth of the weight of the weed, and the cake of alginic acid obtained is usually about the same weight as the weed. The quantity of dry alginic acid is given below:—

	Laminaria Stem.	Digitata. Frond.
Water	37·04	44·0
Alginic acid	21·00	17·35
Cellulose	28·20	11·00

	Laminaria Stenophylla. Stem.	Frond.	Laminaria Bulbosa.	Fucus vesiculosus.
Water	34·5	40·02	43·28	40·10
Alginic acid	25·7	24·06	17·95	12·22
Cellulose	11·27	15·06	11·15	—

Falkland Islands Giant Algæ.

Nos.	1	2	3	4	5
Alginic acid	11·21	10·09	5·56	7·44	3·34
Cellulose	8·13	7·25	3·50	12·95	9·68

The three gelatinous algæ, already referred to, contain no algin.

The cellulose in the tangle is higher than in any other weed, the outside of the stem being rather fibrous. I append also analyses of the ash of three varieties of cellulose dry, unbleached to show the trace of iodine still retained:—

	Laminaria Digitata.	Laminaria Stenophylla.	Fucus vesiculosus.
Yield of char.	38·36	36·41	44·62
Soluble	11·08	5·27	11·06
Carbon	12·73	14·27	15·93
Ash	14·55	16·87	17·63
Iodine	·12	·06	·05
On air dry plant about	·012	·006	·005

The new process may be tabulated as follows:—

		Per cent.
Extracted by water—		
Salts	20	
Sugar, mucilage, etc.	10	
	—	30
Extracted by sodium carbonate—		
Algin	20	
Dextrine, etc.	10	
	—	30
Cellulose		10
Moisture		30
		—
		100

Of these, I have accounted for the salts, the algin, and the cellulose, leaving the mucilage, dextrine and sugar for further investigation.

It is not necessary to extract the salts first with water, it comes to the same thing to act on the seaweed at once with soda ash, and to recover the salts by evaporation of the solution, after the alginic acid has been precipitated. In this case chloride of calcium or of aluminium may be employed, the alginate of calcium or aluminium being precipitated. With either salt the alginate is thrown down instead of rising to the surface of the liquid, and the cakes are more compact and easily pressed. In addition to the cheapness with which it can be procured in almost any quantity, as a bye-product in alkali works, now all thrown away, the calcium chloride has the advantage of throwing down the sulphates in the salts, and decomposing them into chlorides, so that the salts consist of chlorides of potassium and sodium, which are easily separated, and do not require the tedious and expensive processes necessary in the lixivation of kelp. The same remark applies to aluminium chloride, which can be cheaply obtained by dissolving bauxite in hydrochloric acid. Either salt can be decomposed by hydrochloric acid, and the calcium or aluminium chlorides recovered; or the salts can be decomposed by sodium carbonate. The calcium alginate, when dry, is very like bone, as the dry alginic acid is like horn. The aluminium alginate is soluble in caustic soda, forming a neutral solution, and giving, on evaporation, a substance like algin, but harder and making a stiffer finish; it is also soluble in ammonia, the salt becoming an insoluble varnish on evaporation. The alginates of copper (blue), nickel (green), cobalt (red), chromium (green) and zinc, are all soluble in ammonia, and form beautiful coloured insoluble films on evaporation. So also do the alginates of platinum, uranium (yellow), and cadmium. The latter is exceedingly soluble in ammonia. The alginate of chromium is also soluble in cold water, and it is deposited on boiling the solution, becoming then insoluble.

With bichrome, algin acts as gelatine, the mixture becoming insoluble under the influence of light. The silver alginate darkens very rapidly under exposure to light, and suggests applications in photography. Algin forms a singular compound with shellac, both being soluble in ammonia; it is a tough sheet which can be rendered quite insoluble by passing it through an acid bath.

Commercial Application of Algin, or Sodium Alginate.

For Sizing Fabrics.—A soluble gum of considerable elasticity and flexibility is a great desideratum; so also is a soluble substitute for albumen, which can be easily rendered insoluble and used as a mordant. As a finish, algin has the advantage over starch, that it fills the cloth better, that it is tougher and more elastic, that it is transparent when dry, and that it is not acted upon by acids. It imparts to the goods a thick clothy elastic feeling, without the stiffness imparted by starch. It has the additional advantage, which no other gum possesses, of becoming insoluble in the presence of a dilute acid, which decomposes starch or dextrine. No other gum has anything like the viscosity in solution, and therefore none will go as far in making up the solution or cover such a large surface. Lime-water, salts of calcium, barium, and various metallic salts can be employed for rendering the coating insoluble. If greater stiffness be required, the algin can be mixed with gum arabic, starch, dextrine, gelatine, albumen or glue, in any proportion.

The alginate of alumina, in caustic soda, is a stiff dressing, and in the crude, unbleached state, will be a cheap dressing for dark materials; and in the colourless state for finer fabrics. The ammoniated alginate of alumina can be used to give a glossy surface, which is quite insoluble after drying.

As to its use as a mordant in dyeing, I quote from Mr. John Christie, of J. Orr Ewing and Co., to whom I am indebted for the fine specimens of Turkey red dyeing exhibited, some of which are finished and mordanted with this new substance instead of cow dung:—"There is another application of the alginate of soda that occurred to me might be of some interest, namely, in the fixing of mordants, such as alumina or iron, upon cotton fibre. I find, so far as I have gone with the experiments, very encouraging results. I believe a very large application will be found for the alginate of soda as a dunging substitute. The mordants, when precipitated, seem to have full dyeing power, the results indicating that this substance is capable of taking the place of cow dung, as used in print and dye-works; also as a dunging substitute it will rank with arseniates, phosphate and silicate of soda, and a number of other salts, which are now largely used for the precipitation of mordants previous to the dyeing of cotton fabrics and yarns."

As an Article of Food.—Algin contains—carbon, 44·39; hydrogen, 5·47; nitrogen, 3·77; oxygen, 46·37; or about the same amount of nitrogen found in Dutch cheese. It has a slight pleasant marine taste, easily overcome if objected to, and may form a useful addition to the kitchen for thickening soups and puddings. It appears specially adapted to replace gum arabic in the manufacture of jujubes and lozenges. To make it into jelly, requires addition of gelose or gelatine, or admixture of lemon juice.

It will be useful for some pharmaceutical purposes, as for emulsion of oils, as an excipient for pills, and for fining of spirits.

For Boiler Incrustation.—The sodium alginate has a remarkable effect in resolving and preventing the incrustation of boilers. My friend, Mr. Spiller, who introduced the first, and one of the best fluids for this purpose, first suggested this application. He found it to precipitate the lime in a state in which it could be easily blown off. Further experience has fully corroborated his opinion. The solution is pumped in with the feed water, in the proportion of 1 lb. to every 1000 gallons. Where hard waters are a necessity, the saving of fuel is considerable.

For Covering Boilers.—The seaweed charcoal, in conjunction with algin, is used for this purpose, and has been largely applied under the name of "carbon cement." It is nearly all charcoal, 3 per cent. of the algin being sufficient to make it cohere. Charcoal is known to be the best solid non-conductor of heat, and in this way its application to steam boilers has been made practicable. It forms a cool, light, and efficient covering.

Algic Cellulose.—This substance bleaches easily, and under pressure becomes very hard, and can be turned and polished with facility. It also makes a good paper, tough and transparent, but with no fibre. Alone, or mixed with algin and linseed oil, or shellac, it may be used as a non-conductor of electricity, where a cheap material is required.

Although there is still a small portion of the plant not accounted for, which will, I hope, also soon be worked out, I think enough has been discovered to justify the following conclusions:—

1. The only way to effectually utilize seaweed is to import it in the raw state.

2. By following the wet process, the additional cost is fully made up by the greatly increased amount of iodine and salts obtained from the water solution, leaving two-thirds of the plant for further treatment.

3. That by extracting from this the algin and the cellulose we utilize the whole plant, and obtain two new products of considerable commercial importance.

4. That the process is extremely simple, and requires no extravagant plant; nor do operations on the large scale present any serious practical difficulties.

5. That the new substance, algin, has very remarkable properties, which may find many aplications not yet known, when it can be put on the market.

6. That the demand for such a substance in fixing and mordanting fabrics alone is enormous.

Our annual export of textile manufactures and yarns is valued at £40,000,000, or more than half the value of our total exports; and a large portion of this requires some dressing material to fit it for the market. We import about £200,000 worth of gum arabic, a good deal of which is used for this purpose; and the war in the Soudan is raising its price, and making it scarce.

7. That the supply of raw material is almost unlimited. Seaweed damaged by rain is equally available for the manufacture of algin.

I will only add that I bring forward this process with some confidence, as the result of a quarter of a century's scientific work, and an almost equally long practical experience—an experience gained in a wide and wild school. I am satisfied, whether it may be given to me to carry it out or not to the extent it should be, it will become the process of the near future. It immediately possesses the advantage of obtaining known marketable products of considerable value, and it bids fair to open up a new industry which may become one of large extent, supplying, as it will, new products for which there is an absolute want. On the other hand, the importance of attaching a marketable value to seaweed can scarcely be overrated. No Royal Commission will give the crofters and cottars on the shores of the Hebrides and the West of Ireland anything like the satisfaction that the offer of £1 per ton for all the seaweed they could gather would. In all these places the sea quest might soon become more important than the land question. Moreover, a shipping trade in the raw material itself is a great benefit to the out-lying islands where it is obtained, it necessitates cartage, it tends to the improvement of roads and harbours, it improves communication by bringing steamers, and necessarily brings the people closer to civilization, and the great centres of industry. This is especially the case where the expenditure of every thousand pounds on the raw material means the expenditure of about as much on carriage. I have reason to know that the lairds of all these shores would not be entirely dissatisfied with such a result. We should all share in the satisfaction of knowing that one more waste product had been effectually utilized.

INDIA RUBBER AND GUTTA PERCHA CULTIVATION IN CEYLON.*

India Rubber.† *Ceara.*—In Ceylon a planted area of 977 acres is credited to this kind of rubber, but it has not yet appeared among our exports. Since it has been ascertained that the quality is excellent,‡ cultivators have been endeavouring to discover a means by which the milk can be obtained at a cost sufficiently low to give a return, but without, as yet, encouraging results. The removal of the outer separable bark, as practised in the experiments referred to in my last report, has been objected to on the ground that the bark formed in its stead is of a different character, very hard and inseparable from the green layer a second time. Instruments have therefore been devised for bleeding without such removal. A knife with two parallel blades, which took out a strip of bark, has been modified into one in which the very sharp cutting edges meet to form a V, the basal angle during use being at the cambium. Another invention avoids all cutting, being a double spur-like wheel with sharp but guarded points which puncture the bark without further injury. The milking (one can scarcely call it tapping) has also been practised on trees of various ages and at different intervals and seasons. While it is found that the yield of individual trees varies extremely,§ none of the experimenters is satisfied that the small quantity obtainable by present methods is sufficient to make the cultivation profitable at the existing price of rubber. Mr. Wall, however, who states that hundreds of young trees have been bled *daily* with the "pricker" for some weeks, and that thus a cooly can collect about half a pound of dry rubber per diem, thinks that, if trees will bear this treatment for two hundred and forty days in the year, the cultivation would be remunerative. It appears evident that milking must be repeated at frequent intervals, and (as often already pointed out) the cultivation be conducted on a large scale. Much of the 35,000 acres in private hands in Ceylon, at present growing nothing but *Lantana* and other weeds, is suitable for this hardy plant, which costs nothing to cultivate, affords a substance of a value which is continually increasing, and awaits only the discovery of a process by which the latter can be cheaply and exhaustively extracted.

Castilloa Rubber.—From a single tree at Péradeniya a considerable crop of seedings was raised. The fruits ripened at the end of May; they are little, white, pointed nuts, about half an inch long, covered by a bright orange pulp, and some twenty to thirty are crowded together on the fleshy flattened scaly receptacle, forming collectively what is called a compound fruit: about half of the fruits ripen and contain each a single seed. I have already expressed my opinion as to the suitability of this tree for cultivation by a Forest Department as a source of prospective revenue; and as comparatively few of the plants were disposed of to private persons, I made an endeavour to get plantations of this valuable tree formed at Ratnapura and Kalutara. The plan was sanctioned by the Governor, and I gave the necessary instructions: but after three months' delay it was discovered that the trifling sum necessary could not be provided.

The growth of the largest *Castilloa* tree at Henaratgoda is, at a yard from the ground, 30¼ inches, an increase of 4¼ inches during the year.

Para Rubber.—Nine trees flowered at Henaratgoda in March, and the fruit ripened in August. About two hundred and sixty seedling plants were raised, many of which have been disposed of to persons desirous to try the cultivation. Our largest tree is now 30 inches in circumference, an increase of 4½ inches in the year.

Eighteen plants of another species of Hevea, *H. Spruceana*, were received from Kew in October. This is a native of British Guiana where it is generally known by its Arawack name "Hatie." It has been studied in its native forests by Mr. Jenman, who sent us a plant in 1881, which unfortunately died. Dr. Spruce also collected it on the Amazons. It is closely allied to *H. brasiliensis*, and grows under quite similar conditions. The specimen of the rubber sent home by Mr. Jenman for report appears to have been unfortunately mixed with some impurity which prevented its value being accurately ascertained. The plants have been put out mostly at Henaratgoda, and are doing well.

Some seeds of this species were also kindly sent to the garden by the Manager of the Ceylon Company, Limited, in July, but were quite dead. It is useless to attempt to import seeds of this description from any distance, as they lose their vitality in a few days.

Other Rubber Plants.—Landolphia Petersiana, one of the East African rubbers has flowered during the year, and *L. Kirkii* is now in bud at Henaratgoda. Two plants of *Tabernœmontana crassa* are now doing well. Among seeds received from Mr. L. Wray, of Perak, were some of "Gutta Singret" which appears from leaf specimens, also sent, to be a species of *Chilocarpus*, another climbing apocynaceous genus. Its rubber is not of a good quality, and is chiefly used for adulteration. A few plants were raised and are planted at Henaratgoda.

Gutta Percha.—A valuable series of dried herbarium specimens, of wood, and of the commercial products of the various gutta-producing trees of Perak, has been sent by Mr. L. Wray, jun. (collecting for Sir H. Low), which

* From the Report of the Director of the Royal Botanic Gardens.

† The import of Caoutchouc into Great Britain during 1882 amounted to nearly 20,000,000 pounds.

‡ I am informed that as much as 4s. a pound has been obtained for Ceylon Ceara rubber.

§ This is to be expected; for it should be recollected that the "milk" in plants is quite distinct from their sap, and is contained in special channels. It has no nutritive function, but, like the alkaloids in cinchona, is rather of the nature of an excretion. Its removal, therefore, *per se*, inflicts little or no injury on the plant.

has enabled me to determine with more certainty the species we possess is a living state. He has also sent me a copy of a report to Sir H. Low on the gutta question, which contains some valuable additional matter to that collected at Kew and published in the report of that institution for 1881, pp. 38-47.

I am now satisfied that the identification of "Gutta Sundek" with *Payena* (*Ceratephorus*) *Leerii*, on which doubt has been thrown, is correct. Mr. Wray describes the tree as partial to swampy places near the coast even where the water is salt; the wood is hard and close-grained, and the fruit sweet and eaten by the Malays. There is an inferior variety with a thinner bark known by its longer leaves. Our plants at Henaratgoda have grown quickly; their rate of growth is much more rapid than the species of *Dichopsis*—the largest are over 8 feet high; the tallest at Péradeniya is 6 feet 2 inches.

The young plants of "Gutta Taban putih" grow very slowly. The good dried specimens now sent show this to be distinct from *Dichopsis Gutta*, but I am not able to say to which species of *Dichopsis* they should be referred. This tree is found in the lower hills, 1800 to 2500 feet, and not in the plains; the gutta is a dirty white (whence the name putih = white), coagulates slowly, and does not thoroughly soften even in boiling water. Mr. Wray also distinguishes a small-leaved variety with a longer fruit.

The specimens further confirm our previous knowledge that the best and most frequent sort of gutta percha of commerce, "Gutta Taban merah," is the produce of *Dichopsis Gutta*. Our trees of this are now nine years old, but the tallest is but 9 feet high. According to Mr. Wray, this tree attains 100 to 200 feet in height, with a clean straight trunk of 4 to 5 feet diameter, flanked at the base with large thin buttresses; the bark is $\frac{1}{3}$ to $\frac{1}{2}$ an inch thick, brown-red in colour, and flakes off; the leaves are much narrower on young plants than old ones, the flowers are white, and the seeds yield an oil solid at ordinary temperatures, but used for cooking. The gutta is at first white and cream-like, but becomes pink and ultimately brownish-red ("merah" = red), and this colour is strongly imparted to the water in which it is washed. There is a variety of this species affording a paler gutta called "Gutta Taban sutra" ("sutra" = silk), which is found at a higher elevation (500 to 600 feet).

Other sapotaceous trees affording gutta, of which specimens have been sent by Mr. Wray, are "Gutta Taban simpoo," *Dichopsis Maingayi*, Clarke—the product of which is also sold as "gutta putih"—and "gutta garru," *Bassia Mottleyana*, De Vriese, which gives a white hard sort, only used for mixing with other kinds. He also sends examples of the curious substance called "Gutta Jelutong," used for adulterating gutta percha. It is obtained from a very lofty apocynaceous tree allied to our "Rukattana" (*Alstonia scholaris*),* and recently named *Dyera costulata* by Sir J. Hooker.

The yield of the gutta percha trees seems to be very small—less even than the rubber trees. Thus, from a tree of *D. Gutta*, thought to be over one hundred years old, and over 100 feet high, Mr. Wray succeeded in extracting, by the ordinary native method of felling and ringing the trunk and branches, only 2 lbs. 5 ozs. of clean gutta. Of "Gutta Taban putih," a tree 10 inches in diameter, gave 2 lbs. 11 ozs., and one of *Payena Leerii*, 2 feet 8 inches in circumference, only $6\frac{1}{2}$ ozs. Mr. Wray has satisfied himself that only about $\frac{1}{30}$ part of the gutta percha actually in the bark is extracted by this method, and he believes that by pounding and boiling the bark the whole could be obtained. As the question of the supply of gutta percha is becoming a pressing one, it is to be hoped that experiments on a large scale may confirm this opinion. To quote Sir J. Hooker ('Kew Report,' 1881, p. 38), "the time cannot be far distant when the natural sources of gutta percha will be definitely used up." In view of this contingency it behoves the Governments of those few British colonies—Ceylon being one—in which the trees will grow, to lose no time in establishing plantations, which must in the future become a valuable source of revenue. But in this colony, neither in this case nor in the case of india rubber, can anything be done until a proper forest conservancy is established.

* This appears to yield a somewhat similar substance at Singapore, called Gutta Pulei.

THE VALUATION OF TARTAR EMETIC.*

BY W. B. HART.

The adulteration and consequent lessening of the valuable ingredient in drugs and dye-wares tends to develop methods of analysis, by which the commercial value of them may be rapidly determined, and thus the user and honest manufacturer be protected. Tartar emetic, whose value to the dyer depends solely on the amount of antimony it contains, has of late been lowered in quality, until in some cases it contains only about one-half the amount of metal that a good commercial sample should have. The usual method of estimating the antimony in this salt is by means of a standard solution of iodine, as recommended in most volumetrical analysis manuals. This method gives good results in careful and patient hands, but I find that it can be well replaced by a solution of calcic hypochlorite, or common bleach liquor, of a strength of about 2° Twaddell. The value of the hypochlorite can be found by using a standard solution of sodium arsenite. The sodium arsenite is the usual decinormal solution, made by dissolving 4·95 grams of pure arsenious acid in a solution of sodium carbonate, and when cool diluting to 1 litre. About 25 grams of sodium carbonate are required.

1 c.c. = ·00355 grams of Cl, or ·0061 grams Sb.

The usual potassic iodide and starch paper are needed. The process is conducted as follows:—A weighed portion of the tartar emetic is dissolved, assisted by heat, cooled, and made alkaline with sodium carbonate. A known amount of the calcium hypochlorite solution is added in excess, this being shown by the blue colour which a drop of the liquid gives to the starch paper. The excess of calcium hypochlorite is now found by titrating with the standard sodium arsenite, until the liquid ceases to give the blue colour to the starch paper. The value of the hypochlorite added is found by taking an amount equal to that put to the tartar emetic, or an aliquot portion may be taken, making alkaline as before and titrating with standard arsenite, Penot's method. If an aliquot part is taken, the value of the whole is then to be calculated. The worth of the total hypochlorite added being known, and that of the excess also known, the amount of hypochlorite and therefore chlorine used to oxidize the antimony is thus obtained by difference. This also gives the amount of antimony. The reaction that takes place is as follows:—

$$Sb_2O_3 + 2Cl_2 + 4NaHo = Sb_2O_5 + 4NaCl + 2H_2O$$
$$\therefore 71\,Cl = 122\,Sb.$$

This process is rapid, and, for all practical purposes, accurate, the end of the reaction being sharp, and denoted at once, which with the iodine process is both tardy and tiresome.

The calcic hypochlorite solution, the value of which should be found at least once a day when required, must be kept in a stoppered bottle in a dark place, as it decomposes quickly if exposed to light and air. Even then it will not be of use long, but a fresh solution can easily be made.

The following are the results obtained by this process, along with those obtained by the iodine method, showing comparison:—

* From the *Journal of the Society of Chemical Industry*, May 29, 1884.

	Iodine Process.	Chlorine Process.
No. 1. Mean of 3 trials.	33·41 p. c. Sb	33·29 p. c. Sb
	37·048 „ „	36·944 „ „
No. 2.	36·896 „ „	36·820 „ „
	37·000 „ „	37·020 „ „
Mean	36·981 p. c. Sb	36·928 p. c. Sb

This method might be reduced to a comparative test only.

Let a standard sample of tartar emetic be procured in which the amount of antimony is known. Equal weights of the standard sample and of the sample to be tried are dissolved separately. From a Bink's or glass tap burette is added to the standard sample a solution of bleach liquor until the liquid just blues the aforesaid starch papers. The amount of bleach liquor used is noted. The second sample is treated in the same way. The relation of the antimony in the samples will be in the direct ratio of the volume of bleach liquor taken, and, therefore, in dyeing the amounts to be taken to produce a certain shade will be in the inverse ratio.

Example.—Equal weights of the standard sample (1), and of the second sample (2), were dissolved. No. 1 took 30 volumes of bleach liquor, and No. 2 took 20 volumes; then the ratio of the amount of antimony is as 3 to 2. Therefore, in practical work, for every two parts of the standard sample, three parts of the sample in question must be used and those give the same result.

NOVELTIES IN VARNISHES AND SHOE POLISHES.*

The *Scientific American* translates the following from a German publication called *Neuste Erfahrungen*:—

Reinhardt has devised a method of destroying the stickiness of varnish, which consists in placing the article in a closed vessel or chamber where it can be exposed to the action of ozonized air in motion.

A leather varnish or polish is prepared by Gunther, of Berlin, by mixing a filtered solution of 80 parts of shellac in 15 parts of alcohol, with 3 parts of wax, 2 parts of castor oil, and a sufficient quantity of pigment. The mixture is evaporated in a vacuum to a syrup. The varnish is applied to the leather with a brush moistened with alcohol or with a colourless alcoholic varnish.

Nicolet, of Lyons, prepares boot blacking by dissolving 150 parts of wax and 15 parts of tallow in a mixture of 200 parts of linseed oil, 20 parts of litharge, and 100 parts of molasses, at a temperature of 230° or 250° F. After this 103 parts of lamp-black are added, and when cold it is diluted with 280 parts of spirits of turpentine, and finally is mixed with a solution of 5 parts of gum lac and 2 parts of aniline violet in 35 parts of alcohol.

Hein, in Kaufering, makes another kind of shoe blacking by melting 90 parts of beeswax, or ceresine, 30 parts of spermaceti, and 350 parts of spirits of turpentine, with 20 parts of asphalt varnish, and adds 10 parts of borax, 20 parts of lamp-black, 10 parts of Prussian blue, and 5 parts of nitro-benzol.

Brunner uses 10 parts of bone-black, 10 parts of glucose syrup, 5 parts of sulphuric acid, 20 parts of train-oil, 4 parts of water, and 2 parts (carbonate of) soda. The bone-black and glucose are stirred with the acid in a porcelain vessel until the whole mass is homogeneous and has a shining black surface when at rest. The soda is dissolved in a little water, and boiled with the oil under constant stirring until it forms a thick liquid, and then the other mixture is stirred into it. By varying the proportions of these two mixtures the blacking is made thinner and softer, or harder and firmer. The substances sold as French polish are mostly composed of these ingredients. In this and all other kinds of shoe blacking made with bone-black and sulphuric acid, the precaution must be observed of stirring rapidly and evenly after the acid is added, otherwise lumps will be formed that are difficult to crush, and the blacking will have a granular condition that does not belong to it. Good shoe blacking must always remain soft, and show a smooth, uniform surface when applied to the leather.

* From *Pharmaceutical Record*, June 1, 1884.

BOLIVIAN CINCHONA FORESTS.*

The great progress made in the acclimatization of cinchona trees in India, Ceylon, and elsewhere, has awakened the Governments of countries where the plants are indigenous to the necessity of conserving from reckless destruction, and re-planting denuded forests, so as to be able to keep up the supply of this valuable product.

In Bolivia, since 1878, according to the report of the Netherlands Consul, private individuals and land owners have taken up the question with great earnestness, and at the present time on the banks of the Mapiri, in the department of La Paz, there are over a million of young trees growing.

New plantations have also sprung up in various other localities, either on private ground or that owned by Government. The competition of India and Ceylon in supplying the markets, has had also the effect of inducing more care in collecting and also of revisiting old spots, often with the result of a rich harvest of bark which had been left on partly denuded trunks, and the opening up of new localities. The new shoots springing up from the old stumps have yielded much quill bark, and the root bark of the old stumps has also been utilized.

The re-planting entails very little expense. The Indian tenant on an estate has a house and land from the owner (hacienda) of the estate. For this he binds himself to work for two to four days a week, at from 28 to 36 cents. per day, women and children obtaining 16 to 21 cents. per day. Thus the planting, weeding, etc., during the first two years, is but nominal in expense; after this period the trees may be left to themselves.

On Government land the expense is greater, as after an application being made, the land is put up to public auction, and may fetch a very low or a higher price, according to the bidding. The land secured, contracts are made with natives of the lower class to clear the forest and plant cinchona. The contracts are often sublet to Indians. The young plants are planted from five to six feet apart, with banana trees between, on account of their rapid growth and the shade the latter afford. From March to June, after the wet season is over, is the best time for planting, and the contractor keeps the plantation free from weeds and in good order for twelve months, when it is handed over to the owner. The following is given as the cost of the Mapiri river plantation of an area from sixty or more miles in extent:—

	Dollars.
Ground	1,200
300,000 plants at 0·14 dollars	42,000
Superintendent, buildings, etc. . . .	4,400
Interest	4,800
Total	52,400

Till the plants are above two years of age, they are liable to die from drought or the attacks of ants, and during 1878 many thousands died from these causes. At the end of the fourth year some proprietors begin to collect the quill bark by the method of coppicing.

It is feared by some that should this new venture be successful, it will prove a dangerous rival to the plantations of India, Ceylon and Java, and lower the price of bark considerably.

* From the *Journal of the Society of Arts*, June 13, 1884.

The Pharmaceutical Journal.

SATURDAY, JUNE 28, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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

THE MEDICAL BILL AND PHARMACOPŒIA REVISION.

AT last the Franchise Bill has been fairly disposed of in the House of Commons, and on Tuesday the Government found a favourable opportunity for bringing forward the second reading of the Medical Acts Amendment Bill. This was moved by Mr. MUNDELLA, who said the Bill was a measure of reform which was greatly desired by the medical profession in the public interest, and pointed out that its introduction was not the result of pressure from the outside public, but of an agitation that had been going on among medical men for many years. The principal objects of the Bill were summarized by Mr. MUNDELLA as (1) the reform of the Medical Council by diminishing the number of its members, strengthening their powers, and giving to the medical profession direct representation; (2) the effecting of an approximation to uniformity in the examinations by the establishment in each division of the United Kingdom of a medical board which would regulate the examinations under the control of the Medical Council; and (3) the establishment of a *minimum* threefold qualification—in medicine, surgery and midwifery—which should be required from every person before being placed on the Medical Register. These were described as the main principles of the Bill; but it was admitted that whilst adhering to them there were many details to which the Government was not inclined to pledge itself pedantically and which might be discussed with a view to settlement in Committee. The motion for the second reading was supported by Sir LYON PLAYFAIR, who referred to some of the anomalies arising from the number of licensing boards through which the medical profession could at present be entered, and it received a more qualified advocacy from other members, who evidently were possessed of the views of certain corporations that consider their interests would be injured by the passage of the Bill in its present form. But the force of any opposition was temporarily disarmed by the minister's promise to consider objections when the Bill was in Committee, so that although the sitting came to an end before the Bill was read a second time, there was no indication that any serious objection would be raised to the motion when it next comes before the House, which according to the notices for Thursday would possibly be about the time this Journal goes to press.

One of the details in respect to which Mr. MUNDELLA's invitation will be accepted, and the one which will perhaps be the furthest of all from affecting any principle of the Bill, is that relating to the preparation of the British Pharmacopœia. It is well known to our readers that the Council of the Pharmaceutical Society has decided that the Bill ought not to be allowed to pass through Parliament without an attempt being made to introduce a provision giving to representative pharmacists an official position on the Pharmacopœia Committee. Of course there has been no desire to place any obstacle in the way of the progress of a Bill so much desired by a majority of medical men, and, therefore, no active opposition has been offered to it in the preliminary stages; but the time has now arrived when in the absence of any concession on the part of those in charge of the Bill, the pharmacists of Great Britain, if they wish to remove the disability under which they labour as compared with their *confrères* in any other civilized country, will have to exert themselves to make their wishes known to, and bring their influence to bear upon, the House of Commons. As this may be done most effectually by individuals personally submitting a statement of the facts to the members for their respective constituencies, it will be convenient that we should give here a brief *résumé* of the principal points in the case to be laid before them. It was not until the year 1858 that any provision was made for the compilation of a national pharmacopœia which should have the force of a law throughout the British empire, but by the terms of the Medical Act passed in that year the duty was entrusted to the Medical Council. At that time the pharmaceutical body in Great Britain had so recently emerged from the inchoate condition which had characterized it up to the middle of the present century that no one was surprised that pharmacists did not receive any official recognition in respect to this subject, although it was one in which they were so intimately concerned, and that it was left to the option of the Medical Council either to consult them or to ignore them. We are glad to acknowledge that to a certain extent the Medical Council has followed the former course, but this has been simply as a matter of grace and courtesy. As, however, under the fostering influence of the Pharmaceutical Society the followers of pharmacy have gradually assumed a more worthy position in this country, it has been increasingly felt that the time was at hand when they might reasonably ask for a recognized position in the Committee charged with the revision of future editions of the text-book by the terms of of which they are bound much more stringently than are medical practitioners. As an outcome of this feeling, in 1874, on the motion of Mr. HAMPSON, a resolution was passed by the Council of the Pharmaceutical Society and communicated to the Medical Council, expressing an opinion that it was desirable to associate more practical pharmacists with any Committee which might be appointed for the purpose of preparing any future edition of the British Pharmacopœia and offering to nominate such pharmacists should the Medical Council concur with the suggestion. But the Medical Council contented itself with making the briefest form of acknowledgment of the receipt of the resolution and does not appear to have taken any further notice of it. At any rate another seven years had passed without anything being done, when the present President of the Pharmaceutical Society introduced the subject of Pharmacopœia Revision at the International Pharmaceutical Congress, held in London in 1881, when the reasonableness of the desire thus ignored was strikingly manifested as in the course of the discussion representatives from Germany, France, the United States, Belgium, Russia, Italy, Holland and Denmark rose in succession to say that in their respective countries pharmacists already occupied a position, in respect to the compilation of the national pharmacopœias, more than equal to that asked for so unsuccessfully by the pharmacists of Great Britain and Ireland. The Council of the Pharmaceutical Society, therefore, can hardly be accused of undue urgency or impatience, because when a Medical Bill was introduced into Parliament last year, re-enacting in an unaltered form the existing provisions as to the compilation and publication of the national pharmacopœia, it considered it to be a duty to attempt to urge its views more effectively. A memorial to the Privy Council was, therefore, drawn up and presented, which served as a basis for a large number of petitions afterwards presented to the House of Commons, in which it was asked that a clause should be inserted in the Bill providing for the establishment of a Pharmacopœia Committee consisting of six medical practitioners, to be nominated by the Medical Council, and five pharmaceutical chemists, four to be nominated by the Pharmaceutical Society of Great Britain, amongst whom one should be resident in Scotland, and one by the Pharmaceutical Society of Ireland. It will be remembered, however, that although about four hundred petitions were presented, they were without effect, as the Bill was withdrawn a few days before the end of the session.

The Bill having, however, been re-introduced this session in practically the same form, so far as it applies to this subject, and it having now arrived apparently within a measurable distance of being considered in Committee, the time has come for repeating the work of last year. Within the next few days, we believe, copies of petitions will be sent to Local Secretaries of the Pharmaceutical Society in the provinces and to those other gentlemen who have undertaken to canvass their respective districts and it will be very desirable that they should at once set to work to get them signed as fully as possible and arrange for their presentation by a member of Parliament as soon as ready. In addition to the form of petition issued for signature by chemists and druggists, there will be another for medical practitioners, and, considering that so far as medical opinion has yet been expressed it has been uniformly in accordance with pharmaceutical opinion, it may be hoped that many medical gentlemen will feel at liberty to affix their signatures, especially as there is no longer any danger that by their so doing they will impede the progress of the Bill. We understand that it is also intended to address to every member of Parliament a request to use his influence, and vote if necessary, in the direction of the sense of these petitions, and that in order to enable him to do so intelligently, he will be furnished with a copy of the memorial addressed to the Privy Council, as well as excerpts from the official report of the proceedings at the International Pharmaceutical Congress, consisting of the above-mentioned statements by foreign representatives upon the subject of pharmacopœia revision in their respective countries. It may be convenient to add that a report of the Congress discussion on Pharmacopœia Revision appeared in the number of this Journal for August 6, 1881, and that it was subsequently summarized in the number for April 7, 1883.

The Pharmacopœia Committee of the General Medical Council met on Friday, the 20th inst., to consider the additions and omissions which it is proposed to make in the next edition of the British Pharmacopœia. According to the *Medical Press and Circular* it has been decided that the volume shall be published before the end of the present year.

* * *

Shortly after the last number of this Journal was sent to press, Mr. Mundella, in reply to a question put by Mr. Warton in the House of Commons, stated that the Goverment Bill to regulate the sale of poisons had been drafted, but that before introducing it he was conferring with the Lord Lieutenant of Ireland as to the propriety of extending its provisions to that country.

* * *

The annual meeting in Philadelphia of the Medical Society of the State of Pennsylvania, last month, was made the occasion of the issue of a daily edition of the *Medical Bulletin*, an event that has been only once anticipated in the history of medical journalism.

* * *

Referring to the menthol derived from American oil of peppermint (see before, p. 966), which differs from the ordinary menthol at least in having the odour of peppermint, Professor Maisch suggests that it should be designated "pipmenthol," as even should it prove to be chemically identical a distinctive name would be desirable. Professor Maisch says it occurs sometimes in snow-white acicular crystals and sometimes in white needles with a satiny lustre and forming stellate groups.

* * *

We understand that the Silver Medal of the Society of Arts has been awarded to Mr. E. C. C. Stanford in recognition of the merit of his paper on the "Economic Applications of Seaweed."

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, June 19. Dr. W. H. Perkin, F.R.S., President, in the chair.

The following certificate was read for the first time:—L. Ehrmann.

During the evening a ballot was held and the Scrutators, Drs. Plimpton and Miller, declared the following gentlemen duly elected Fellows of the Society:—W. Alabaster, H. B. Baker, W. T. Burgess, E. G. B. Barlow, R. D. Courtney, E. J. Caley, M. H. Foye, W. F. Fremersdorff, W. F. Grace, J. Hargreaves, Baron F. Von Mueller, E. L. C. Muspratt, F. Nettlefold, A. G. Page, J. Parr, E. H. Rogers, R. S. Stephens, T. Stormouth, R. C. Tresidder, A. J. Watts, J. S. Wells.

Dr. Gladstone then took the chair while the President communicated the substance of a most important and lengthy paper entitled—

On the Magnetic Rotary Polarization of Chemical Compounds in Relation to their Composition; with Observations on the Preparation and Densities of the Bodies examined. By W. H. Perkin, F.R.S.—In a preliminary note on this subject, read before the Society about two years ago, it was shown that no definite laws could be expected by the ordinary system of comparing the rotary effect of unit lengths of fluid, and that a comparison of molecular lengths (*i.e.* such lengths of fluid that the ray of light in passing through them should in all cases traverse the same number of molecules) must be made if any relationship in the rotary effect of various bodies was to become apparent. It was further shown that the rotation due to these molecular lengths may be calculated from observations made on unit lengths by the formula $\frac{r \cdot Mw}{d}$ where r = rotation observed, Mw the molecular weight and d the density; and that if this number be divided by the number similarly obtained for the standard of comparison (in this case water) the result will be *the molecular coefficient of magnetic rotation*, or more briefly the *molecular rotation.* Examples were then given, calculated from original observations as well as from numbers taken from the papers of Becquerel and De La Rive, fully confirming this view, and plainly showing the existence of definite laws governing the magnetic rotary polarization. These investigations have been continued and the present communication embodies the results of the careful observation of about one hundred and forty substances belonging to the various classes of the fatty series of organic compounds. From these results it is clear that in a strictly homologous series the introduction of each CH_2 is marked by an increase in the molecular rotation. This constant for CH_2 was found (as the means of a large number of closely concordant observations) to be 1·023. Each series has, in addition, it own initial or *series constant*, and it was found that when this initial constant has been once determined for a series by the careful observation of one of its members, the molecular rotation of any other members may be found by the formula Mol. Rot. = s + 1·023.n, where s = the initial or series constant, and n the number of carbon atoms in the molecule. It is found, however, that in speaking of homologous series the first, and in most cases the first two, members of the series must be omitted. This agrees with the results obtained by other investigators, when dealing with other chemical and physical properties, and it appears as if the influence of the hydrocarbon portion of these substances was to a greater or less extent neutralized by that of the extraneous elements, and that the truly homologous series never commences until there are at least three carbon atoms in the nucleus. Again, isomerism plays an important part, and for the above law to hold good it is necessary that the series should be homologous, not only in molecular weight, but also in molecular constitution. Thus, taking as the standard the line formed by the molecular rotation of a series of normal compounds, the numbers obtained for iso and secondary bodies of that series lie above the line, those for tertiary bodies being still higher. In fact, the increase of methyl groups tends to raise the molecular rotation, or, in other words, the more complicated the construction the greater the influence on polarized light. In some cases the influence of isomerism is still more marked, as, for instance, in the case of ethylene and ethylidene compounds, and in fact wherever there are two or more non-hydrocarbon radicals or elements present in the compound. In this case the numbers obtained vary both according to the arrangement of the carbon atoms in the nucleus, and also as to the position of the substituting radicals, whether they are on the same carbon atom, or on neighbouring, or on more distant ones. This is well shown in the case of the ethers of the dibasic acids of the $C_nH_{2n-2}O_4$ series. The acids being solid could not be examined. The normal series appears here to have the formula $COOEt(CH_2)_nCOOEt$, and the first member of the truly homologous series to be succinic or possibly glutaric ether. With the help of the malonic acid derivatives a considerable number of representatives of the lower members of this series were obtained and examined. The four ethers of the formula $C_3H_6(COOEt)_2$ will form good examples of the effect of molecular isomerism in this series. The molecular rotations are ethyl glutarate, 9·403 (calculated from succinate); ethyl pyrotartrate, 9·347; ethyl ethylmalonate, 9·272; and ethyl dimethylmalonate, 9·268. With halogen derivatives of polyvalent radicals these isomeric variations are still more marked, the bromides being especially conspicuous in this respect. Turning to the influence of the successive replacement of hydrogen in a compound—the number of carbon atoms in the nucleus remaining unchanged—by a negative radical, it will at once be seen, from what has been said on the effect of isomerism, that it becomes much more difficult to obtain any *fixed* increment as the cases of possible isomerism are so much increased, and it becomes almost impossible to say which kind of replacement should be considered as constituting the homologous series. This difficulty is much added to by the fact that it is almost impossible to obtain these poly-substituted bodies in sufficient numbers and purity for the determinations, many of the bodies, suitable in other respects, melting at too high a temperature. The abstraction of hydrogen (*i.e.*, the rendering unsaturated) of a compound has a most marked and curious influence on its magnetic rotation, raising it about one unit above the normal line for each diminution of H_2. Thus: propyl alcohol, 3·769; allyl alcohol, 4·683: difference, ·914; and ethylpropylmalonate, 10·367; ethylallylmalonate, 11·281: difference, ·914. Attempts were made to calculate from the results the rotation values of the elements, but it will be seen, on consideration, that as the isomerism of the molecule plays such a leading part in the determination of molecular rotation, the value of the elements must vary according to their position in the molecule and that the most that could be obtained would be values varying between certain limits or constants for certain series. It is believed that this variation of molecular rotation due to molecular isomerism may prove of great use to chemists in helping to determine the constitution of doubtful bodies. The following are the series constants obtained for a large number of different series:—Paraffins, C_nH_{2n+2} ·512; Isoparaffins, ·625; Alcohols, $C_nH_{2n+2}O$ ·700; Iso and Secondary Alcohols, ·845; Oxides, $C_nH_{2n+2}O$ ·642; Iso Oxides, ·932; Aldehydes, $C_nH_{2n}O$ ·264; Iso Aldehydes and Ketones, ·377; Acids, $C_nH_{2n}O_2$ ·393; Iso Acids, ·504; Formic Ethers, ethyl and above, ·495; Acetic Ethers, ethyl and above, ·370; Acetic ethers, Isopositive radicals, ·483; Ethers, methyl, ·273; Ethers, ethyl and above, ·336; Iso ethers, ethyl and above, ·449; Ethers, succinic series, C_nH_{2n-2}; Methyl,

·093; Ethers, succinic series, ethyl, ·196; Ethers, succinic series, iso positive radicals, ·432; Chlorides, $C_nH_{2n}+_1Cl$ 1·988; Iso and Secondary Chlorides, 2·052; Bromides, 3·814; Iso and Secondary Bromides, 3·902; Iodides, 8·006; Iso and Secondary Iodides, 8·092; Ethyl ethers, Oleic series, $C_nH_{2n}-_2O_2$ 1·452. All the observations were made for the D line of the spectrum, a lamp was used in which hydrogen was passed over strongly heated sodium contained in a piece of iron gas barrel, and thus the gas becoming impregnated with sodium vapour burnt at the nozzle and gave a very brilliant monochromatic flame, the size of which could be varied at pleasure. During this research a large number of careful determinations of densities of pure substances were made and attention has already been called (*Chem. News*, xlix., 122) to the relationship which the densities of members of homologous series show to one another and the curves which are formed, both by the densities and coefficients of expansion.

The author exhibited the sodium lamp, the pole pieces of the magnets, the tubes, the modified Sprengel tube for taking the densities, etc.

Professor Ayrton said that although the paper was eminently chemical, he had, as a practical electrician, listened with much interest. It would be of great importance to determine the magnetic value of the field; it would be difficult as the field was not uniform, but it might easily be made uniform. If it were uniform its strength might be measured in terms of Verdet's constant, and we might convert Dr. Perkin's numbers into absolute measurements. This having been done, the apparatus might be used to determine the strength of a current in absolute measure. It would be very portable and very convenient if a suitable liquid were chosen, so many seconds rotation of the D line would indicate so many ampères.

Dr. Glazebrook, some years ago, undertook some researches to determine the magnetorotary power of solutions of certain salts; he had met with two difficulties, the want of a good sodium flame, and the fact that the differences between solutions of varying concentration were so small. A plan somewhat similar to that proposed by Professor Ayrton for determining the strength of a current had been carried out by Lord Rayleigh. The results were not very satisfactory. Bisulphide of carbon was the liquid employed.

After the thanks of the meeting had been given to Dr. Perkin the Society adjourned over the summer vacation to November 6, the following papers, in consequence of the lateness of the hour, being taken as read:—

On the Effect of High Temperatures on Petroleum Hydrocarbons. By Drs. Armstrong and Miller.—In this paper the authors describe the results of their examination of the liquid obtained on compressing oil gas such as is made by passing the vapour of petroleum through highly heated retorts. They point out that their material is in every respect similar to that examined by Faraday in 1825, and in which he discovered benzene. Besides benzene and its homologues, the liquid from oil gas contains hydrocarbons of the ethylene and acetylene series. It is noteworthy that the latter are none of them true homologues of acetylene, as they are incapable of forming metallic compounds analogous to acetylide of copper; they are probably all derivatives of allene, $CH_2.C.CH_2$, the isomer of allylene or methylacetylene. From the fractions boiling below benzene two hydrocarbons of the acetylene series have been isolated, methylallene, $CH_3.CH.C.CH_2$, identical with the crotonylene separated by Caventou from the mixture of hydrocarbons condensed by compression of coal gas, and hexoylene, C_6H_{10}, identical with that described by Schorlemmer. The crystalline tetrabromides of these hydrocarbons have both been obtained in large quantity in a pure condition. As yet it has not been found possible to isolate the intermediate hydrocarbon C_5H_8. The fractions below benzene contain two olefines, amylene and hexylene. A study of their oxidation products shows that both of these are the normal hydrocarbons, the amylene furnishing on oxidation with permanganate normal butyric acid, the hexylene being converted into normal valeric acid; in other words the amylene is normal-propyl-ethylene, the hexylene normal-butyl-ethylene. In conclusion, it is pointed out that this is an extension of the investigation of Thorpe and Young. By heating paraffin under pressure at a comparatively moderate temperature they obtained a mixture, with corresponding olefines of lower (normal) paraffins down to pentane. At the higher temperature of the oil gas retorts, the paraffins are completely converted into olefines, acetylenes, benzenes, etc.; it is not improbable that the benzenes are products in a direct line of the action of heat on the paraffins, and that they are not built up as has been supposed from hydrocarbons of the acetylene series.

On the Decomposition of Terpenes by Heat. By W. A. Tilden.—The following are the conclusions arrived at by the author. When ordinary turpentine oil is exposed to a temperature just short of redness, the greater part of it is transformed in four different ways, viz., into an optically inactive terpene, by polymerization into a colophone, by resolution into cymene and hydrogen, by splitting up into two molecules of a pentine, C_5H_8. These are probably the immediate changes which it undergoes, the small quantities of other hydrocarbons which are simultaneously produced being the result of secondary reactions. The citrenes yield the same pentine as also does terpilene, though less readily. The pentine obtained from the terpenes is identical with isoprene. This pentine is readily polymerized by heat into terpilene. From this easy transformation of $2C_5H_8$ into $C_{10}H_{16}$ and *vice versâ* it appears probable that the molecule of terpilene is composed symmetrically of two halves. The pentine from turpentine, or isoprene as it may now be called, is a lower homologue or isomeric with a lower homologue of heptine from rosin spirit which has been shown by Morris to be probably methyl-propyl-allene. As the pentine is polymerizable by heat or by sulphuric acid into a dipentine, so the heptine may be converted into a diheptine, $C_{14}H_{24}$. It is a liquid boiling 235° to 240°, which appears to possess all the properties of the terpenes. The author intends to examine this compound to ascertain whether it is entitled to rank as a true homologue of turpentine.

A Short Note on the General Law which Governs the Dilatation of Liquids. By P. de Heen.

On the Melting Points of Certain Inorganic Substances. By T. Carnelly and L. T. O'Shea.

On Nitrification. Part III. By R. Warington.

INTERNATIONAL HEALTH EXHIBITION.

Address on the National Value of Public Health.

Delivered at the Inauguration of the Juries, June 17.

BY SIR JAMES PAGET, BART., D.C.L., F.R.S.

I shall speak only of national health. In consideration of his own self a man may be deemed healthy who lives idly, comfortably, and long; who enjoys every day of his life, and satisfies every natural appetite without consequent distress. And when such an one dies of old age, with a timely, uniform, and painless decay of every part, he may be deemed to have been completely healthy; and yet it is possible that he may have enjoyed his own health in the midst of a poor, unhealthy, and unhappy nation, to which he has done no good whatever.

If we could find a nation composed of people such as this man, we might be bound to speak of them as healthy; but we should be right in calling the whole nation utterly unsound, and might safely prophesy its complete stagnation, or its quick decline and fall.

It is not health such as this—idle, selfish, unproductive—that we want to promote either in the individual or in the multitude. Comfortable idleness, such as that of some vagrants and some fine gentlemen, is a despicable result of good health; it is what no thorough man would ever wish for. In view of the national health and welfare, the pattern healthy man is one who lives long and vigorously; who in every part of his life, wherever and whatever it may be, does the largest amount of the best work that he can, and, when he dies, leaves healthy offspring. And we may regard that as the healthiest nation which produces, for the longest time and in proportion to its population, the largest number of such men as this, and which, in proportion to its natural and accumulative resources, can show the largest amount and greatest variety of good work.

Here let me insert, as an interpretation clause, that in all this and what is to follow the word "man" means also "woman," and "he" means also "she;" and that when I speak of work, I mean not only manual or other muscular work, but work of whatever kind that can be regarded as a healthy part of the whole economy of the national life. And I shall take it for granted that a large portion of all national welfare is dependent on the work which the population can constantly be doing; or, if I may so express it, that the greater part of the national wealth is the income from the work which is the outcome from the national health.

It is a common expression that we do not know the value of a thing till we have lost it; and this may be applied to the losses of work which are due to losses of national health. There are very few cases in which these can be estimated with any appearance of accuracy; but I am helped to the best within our present reach by Mr. Sutton, the Actuary to the Registry of Friendly Societies. In his office are the returns, for many years past, of the sickness and mortality among the members of a very large number of these societies; and, among other things, there is recorded the number of days for which each member, when "off work" on account of sickness, receives money from his society. Hence Mr. Sutton can estimate, and this he has been so good as to do for me, the average number of days' sickness and consequent loss of work among several hundred thousands of the workmen and others who are members of these societies. From the entire mass of these returns, he deduces that the average number of days' sickness, per member, per annum, is very nearly one and a half weeks; and this agrees, generally, with the estimates made in other societies by Mr. Neison and others. But the average thus obtained includes the cases of members of all ages, and among them many cases of chronic sickness and inability to work during old age. In order, therefore, to get a better idea of the actual annual loss of work through sickness he has calculated the average annual number of days' sickness of each person during what may be deemed the normal working time of life; that is between fifteen and sixty-five years of age. This he has done among the members of the large group of friendly societies known as the Manchester Unity of Odd Fellows; and then, on the fair assumption that the rates of sickness of the whole population during the working years of life would not be far different, he has calculated tables, showing the average annual rates of sickness of each person, enumerated in the Census of 1881 as living between the ages of fifteen and forty-five.

Briefly, it appears from these tables that the average time of sickness among males during the working years is 1·314 weeks—that is, a small fraction more than nine days each—in each year, and that among females it is yet a small fraction more. The result is that, among males, there is a loss of 9,692,505 weeks' work in every year, and among females a loss of 10,592,761 weeks. Thus we may believe that our whole population between fifteen and sixty-five years old do, in each year, 20,000,000 weeks' work less than they might do if it were not for sickness. The estimate is so large that it must, on first thoughts, seem improbable; but, on fair consideration, I believe it will not seem so. For the members of the Manchester Unity, who are in the working time of life, the reckoning is certainly true, and it is founded on the experience of between 300,000 and 400,000 members. In respect of health, they may represent the whole population at least as well as any group that could be taken. They are not very strictly selected; they are not picked lives; yet they are such as are able, when they are in health, to earn good wages or good salaries; and, as their prudence in joining this association shows, they are comparatively thrifty and careful persons. They do not, at all events, include many of the habitual drunkards, the cripples, or utterly invalids, or those who, through natural feebleness, or early disease, or mere profligacy, cannot earn enough to become members or maintain themselves in membership. Neither do they include many of the insane, or imbecile and idiotic, of whom there are in our population, nearly 70,000 doing no work, and losing not less than 3½ millions of weeks' work in the year.

It would be tedious to tell the grounds on which the estimate may be deemed too high, for just as many and as good could be told on which it might be deemed too low; and it is rather more than confirmed by some estimates of the annual sickness in other and very different groups of persons.

In the Army, at home, the average number of days' sickness in each year is, for each soldier, about seventeen; and, as the number of the troops in the United Kingdom is more than 80,000, we have here a loss of about 200,000 weeks' service in each year.

In the Navy, on the home stations, the average number of days' sickness in each year has been, in the last five years, for each man, nearly sixteen; so that, for the total of about 20,000 men, there is a loss of 45,000 weeks' service in each year.

The amount of sickness in the services thus appears much higher than in the Friendly Societies. This is due, in great part, to the fact that a soldier or a sailor is often put off duty for a day or two for much less illness than that for which a civilian would "go on his club." Still, the one estimate may confirm the other; for the sickness in the Army and Navy is that of picked men, who were selected for the services as being of sound constitution, and who are in what should be the best working years of life; and, if it includes many cases of sickness for only a day or two, it excludes nearly all cases of more than a few months, such as make up a heavy proportion of the average sickness in the Friendly Societies and in the general population. And I may add that the estimates from these societies, that nine days in the year may justly be thought a fair estimate of the working time lost by sickness, is confirmed by the records of sickness among the 10,000 members of the Metropolitan Police Force; for among these, including cases of long illness, such as are also in the societies, the average is more than nine days in the year.

I think, then, that we cannot escape from the reasons to believe that we lose in England and Wales, every year, in consequence of sickness, 20,000,000 of weeks' work; or, say, as much work as 20,000,000 of healthy people would do in a week.

The number is not easily grasped by the mind. It is equal to about one-fortieth part of the work done in each year by the whole population between fifteen and sixty-five years old. Or, try to think of it in money. Rather more than half of it is lost by those whom the Registrar-General names the domestic, the agricultural, and the industrial classes. These are rather more than seven millions and a half in number, and they lose about 11,000,000 of weeks; say, for easy reckoning, at a pound a week; and here is a loss of £11,000,000 sterling from what should be the annual wealth of the country. For the other classes, who are estimated as losing the other 9,000,000 weeks' work, it would be hard and unfair to make a guess in any known coin; for these include our great merchants, our judges and lawyers and medical men, our statesmen and chief legislators; they include our poets and writers of all kinds, musicians, painters, and philosophers; and our princes, who certainly do more for the wealth and welfare of the country than can be told in money.

Before I speak of any other losses of work or of wealth due to sickness, permit me, as in parenthesis, to point out to you how very imperfectly these losses are told or even suggested by our bills of mortality. These, on which almost alone we have to rely for knowing the national health—these tell the losses of life; and more than misery enough they tell of; but to estimate rightly the misery of sickness and the losses of all but life that are due to it, we need a far more complete record than these can give.

Take, for example, such a disease as typhoid fever—that which Mr. Huxley has rightly called the scourge and the disgrace of our country. It has of late destroyed in England and Wales, among persons in the working time of life, nearly 4000 in the year. Its mortality is about 15 per cent.; so that if, in any year, 4000 die of it, about 23,000 recover from it. Of these the average length of illness is, on the authority of Dr. Broadbent, about ten weeks. Here, therefore, from one disease alone, and that preventable, we have an annual loss of 230,000 weeks' work, without reckoning what is lost with those who die. And the same may be said of nearly all the diseases that are most prominent in the bills of mortality. The record of deaths, sad as it is, tells but a small part of the losses of happiness and welfare that are due to sickness. It is as if, in a great war, we should have a regular return of the numbers killed, but none of the numbers wounded, though these, more than the killed, may determine the issue of the war.

Let me now tell of another loss of work and of money through sickness and early death. In all the estimates I have yet referred to, no account is taken of those who are ill, or die, before they are fifteen years old. They are not reckoned as in the working time of life, though in some classes many thousands of them are; in the domestic, agricultural and industrial classes of the Registrar-General, nearly half a million of them are included, and yet the losses of work due to sickness among children must be very large. Consider the time which might be spent in good productive work, if it were not spent in taking care of them while they are ill. Consider, too, the number of those who, through disease in childhood, are made more susceptible of disease in later life, or are crippled, or in some way permanently damaged; such as those who become deaf in scarlet fever, or deformed in scrofula or rickets, or feeble and constantly invalid, so that they are never fit for more than half work, or for work which is only half well done. These losses cannot be counted, but they must be large, and there are others more nearly within reckoning—the losses, namely, which are due to the deaths of those who die young. It may justly be said that all that they have cost during their lives is so much money sunk, so much capital invested and lost. If they had lived to work their earnings would have been more than sufficient to repay it; but they have died, and their cost is gone without return. The mortality of children under fifteen in 1882, was nearly a quarter of a million. What have they cost? If you say only £8 a piece, there are more than £2,000,000 sterling thus lost every year. But they have cost much more than this, and much more still is lost by the loss of the work they might have lived to do.

It is, indeed, held, I believe, by some that these things should not be counted as losses; that we have a surplus of population, and that really the deaths of children, though they may be the subjects of a sentimental sorrow, cannot reasonably be regretted. I cannot bring myself to admit that such a thing should even be argued. I have lived long in the work of a profession which holds that wherever there is human life it must be preserved—made happy, if that can be, but in any case, if possible, preserved—and no argument of expediency shall ever make me believe that this is wrong. Indeed, I am rather ashamed—even for the purpose that I have in view—to use so low an argument as that of expediency in favour of the saving of health and of life. I am ashamed of making money appear as a motive for doing things for which sufficient motives might be found in charity and sympathy, and the happiness of using useful knowledge; but it seems certain that these are not yet enough for all that should be done for the promotion of the national health; therefore it seems well to add to them any motives that are not dishonourable; and so I add this, that we lose largely, not only in happiness, but in wealth, by the deaths of these poor children.

I will add only one more illustration of these losses, which is always suggested by looking at tables of mortality. The deaths of persons between twenty-five and forty-five years old, that is, during what may be deemed the twenty best working years of life, are annually between 60,000 and 70,000; in 1882 they were 66,000. Think, now, of the work lost by these deaths; and of how much of it might have been saved by better sanitary provisions. If one looks at the causes of their deaths it is certain that many might have been prevented, or, at least, deferred. Say that they might have lived an average of two years more, and we should have had in this year and last an increase of work equivalent to that of, at least, 6,000,000 weeks; as much, in other words, as 6,000,000 people could do in one week.

More instances of losses of work by sickness and premature death might easily be given, but not easily listened to in this huge hall. Let these suffice to show something of our enormous annual loss, not only of personal and domestic happiness—that is past imagining—but of national power and wealth. Surely we ought to strive more against it.

But, some may ask, can these things be prevented? Are they not inevitable consequences of the manner of life in which we choose or are compelled to live? No; certainly they are not. No one who lives among the sick can doubt that a very large proportion of the sickness and the loss of work which he sees might have been prevented; or can doubt that, in every succeeding generation, a larger proportion still may be averted, if only men will strive that it may be so.

Let me enumerate some of the chief sources of the waste, as they appear to oneself in practice.

Of the infectious fevers, small-pox might be rendered nearly harmless by complete and careful vaccination. Typhus and typhoid, scarlet fever and measles, might, with proper guards against infection, be confined within very narrow limits. So, probably, might whooping-cough and diphtheria.

Of the special diseases of artizans there are very few of which the causes might not be almost wholly set aside. Of the accidents to which they are especially liable, the greater part, by far, are due to carelessness.

Of the diseases due to bad food and mere filth; to intemperance; to immorality; in so far as these are self-induced, they might, by self-control and virtue, be excluded. And with these, scrofula, rickets, scurvy, and all the wide-spread defects related to them, might be greatly diminished.

It can only be a guess—but I am sure it is not a reckless one—if I say, that of all the losses of work of which I have spoken, of all the millions of weeks sadly spent and sadly wasted, a fourth part might have been saved, and that henceforth, if people will have it so, a still larger proportion may be saved.

We may become the more sure of what may be done by looking at what has been done already. Let me show some of it; it will be a relief to see something of the brighter side of this picture.

In a remarkable paper lately read before the Statistical

Society, Dr. Longstaff says:—"One of the most striking facts of the day, from the statistician's point of view, is the remarkably low death-rate that has prevailed in this country during the last eight years." In these years, the annual death-rate has been less than in the previous eight years in the proportion of two deaths to every 1000 persons living. The average number of deaths has been 50,000 less in the last than in the previous eight years. Doubtless many things have contributed to this grand result, and it is not possible to say how much is due to each of them; but it would be unreasonable to doubt that the chief good influence has been in all the improved means for the care of health which recent years have produced. This is made nearly certain by the fact that the largest gains of life have been in the diminution of the deaths from fever, and of the deaths in children under fifteen years old; for these are the very classes on which good sanitary measures would have most influence.

The annual number of deaths from typhus, typhoid, and the unnamed fevers, has been about 11,000 less than it was about twenty years ago. The annual number of deaths of children under five years old has been about 22,000 less than it was; and that of children between five and fifteen has been upwards of 8000 less.

These are large results, and though they tell of only deaths, yet they bear on the chief subject I have brought before you—the working power of the nation; for, however much we might assign to improved methods of medical treatment of fever, yet the diminished number of deaths means a very large diminution in the total number of cases. The deaths during the working years of life were 6500 less; and, this being so, we may hold that, if the average mortality was, say, 25 per cent., the diminution in the total number of cases must have been at least 25,000; and if we may believe, as before, that each of these involved ten weeks of sickness, we have, in these fevers alone, a clear saving of 185,000 weeks' work in every year.

And so, with the diminution of the mortality among children, there must have been a greater diminution in the number of costly and work-wasting illnesses, and a large saving of money that would otherwise have been sunk. And not only so, but many of the children saved in the last eight years will become bread-winners or care-keepers; and who can tell what some of them will become? or what the world would have lost if it had lost them?

Let me add only one more reckoning. In a paper last year, at the Statistical Society, Mr. Noel Humphreys said "that if the English death-rate should continue at the low average of the five years 1876–80, the mean duration of male life in this country would be increased by two years, and that of female life by no less than 3·4 years, as compared with the English life-table." And he showed further that, "among males, 70 per cent., and among females, 65 per cent., of this increased life would be lived between the ages of twenty and sixty years, or during the most useful period."

I should like to be able to tell the value in working power of such an addition to our lives. It is equal to an addition of more than 4 per cent. to the annual value of all the industry, mental and material, of the country.

But, some will say, admitting that it is desirable, though seeing how keen the struggle for maintenance already is, can more than this be done? and the answer may be and must be, much more. In this, as in every case of the kind, every fruit of knowledge brings us within reach of something more. While men are exercising the knowledge they possess, they may be always gaining better. This Exhibition has scores of things which are better helps to national health than those of the same kind which we had twenty years ago, and with which the gains already made were won. If I were not in near official relation with the jurors, I would name some of them; there are truly splendid works among them.

But do not let me seem to disparage the past in praising the present. It is difficult to speak with gratitude enough of what has been done, even though we may now see ways to the yet better.

Anyone who has studied the sources of disease during the last thirty years can tell how and where it has been diminished. There is less from intemperance, less from immorality; we have better, cheaper, and more various food; far more and cheaper clothing; far more and healthier recreations. We have, on the whole, better houses and better drains; better water and air, and better ways of using them. The care and skill with which the sick are treated in hospitals, infirmaries, and even private houses, are far greater than they were; the improvement and extension of nursing are more than can be described; the care which the rich bestow on the poor whom they visit in their own homes, is every day saving health and life; and even more effectual than any of these is the work done by the medical officers of health and all the sanitary authorities now active and influential in every part of the kingdom.

But good as all this work has been, we may be sure it may become better. The forces which have impelled it may still be relied on. We need not fear that charity will become cool, or philanthropy inactive, or that the hatred of evil will become indifference. Science will not cease to search for knowledge, or to make it useful when she can; we shall not see less than we do now, and here, of the good results of enterprise and rivalry, or of the sense of duty, or of the sorrow for shame that there should be these evils in the land.

What more, then, it may be asked, is wanted? I answer, that which I have tried to stir; a larger and more practical recognition of the value and happiness of good national health; a wider study and practice of all the methods of promoting it; or, at least, a more ready and liberal help to those who are striving to promote it. In one sentence, we want the complete fulfilment of the design of this Exhibition, with all the means towards health and knowledge that are shown in it, and with its hand-books, lectures, conferences, and the guidance which will be given by the verdicts of its juries.

We want more ambition for renown in health. I should like to see a personal ambition for renown in health as keen as is that for bravery, or for beauty, or for success in our athletic games and field-sports. I wish there were such an ambition for the most perfect national health as there is for national renown in war, or in art, or commerce. And let me end soon by briefly saying what I think such health should be.

I spoke of the pattern healthy man as one who can do his work vigorously wherever and whatever it may be. The union of strength with a comparative indifference to the external conditions of life, and a ready self-adjustment to their changes, is a distinctive characteristic of the best health. He should not be deemed thoroughly healthy who is made better or worse, more or less fit for work, by every change of weather or of food; nor he who, in order that he may do his work, is bound to exact rules of living. It is good to observe rules, and to many they are absolutely necessary; but it is better to need very few besides those of moderation and cleanliness, and, observing these, to be able and willing to live and work hard in the widest variations of food, air, clothing, and all the other sustenances of life.

And this, which is a sign of the best personal health, is essential to the best national health. For in a great nation, distributed among its people, there should be powers suited to the greatest possible variety of work. No form or depth of knowledge should be beyond the attainment of some among them: no art should be beyond its reach; it should be excellent in every form of work. And, that its various powers may have free exercise and influence in the world, it must have, besides, distributed among its people, abilities to live healthily wherever work must be or can be done.

Herein is the essential bond between health and education; herein is one of the motives for the combination of the two within the purpose of this one Exhibition. I do not know whether health or knowledge contributes most to the prosperity of a nation; but no nation can prosper which does not equally promote both; they should be deemed twin forces, for either of them without the other has only half the power for good that it should have.

It is said, whether as fact or fable, that the pursuit of science and of all the higher learning followed on the first exercise of the humanity which spared the lives of sick and weakly children; for that these children being allowed to live, though unfit for war or self-maintenance, became thinkers and inventors. But science and art are not dependent upon invalids; minds are not the more free or the better now for having to work in feeble bodies; each nation needs for its full international influence both health and knowledge, and such various and variable health, that there should be few places on earth or water in which some of its people cannot live, and multiply, and be prosperous.

If, therefore, we or any other people are to continue, ambitious for the extension of that higher mental power of which we boast, or for the success of the bold spirit of enterprise with which we seek to replenish the earth and subdue it; if we desire that the lessons of Christianity and of true civilization should be spread over the world, we must strive for an abundance of this national health, tough, pliant, and elastic, ready and fit for any good work anywhere.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The annual general meeting of the above Association was held at 53, Conduit Street, on May 14.

The report of the past session was read and adopted. It stated that the Association then numbered ten honorary, and sixty-one ordinary members, twelve new members having been enrolled during the session. Twenty-three meetings had been held during the past session, including five social and musical evenings. The largest attendances had been 31, 31, 30, 28 and 24, the aggregate 417, showing an average of 18. Sixteen papers on different subjects had been read, notices of which have from time to time already appeared in this Journal. The social evenings had continued to be a marked success. The annual dinner, held as usual at the Holborn Restaurant, under the presidency of Mr. S. R. Atkins, had been very largely attended. The Council, in the hope of increasing the usefulness of the Association, and augmenting the advantage of membership, had, during the past session, subscribed to Mudie's library, and subject to certain rules, had supplied all kinds of books obtainable from that library, other than works of fiction. In conclusion the Council expressed its gratitude to the authors of papers, to donors to the funds of the Association, and to the large body of the trade generally, who had shown their kindly feeling towards and interest in the Association.

The report having been read, the following gentlemen were elected members of the Council for the esuing session:—Messrs. Parkinson, Hadfield, Winfrey, Millhouse, Braithwaite, Williams, Cracknell, Burnett, Dodd, Cunningham, Baily, Flintan, Perkins and Flint.

The balance sheet for the past year was then accepted, and the meeting adjourned.

CONFERENCE OF INSPECTORS OF WEIGHTS AND MEASURES.

The annual conference of the British Association of Inspectors of Weights and Measures was opened at Glasgow on Tuesday morning, the members assembling in one of the halls in the Christian Institute. There was a numerous and representative attendance. Bailie Fullerton, of Greenock, was called upon to preside over the opening proceedings.

The Chairman said this was the first occasion on which the Association had met in Glasgow, and he believed that the interests which it sought to advance could not fail to recommend it to the general public of the West of Scotland. A desire to see the national system of weights and measures brought to a high state of perfection, and an anxiety to promote the enactment of such imperial statutes or corporation bye-laws as were most likely to secure just dealing, and leave no loophole for fraud, was surely a laudable ambition for this or any other society to have in view. At last year's meeting at Sheffield some time was occupied in discussing the Weights and Measures Act of 1878, and a number of suggestions of a valuable nature were discussed and submitted for the consideration of the Board of Trade. He trusted that the outcome of the deliberations during the present meeting of the Association would tend to the rectification of any abuses in connection with the Weights and Measures Act, and lead to improved legislation on the question, and that the proceedings would meet with the approbation of the country at large.

The report of the Committee, read by the Secretary, stated that the past year had not furnished anything very striking with regard to weights and measures. It must be apparent to anyone who had any experience of the working of the Weights and Measures Act how few local authorities attached that importance to it which the matter deserved; and unfortunately what was true of the local authorities was to a certain extent true of many inspectors. With a view of trying to create a more lively and genuine interest in the question of weights and measures, the Committee had issued information on the subject to others than members of the Association, in the hope that the seed thus sown might bear fruit at no very distant day. During the year the Committee, it was reported, had forwarded resolutions to the Board of Trade against legalizing a new standard weight of 112 lb., and in favour of the inspection of Post Office scales and weights by duly authorized inspectors. The membership at present was as follows:—30 ordinary, 18 extraordinary and 11 honorary members; or a total of 59, against 53 last year.

Mr. W. H. Hopkins, Treasurer, submitted the financial statement of the Association's position. The income was stated at £76 0*s*. 9*d*., and after meeting the expenditure a balance of £30 8*s*. remained, that sum being £3 4*s*. 9*d*. less than the sum the Association began the previous year with. This, it was explained, was only an apparent falling off, as subscriptions to the amount of £30 were still to be paid.

Mr. J. Hare, Birmingham, moved that Leeds be the next place of meeting. He had been desirous that London should have been chosen rather—they had many prejudices to attack there at headquarters—but Leeds was a place of very great importance.

Mr. Shaw, Edinburgh, seconded the proposal, and it was unanimously adopted.

Mr .William Scott Brown (Manchester) was then re-elected President for the ensuing year. Alderman Chunley was re-elected Vice-President, and the Treasurer, Secretary, Committee and Auditors were afterwards appointed

Opposition to the Proposed 112 *lbs. Weight.*

Mr. Walker (Glasgow) laid before the Association a motion to the effect that the members of the British Association of Inspectors of Weights and Measures respectfully submit to the Board of Trade that they do not consider it at all necessary, and certainly not desirable, that a new standard weight of 112 lbs. should be legalized, and for the reasons that it was so near in size to the cental or 100 lbs. weight, and in consequence liable to be used fraudulently; that anyone requiring such a large weight could use the already legalized cental; that if a concession was to be made to one business the Board of Trade could not consistently refuse to grant a special weight to any other business; and that the concessions asked for by the ironmasters, if granted, would destroy the main principle of the Weights and Measures Act, 1878. Mr. Walker's chief objection to the new weight was the increase of the already large number of standard weights—ninety-four being at present in use.

Mr. A. Pickering seconded the motion, and others having spoken in its favour, it was adopted.

The Inspection of Post Office Scales.

Mr. Wimhurst moved that, in the opinion of the meeting, it was not only desirable, but absolutely necessary for the protection of the public, that duly authorized inspectors of weights and measures should be empowered to enter any place where weights and scales were kept and used by the *employés* of the Post Office. Mr. Wimhurst referred to the action of the Post Office authorities in Manchester in securing exemption from inspection by the inspectors of weights and measures. He trusted that the result of the correspondence that had taken place between the Board of Trade and the Post Office would be that the inspectors of weights and measures would be allowed to go into post offices, so that the public would have confidence in these scales.

Mr. Walker seconded the motion, which was ultimately adopted.

Illegal Weights in Government Offices.

Mr. Pickering (Sunderland) proposed that the meeting should call the attention of the Board of Trade to the continued use of the old troy weights in some districts and in Government offices—the latter fact being given as a reason by a magistrate who dismissed a summons for the use of such—and the stamping of new weights of such denominations, which is clearly illegal.

Mr. Walker seconded, and the resolution was agreed to.

Inspectors' Fees.

Mr. Shaw submitted a motion that pleaded for an amendment of the Weights and Measures Act of 1878, to secure compulsory uniformity of fees for the verification and stamping of weights and measures established throughout the United Kingdom, and that legislation should be passed to that effect without unncessary delay. The motion also proposed that a committee of the Association be appointed to present to the Board of Trade a memorial embodying the resolution, and with powers to take all necessary steps to secure an early accomplishment of the object in view.

Mr. Walker seconded the motion, and it was adopted.

The Vagaries of Weights Makers.

Mr. Pickering moved that, in the opinion of the Association, it is highly desirable, for several reasons, that the vagaries which distinguish the manufacture and stamping of ordinary commercial weights should in future be avoided; and that the inspectors, anxious to make progress in this direction, request the Honorary Secretary to address to the manufacturers a friendly communication, asking them to take such steps, either in concert or otherwise, as will give uniformity in the style of stamping the denomination on weights, particularly brass weights, so that adequate room may be left for the stamp of verification, and a greater measure of regularity, neatness and efficiency attained.

Mr. J. Parnall (Bristol) seconded the motion, and it was adopted.

Afternoon Sitting.

At the afternoon sitting Mr. W. H. Hopkins, of Manchester, took the chair at the commencement of the proceedings.

Mr. W. Shaw, of Edinburgh, read a paper entitled "Observations on the Weights and Measures of Apothecaries, and the necessity existing for exactness in comparing and verifying the same." After alluding to the weights and measures in general use for many years, for dispensing medicines, until the new series were legalized in 1879, he spoke at some length upon the suspicious way in which the drug trade looked upon inspectors. Suggestions that had been made by the Board of Trade had turned out to be of no use, as the inspectors had no power to enforce them. At length, in 1880, standards were got, and three months' time was given before any visits were made. No undue haste was shown. however, in carrying out the new regulations. Although about eighteen months were allowed to elapse before he made any visits, he found large numbers of the weights in use in Edinburgh incorrect, some being too heavy and others too light. Some of them were dangerously wrong for dispensing certain kinds of medicines. Measures and balances were also found to be wrong. It was clearly the duty of the inspectors to see that such shops in their districts were visited—not in a persecuting spirit, but to make sure that things were being kept all right.

Mr. Wimhurst read a paper on the 24th, 25th and 29th sections of the Weights and Measures Act, 1878, and the 8th section of the Licensing Act, 1872. He alluded to the use of glass measures by licensed traders, which in several districts had been examined, and orders given to have them sent in and stamped. In one or two towns no action had been taken with regard to glasses marked half-pints, but he thought that inspectors should deal with all kinds of glass measures. It was perhaps not so easy to make a correct glass measure as a pewter one, but since attention had been given to this subject it was astonishing to find the improvement that had taken place in their manufacture. It was distinctly stated in the Act that all quantities of liquids asked for over half a pint should be served in a glass vessel. When customers did not ask for the liquor according to imperial measure they were liable to to be served with smaller quantities. Any glass measure could be made quite accurate by making it a little larger than at present, and putting a line round the rim to indicate how far it should be filled up to give the exact quantity marked upon it. He thought that powers should be given to inspectors to make purchases, and prosecute if the correct quantity was not supplied.

Mr. Richmond referred to a recent prosecution in Glasgow, which went to the Court of Session, when Lord Young dismissed the case, saying that the measures taken away were "local and customary ones,' if not recognized in the Board of Trade list or stamped.

Mr. Walker (Glasgow) explained that the measures complained of, not being imperial ones, could not be verified by the inspector. The attention of the shopkeeper who was using them was called to the circumstance, and he was requested to cease using them, but declined to do so. The measures were then seized and a prosecution raised, but, while the local magistrate convicted, Lord Young dismissed the case, chiefly on account, it was believed, of the way in which the prosecution was conducted.

The Dinner.

In the evening the members of the Association and their friends dined together in Macgregor's Hotel.

Parliamentary and Law Proceedings.

New York State Pharmacy Law.

An Act to establish a Board of Pharmacy and to regulate the practice of pharmacy for all the counties of New York State except New York, Erie, and Kings.

The people of the State of New York, represented in Senate and Assembly, do enact as follows:—

Section 1. There shall be established and created a Board of Pharmacy as follows:

1. Within ninety days after the passage of this Act the New York State Pharmaceutical Association shall

nominate ten pharmacists, residents of the district to which this Act applies, from which number the Governor of the State shall, within twenty days after notice to him of such nomination, appoint five, who shall constitute the Board of Pharmacy.

2. It shall be the duty of each member of the Board of Pharmacy, immediately after the receipt of the notice of his appointment, to appear before the clerk of the county in which he resides, and make and subscribe an oath to properly and faithfully discharge the duties of a member of the said Board of Pharmacy.

3. One of said members shall hold office for one year, one for two years, one for three years, one for four years, and one for five years from the first Tuesday of September, in the year one thousand eight hundred and eighty-four, which term shall be determined by lot at the first meeting of said Board of Pharmacy.

4. The said members of said Board shall meet on the first Tuesday of September, in the year one thousand eight hundred and eighty-four, at the College of Pharmacy building, in the city of Albany at twelve o'clock, noon, of that day, and shall immediately proceed to organize by determining by lot the respective terms for which they shall hold office, and by electing a President, Treasurer, and Secretary, who shall hold their respective offices for the term of one year.

5. The Board shall hold meetings at least once in three months. Three members shall constitute a quorum.

6. The said Board shall have power to make such bye-laws, not inconsistent with the constitution, or the provisions of this Act, as it may deem necessary.

Section 2. It shall be the duty of the Board of Pharmacy—

1. To examine all persons applying for licences under this Act, and to grant licences to such persons as may be entitled to the same.

2. To keep a record of licensed pharmacists.

3. To investigate all complaints of disregard, non-compliance, or violation of the provisions of this Act, and to bring all cases of violation to the notice of the proper prosecuting officers.

Section 3. Any person who at the time of the passage of this Act is carrying on the business of retailing or dispensing drugs, medicines, or poisons, or practising pharmacy on his own account, or who, at the time of the passage of this Act, shall have served five years or upwards at the business of retailing or dispensing drugs, medicines, or poisons or practising pharmacy, and who is over the age of twenty-one years, or any person who holds a certificate of registration as a pharmacist from any Board of Pharmacy legally created under the laws of this State, or any person who holds a diploma as a graduate of any incorporated college of pharmacy of this State, shall be granted a licence by said Board of Pharmacy to practise as a pharmacist upon compliance with the requirements hereinafter stated.

Section 4. Any person entitled to a licence as a pharmacist, as provided for in section 3, who shall not, within ninety days after the organization of the Board of Pharmacy, as herein provided, make a written application to such Board for such licence, accompanied by a written statement signed by him or her and duly verified before an officer authorized to administer oaths within this State, fully setting forth the grounds upon which he or she claims such licence, shall be deemed to have waived his or her right to a licence under the provisions of said section.

Section 5. No licence shall be granted to any person under the provisions of section 3 of this Act unless the applicant pays to said Board of Pharmacy the sum of five dollars.

Section 6. The said Board of Pharmacy shall make such regulations for the examination of applicants for licences and the granting of licences to such applicants and the payment of licence fees as it may deem proper, but no licence fee shall exceed the sum of five dollars.

Section 7. The New York State Pharmaceutical Association shall, annually, after the first Monday in June, in the year eighteen hundred and eighty-four, nominate ten pharmacists, residents of the district to which the Act applies, from which number the Governor shall fill the vacancy annually occurring in the Board, and the person so appointed by the Governor shall hold office for five years. In case of the death, resignation, or removal from the State of any member of the Board before the expiration of his term of office, or in case of vacancy occurring from any other cause but expiration of term of office, the Governor shall fill the vacancy from the list of names nominated as aforesaid during the year in which such vacancy occurs, and the person appointed shall hold for the unexpired term of his predecessor.

Section 8. Every person to whom a licence is granted by said Board of Pharmacy shall display the same in a conspicuous part of the pharmacy in which he or she does business.

Section 9. No licence granted by said Board of Pharmacy shall be revoked except for just and sufficient cause.

Section 10. It shall be unlawful, after the first day of January, in the year one thousand eight hundred and eighty-five, for any person to practise as a pharmacist unless he or she shall have been granted a licence by said Board.

Section 11. Nothing in this Act shall be so construed as to apply to the business of a practitioner of medicine, nor to prevent practitioners of medicine from supplying their patients with such articles as they may deem proper; nor to those who sell medicines and poisons at wholesale; nor to the manufacture or sale of patent or proprietary medicines; nor to the sale of the usual domestic remedies by retail dealers in the rural districts. And nothing in this Act shall be so construed as to prohibit the employment in any pharmacy of apprentices or assistants, for the purpose of being instructed in the practice of pharmacy: but such apprentices or assistants shall not be permitted to prepare and dispense physicians' prescriptions, or to sell or furnish medicines or poisons except in the presence of and under the personal supervision of a licensed pharmacist.

Section 12. All violations of the provisions of this Act shall be deemed misdemeanours and shall be punished as such.

Section 13. This Act shall not apply to the counties of New York, Erie, and Kings.

Section 14. All Acts and parts of Acts inconsistent with the provisions of this Act are hereby repealed.

Section 15. This Act shall take effect immediately.

ANSWERS TO CORRESPONDENTS.

R. H. Burchell.—"Methylated finish" is exempt from payment of duty. But it must contain at least three ounces of shellac, seedlac, sandrac, or colophony dissolved in every gallon; otherwise it can only be sold under licence as methylated spirit.

T. R. D.—The right to use the term "pharmaceutical chemist" is not transferable from one person to another.

J. B.—For a recipe for india rubber cement, see before, p. 600.

E. J. H.—(1) The question has not yet been legally decided. (2) The seller of such a wine would require to hold a wine licence, unless by the manner in which it was advertised it was brought within the scope of the Patent Medicines Act.

D. P.—The Syrupus Ipecacuanhæ, P.G., the formula for which is—Bruised ipecacuanha root, 1 part; macerate for twenty-four hours in spirit (sp. gr. 0·892) 5 parts and water, 40 parts; filter 40 parts and add sugar, 60 parts, to make a syrup and filter cold. All parts by weight.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Wilkinson, Kinninmont, Hutchinson, MacEwan.

INDEX TO VOL. XIV.

(THIRD SERIES.)

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Pharmaceutical Society of Great Britain.

CATALOGUE

OF

ADDITIONS TO THE LIBRARY,

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